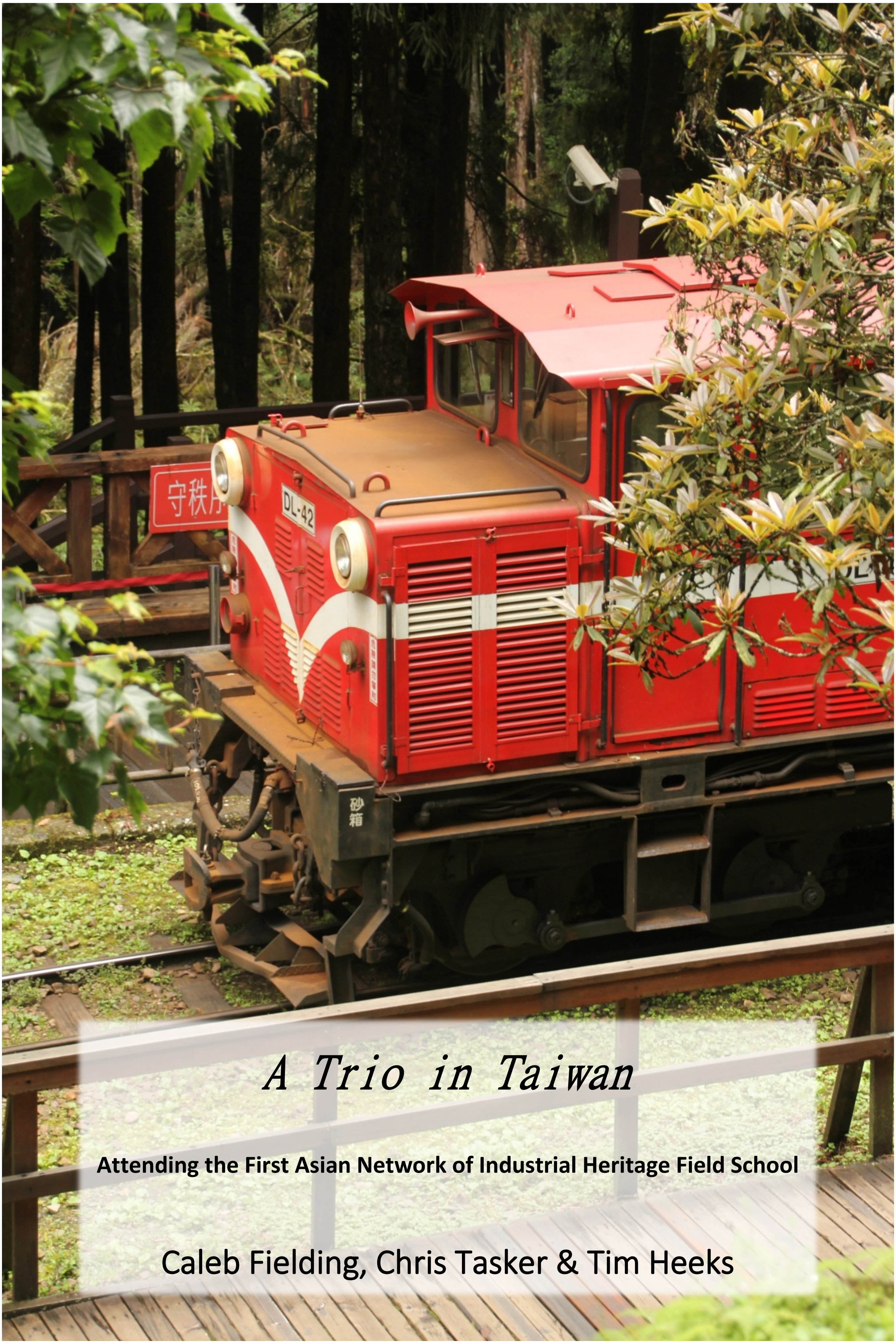


A Trio in Taiwan

Attending the First Asian Network of Industrial Heritage Field School

Caleb Fielding, Chris Tasker & Tim Heeks

1. Executive Summary

Three Puffing Billy volunteers, sponsored by the Puffing Billy Preservation Society, recently travelled to Chaiyi, Taiwan for a 6-day field school. Caleb Fielding, Chris Tasker and Tim Heeks were there by invitation of the Taiwanese Cultural Heritage Bureau.

In this report we aim to convey just a little of the passion and enthusiasm that the presenters radiated, we will talk about things that struck us as the key messages to take away from our time there, and how we see them being relevant and applicable to Puffing Billy in our quest to be the best heritage preserved railway in the world.

Some might say we already are, but the writers felt that their time in Taiwan instilled in them the impression that whilst we do well in many areas, there is still so much more we can achieve, and we need renewed focus and vision to put us on the right path.

We are not going to try and list each and every presentation or experience from the trip, but we will make mention of the ones that particularly struck a chord with us as we take you through our trip.

We have tabulated our key findings and discussed how we feel these can be related to Puffing Billy.

Within the report we show which of these areas for work are relevant to the ETRB and railway management, and which are more suited to the PBPS. We talk about the need for a renewed focus on industrial heritage and local history, with a need to recognise the 'Riga Charter' as a document designed to inform decision making around dynamic preservation.

Also included is an outline of what we see as the Preservation Society's future role within the Puffing Billy family, various focus areas under the general heading of 'Heritage Conscience'.

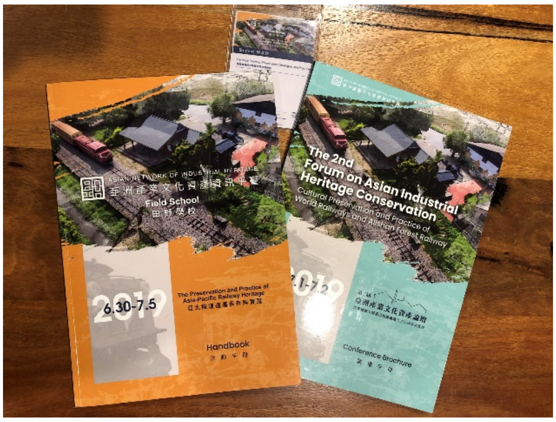
There are key areas where we consider work is critical to ensuring the future success and sustainability of the railway, including a focus on people and the community, sustainability and accessibility, and safeguarding our infrastructure and scenic corridor from unnecessary and inappropriate development.

Finally, we discuss some of the possible next steps; areas where initial discussion should focus.

2. Background

History of The Event

The Field School was part of the 2nd 'Asia-Pacific Forum on Asian Industrial Heritage Conservation'.



Whilst 2019 was the second year for the forum, it was the first year that the Field School was run, being aimed at young railway workers and researchers/students of railway history & heritage, operation and maintenance, with an upper age limit of 45.

Organising Bodies

The forum is part of the **Asian Network of Industrial Heritage** (**ANIH**) organised by **The International Committee for The Conservation of The Industrial Heritage** (**TICCIH**). This year it was hosted by the Taiwanese Ministry of Culture, Taiwanese Bureau of Cultural Heritage and the Alishan Forest Railway & Cultural Heritage Office.

3. Why Alishan?

A brief History

This year's theme was 'Railway" and The Alishan Forest Railway has just been titled Taiwan's premier cultural heritage site, with the Taiwanese having long term designs on UNESCO world heritage status.

The Alishan Forest Railway was built under the Japanese occupation of Taiwan, finally being completed and opened to traffic in 1912. For more on the line's history, see Appendix 1.

The line which, including branch lines, is 86km long, has 77 bridges, 50 tunnels, 2 turning triangles, and several ‘Z’ reversing stations, was operated by a fleet of 20 Lima, USA built Shay locomotives, known for their slow speed but significant pulling power over steeply grade, sharply curved track. This is significant when you realise that the Alishan Railway climbs from 30m above sea level in Chaiyi to an altitude of 2200 m over its length.

4. What were we there for?

The subject of the field school was *‘Implementation of the spirit of the **Riga Charter** and its effect on the sustainable future of the* **Alishan Forest Railway***’* or, more specifically:

“The Preservation and Practice of Asia-Pacific Railway Heritage by taking the preservation, maintenance and management of Alishan Forest Railway as the example”

5. Riga Charter

First off though, what is the **Riga Charter**, and why does it apply to heritage railways?

A simple definition: “The **Riga Charter on Authenticity and Historical Reconstruction in Relationship to Cultural Heritage**, known simply as the **Riga Charter**, is an international charter or a statement of the scope, objectives and participants in cultural heritage projects, which guides the conservation, restoration, maintenance, repair and use of **historic railway equipment**, which can still be operated. (Thanks Wikipedia!)

The Riga Charter has its origins in the **Venice charter** written in the 1960’s; **The Burra Charter** also reflects the philosophy of the Venice Charter, but was written in a way which would be practical for application in **Australia**.

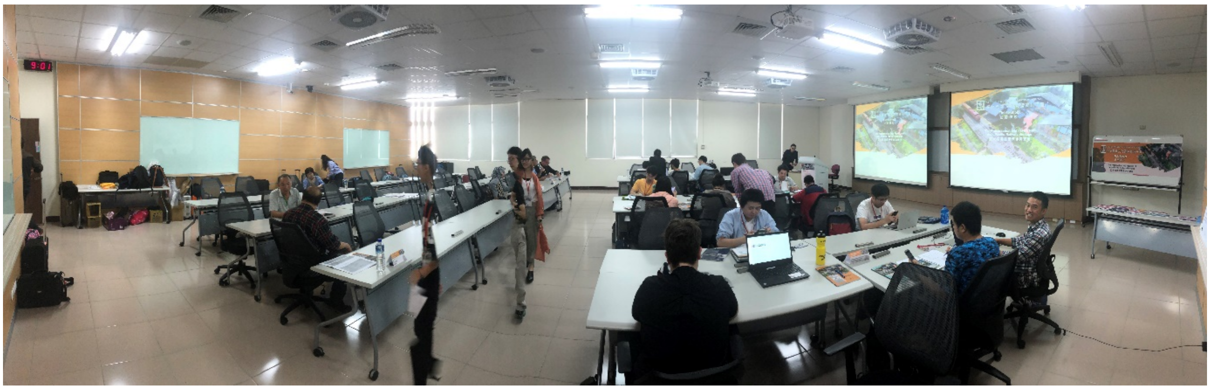
Made up of 12 articles which are designed to guide decisions relating to heritage railways, ensuring they remain to be enjoyed by future generations, the **Riga Charter** can be found in Appendix 2.

6. An Overview of the Week

Arriving early on Saturday, we faced 6 long, gruelling days of lectures, workshops, discussions and chopstick practise, alongside people of similar ages and interests, creating a fully immersive environment of heritage railways and all that they entail. It’s a hard life!

The timetable was divided up into:

- *2.5 days of lectures & workshops*
- *2 days exploring the* **Alishan Forest Railway**
- *1.5 days attending the Official Forum presentations*



Arriving on the first day, we were divided into 3 groups, and each was tasked with merging what we were learning through the week with our previous experience to create a presentation to be given at the end of the week.

The groups were given individual areas to report on:

- *Group 1 – Heritage Railways Preservation Strategies and Practices (***Caleb & Tim***).*
- *Group 2 – Marketing & Operations of Heritage Railways*
- *Group 3 - Alishan Forest Railway's Cultural Values and Developments (***Chris***, as team leader).*

7. The Presentations

Over the course of the week we enjoyed over 20 presentation given by experts in the field of railway cultural and industrial heritage from all over the world, and it was a privilege not only that they were prepared to share their knowledge and experience with us is such a passionate and enthusiastic way but also that they were happy to take the time to chat with us and offer advice throughout the week.

It would perhaps be a little ambitious to try and talk about everything from the 6 days, but the following presentations - which can be found in the appendices - are a few that really stood out:

- *The Preservation Context & Value Practice of Railway Heritage – Ming-Hsun Hsieh*
- *Alishan as Industrial World Heritage – Paul Mahoney*
- *Railway Heritage of Indonesia – Hasti Tarekat Dipowijoyo*
- *The Heritage of the Darjeeling Himalayan Railway - When a Train Climbs a Mountain - Vinita Srivastava*
- *Operation Management & Safety Maintenance Mechanism of Kurobe Gorge Railway - Maeyama Masami*
- *The Conservation & Development of Railway Station Buildings as Historical & Architectural Heritage of Thailand - Parinya Chukaew*
- *Dynamic Preservation and application of Alishan Forest Railway – full 360-degree view record - Shih-Chuan Huang*
  Link to YouTube video: https://www.youtube.com/watch?v=3XjYR0C2uh8&feature=youtu.be
- *Experience on Young Volunteers participating in Railway Cultural Heritage Promotion - Chih-Ting Lin*

8. The Alishan Forest Railway – Part 1

Garage Park & Repair Workshops

On Tuesday afternoon we travelled by bus into Chaiyi city centre, and visited the Alishan Garage Park, Beimen repair workshops and the Chaiyi lumber mill.

These and other facilities form one large railway & heritage complex around the garage park, which is pretty much what it sounds like, a park with trains parked in it!

Shays (SL), diesel locomotives (DL), carriages, wagons and railcars abound, with plenty of seating, interpretation and greenery.

We weren't allowed inside the repair workshops, perhaps because we didn't have the hard hats which seem to be de rigueur for anyone working on Taiwanese railways!

Chaiyi Lumber Mill

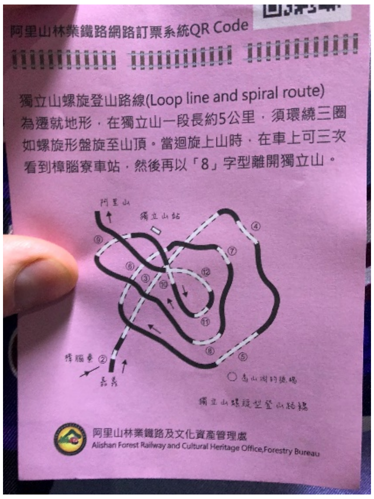
The lumber mill included a tour given by a volunteer guide with megaphone and headsets for interpretation. There is an amazing interpretive mural, displays of existing parts, and recreation of typical examples of track and wagons, timber ponds, cranes, and the incredible recreation of mill buildings with attention to detail that was second to none.

9. The Alishan Forest Railway – Part 2

Wednesday morning, we were up bright and early and on a bus back into Chaiyi; the destination this time was **Beimen Station**.

Our special train was made up of a diesel loco (DL) propelling a rake of modern carriages, fitted with big heater/air con units all running from head-end (well, tail-end) power.

The first 15 kilometres of the line barely rises more than 30m above sea level – much of it close to houses and other building developments – but after that the climbing really starts.



Train up to Jhangnaoliao Station – Our first stop, were we were sidelined to let the service train pass. After walking up to a viewing area we watched the service train climb the Dulishan mountain spirals. It's 11 tunnels and 3 loops demonstrate the remarkable scale of the civil engineering which makes the line unique.

Train to Shueisheliao Station – A short stop, where we received a presentation on the unique bat colonies of the area, some of which have settled in the many abandoned tunnels of the Alishan Line (Tunnels are semi-regularly caved in, flooded or damaged beyond repair and rebuilt following extreme weather events).

Train to Shi tzu lu – Terminus of the current line due to damage from Typhoon Morakot, with one major tunnel in need of complete replacement on a new course. Lunch up on the viewing platform, followed by networking with some of the VIP's, sampling local tea, and a walk up to one of the tunnels. Included in the guide's description was the local tunnel walking technique, where pairs of workers would walk on a rail each through the dark tunnels, arms round each other's shoulders to steady themselves!

Bus to Alishan – Taking a Bus up past the damaged line to Alishan, we walked to one of the many exceptionally large trees the area is known for. The 1.6km walk was along an out of use branch line, completely rebuilt to operating standards including sidings and a platform, but not used and kept as a living museum of railway infrastructure. Included was a large wooden bridge, and several sets of points.

Bus to Alishan Gou Hotel – Following our walk over the line, we checked into accommodation and ate dinner with the VIPs. Beer appeared from nowhere, and we toasted with our Taiwanese hosts who went table to table cheering everyone! Although a planned part of the trip, most people decided against taking the 4am Sunrise train due to the weather so we enjoyed some much-needed sleep until 7am.

10. The Alishan Forest Railway – Part 3

Walk to Zhaoping Station Walking from our hotel, the guide spoke about Station and surrounds in Mandarin while we listened through our interpreter headsets. The station featured a huge exhibition on Alishan's sister railways – fantastic to see the value they place on their relationships with sister railways. Signed agreements for each sister relationship were displayed in glass cases, and beautiful signs showed artistic blending of the railways together.

We then enjoyed a ride to Alishan station behind Shay #31 which, though only in light steam (the diesel behind did all the work), was still a great experience. We rode in beautifully varnished cedar carriages (including the seats, sadly not covered with cushions) and soaked up the atmosphere.

On arrival in Alishan, the train continued into the depot where there were photo opportunities galore, and where we were able to view the locomotive in detail. Burning coal is not permitted in the county, and frowned upon in the Alishan National Park, and so the locomotive was oil fired. Unusually, this was accomplished with an industrial package burner, using a diesel generator in the former coal bunker to run the computer control system which, as well as the fire, also automatically monitored and adjusted water and steam levels!

Train to Sacred Tree Station – Another ride to a new station, we visited a mural to the sacred trees followed by a forest walk to visit some of the largest trees in the Alishan mountains. This walk was entirely on boardwalk, meaning the beautiful environment remains undisturbed as you gaze in awe at trees which are 3000-4000 years old. Our minds were blown trying to imagine what they must have seen in their lifetime!

Train to Erwanping - The view here was breathtaking, an unbelievable example of civil engineering as well as beauty. It contained a triangle for turning engines, as this was where the 28T shays were exchanged for 18T shays. We had a brief look at the nearby timber yard where newly harvested timber was being held. We ate lunch and enjoyed a few nice speeches to end our time with the VIPs before they headed for Taipei.

Bus back to the CPC training center - A long bus ride back down the mountain ensued, followed by a quick rest and final work on our group presentations. After completing our work, we went out for a last look at Chaiyi at night, including the fabulous night market. The end of a wonderful trip was celebrated over a few beers with some of our colleagues, and we went to sleep very late.

11. Final Presentations

After a few final presentations from guest lecturers, each group gave a final presentation. Tim & Caleb's group presented on ***'Heritage Railways Preservation Strategies and Practices'***, focusing on preservation and its relationship to the Riga Charter. Tim spoke on the complexities of dynamic steam preservation, given the competing goals of safety and reliability and heritage and cultural preservation. Caleb spoke on the complexities of the law, with reference to the lack of a legal framework in Taiwan for volunteer operation and certification for railways. Chris's group presented on ***'Alishan Forest Railway's Cultural Values and Developments'***.

After feedback from the field school leaders we said our goodbyes, inviting many of our new friends to visit Puffing Billy and experience what we had to offer. We gifted our copies of ***Saving Puffing Billy 1955-1965*** to our group mentors Osweder Kuo (Alishan Steam and Diesel Driver) & Sheng-Kun Chang, and Field School director Gwo-Long Shih.

12. Taipei

Following the conference end, we caught the high-speed rail back to Taipei for a couple of days sightseeing. Saturday morning Chris and Tim went for a run along the river – Impressive flood defences and small interpretation areas within the city.

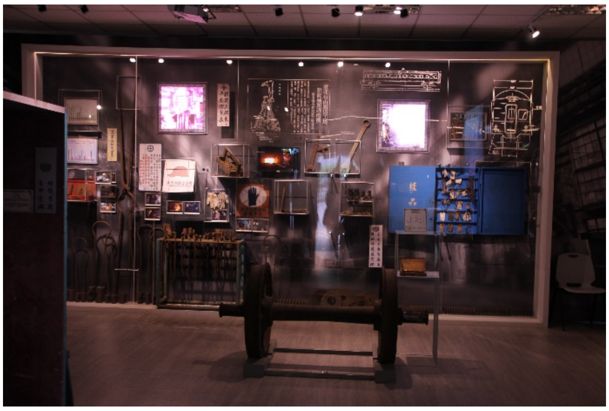
Tours of the Taipei Railway Workshops were all booked according to the website, but we thought it would be worth going to have a look anyway. A small exhibition at the front desk gave us the chance to chat to the museum project manager, who, upon hearing why we were in Taiwan, added our names to the next tour FOC. After inhaling a MOS burger we were good to go!

Amazing to see what can be done with an historic industrial facility like this. The Taiwanese, quite rightly, realised that heritage railway workshop facilities are not suited to maintaining modern trains. Rather than destroying what was there whilst trying to make it work, they chose to create a brand-new state-of-the-art facility somewhere else and leave this site as a museum for education and interpretation. A big win for cultural and industrial heritage!

Much of the tour was focused on the buildings, which were of beautiful 1930’s design with ornate ironwork. The complex was highly contextualised, with figures set up at machines and various other points demonstrating life in the workshops (including one with a bike, their preferred transport around the enormous complex!).



The “Assembling Trains” exhibition was amazing, so much detail and so well put together. Only one room but it kept us occupied for well over an hour! Particularly excellent were the stories on the wall, which were testimonials from retire career workers discussing life at the facility, including such things as the social life and daily rituals which made the place feel like home. It was here we realised the Taiwanese have a true reverence for their history and cultural heritage and consider it a responsibility to preserve and share it with both tourists and future generations.



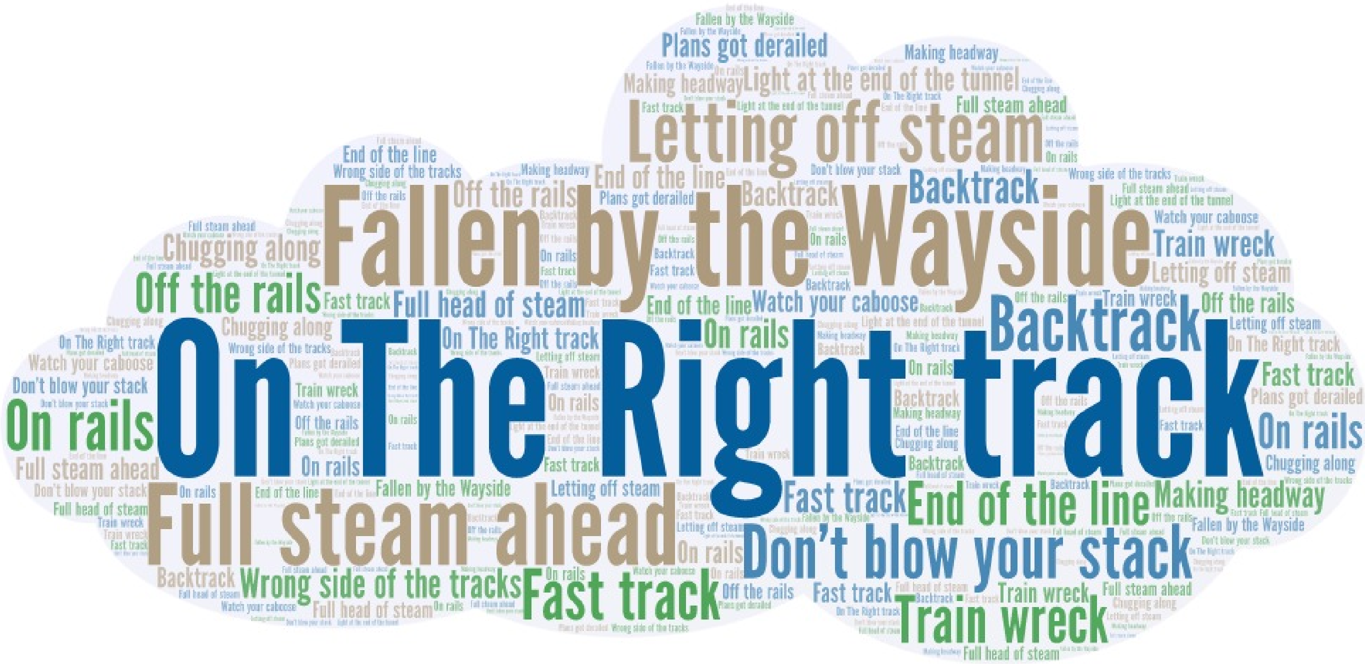

13. What Did We Get from This Trip?

Other than a fantastic overseas trip, dripping with culture and railways, we learnt an awful lot.....

Key Messages

From our many photos, pages of notes and discussions, we managed to distill everything down into 7 key areas. There are many overlaps, and some ideas appear relevant to more than one area because they are equally critical to the success of each.

The Train as a Metaphor for Life



"The train, if it could talk to us, would be reticent to boast, but rightly proud of its contributions to man's inextinguishable need to move, to explore, and to change. Yet it would know that mans need for more speed has been won by carriers that are not landlocked but can fly over the mountains that the train once had to conquer one mountaintop after another.

Yet on dark nights such as this, men of a certain age, watching and listening as the huge behemoth of his youth rolls by, can't help it if a tear forms in the corner of his eye as the whistle fades in the distance. Train and man unwilling to let go, unwilling to take that next step that eradicates all those lovely memories."

People

*"The Most Beautiful Scenery is **People**"*

"How to better connect to modern urban living so as to boost community participation"

By far the most important element of the development and growth of railways throughout the world are the personalities that persevered to see that localities got their railways, the communities that the railways supported and in turn supported the railways, and the pioneers of industry and economic development.

Key Messages	*Application to Puffing Billy*
• Focus more on the connection between the railway and the community	• *Community Liaison training*
• Community/Locals days	• *Locals day/open house, opportunity for people to find out what we do, what the organisation is about and how they can play a part in our future*
• Involvement in local parades & festivals	• *Puffing Billy stands/activities at local events, parades and festivals such as Pave, Funfest, Lantern parade, local community markets and events. Not primarily aimed at recruiting or marketing, but to build awareness and relationships.*
• Work on projects with community groups	• *Involve community groups, schools and TAFE's in railway projects; station makeovers, environmental works and heritage restoration/recreation projects.*
• Support the local community; schools, businesses etc.	• *Policy of purchasing locally* • *Cross-promotion partnerships with local businesses*
• Closer coordination and interaction with allied tourism attractions	• *Shared User Paths – bike hire/bike train opportunities* • *Forest adventures in Sherbrook Forest, Wright Forest, Bunyip State Park/Kirth Kiln etc* • *RidgeWalk connection* • *Identify other opportunities- particularly at Cockatoo, Wright, Fielder, Emerald* • *Heritage precinct from Emerald to Lakeside along paths, with interpretation trail; stops at Emerald Museum, local Cafés, Packing Shed as a gallery/tearoom*

Connects to **'Interpretation'** and **'Collaboration'** sections for more on telling the story of the local area, people and communities and relationships with local/community interaction.

Interpretation - Telling the Stories of Our Cultural Heritage

"The past is like a foreign country"

How do we engage people and inform them of our rich social and industrial heritage, creating a legacy which can be passed down to future generations to appreciate?

What are the stories we need to tell?

Key Messages	*Application to Puffing Billy*
• Why was it built – Filling a need	• *Railway expansion and the narrow-gauge experiment* • *Opening up the land* • *Making it accessible* • *Providing a means of transport for people, goods etc*
• Communities and Characters	• *Railway at War* • *Stories of railway employees/volunteers (Nick Anchen books, PBPS and Mike McCarthy Interviews)*
• Heritage railway; still filling a need, but a new one.	• *Puffing Billy is still doing what it did pre-preservation, carrying tourists through beautiful countryside* • *Tourism* • *Preservation Era*
• History & Background – Before the Railway	• *Aboriginal history before Europeans* • *First roads*

How do we tell these stories, in such a way as to engage, educate and inspire our visitors?

Key Messages	*Application to Puffing Billy*
• From the human/community perspective	• *Many more information boards/signs (multi-lingual)*
• Using actual heritage assets/artefacts	• *Rolling Stock, trolleys, tools and equipment, but also the intangible; language, systems, processes.*
• Through the use of technology: • Holograms • Light shows • Augmented reality • Signage • Wayfinding • Audio/video – Recordings of the actual people telling stories • Nodes/geo-location with apps and push notifications	• *Augmented Reality exhibition of significant heritage sites* • *Hologram/Light shows at significant sites* • *Nodes at significant sites that push notifications* • *Night train potential for sound and light/holograms etc* • *Statues/People used for interpretation doing what they did….* • *Include A/V presentations e.g. videos of people actually telling the stories, or recordings of songs etc* • *Invite Young Volunteers to undertake the interviews – will help with the transfer of information to the newer generation and they have an enthusiasm for the subject* • *Placemaking – remember the locations for the right reasons, each station or location has a unique narrative & identity - Links to the community* • ***Take care not to distract from the experience!***

• Premium products:
  • Tour Guides – language options, see **Education**
  • Heritage train experiences
  • Museums & discovery centres
	• *Increased Conductor training on history of railway*
	• *Better provision of information*
	• *Focus more on educating passengers*
	• *Standard topics, answers and talking points per section*
	• **Gembrook Timber Industry Discovery Centre**
	    ○ *Bullocks and Bullock Dray statue*
	    ○ *Rebuilt Russell's Tramway Sidings*
	    ○ *Rebuilt Gembrook Loco Shed, Goods Shed, Station Buildings and Departmental Residence (Station Master's House)*
	    ○ *Relocate Climax, Shay, TACL, Timber Jinks and other Timber Tramway exhibits*
	    ○ *Quality interpretation*
	    ○ *Partnership with DEWLP, Forestry Vic, Timber Industry Association, Light Railway Research Association,*
	    ○ *Computerised visualisation showing map of tramway networks and sawmills growing and developing then dwindling*
	• **Cockatoo Potato Industry Discovery Centre**
	    ○ *Rebuild Weighbridge*
	    ○ *Rebuild Goods Shed*
	    ○ *Rebuild DR*
	    ○ *Potato Wagon on waybridge statue*
	    ○ *Partnership with Potato Industry Association*
	• **Wright and Fielder**
	    ○ *Statues of people waiting for the train etc.*
	    ○ *Interpretation panels*
	• **Lakeside**
	    ○ *Original station platform with sign & flags*
	    ○ *Statues of couple with picnic basket waiting for train*
	    ○ *Sculpture box brownie camera as selfie stand*

• Partnerships with industry bodies, education & training centres, universities	• *Partner with University History, Cultural Heritage, Architecture and Engineering Departments E.g. UniMelb has a master's degree in Cultural Heritage – Puffing Billy, VR Narrow Gauge or VR in general could form the basis of some of their research*
• Create the theatre of stepping back in time	• *Create defined entrances to each station precinct, a portal where people get the feeling of being transported to a different age, modern technology is removed or limited, people dress, act and talk differently, courtesy and manners rule.* • *Much more work needs to be put into portraying this image, with particular reference to the details; uniform and dress code, actions and acting; portray the EoS.*

Connects to **'People', Education'** and **'Collaboration'** sections for more on telling the story of the local area, people and communities and building relationships with local/community interaction.

Preservation

"There is no universal definition for heritage railways, however they can be considered a railway which played an important part in development of society and/or industry but had to stop or change as times moved on"

"Their value is in the way they represent or memorise an era of life and its contribution to society or industry"

This section focuses on conserving, preserving restoring and recreating industrial heritage, and how we can create engaging interpretation that will be exciting, informative and more of all engaging. It also considers ongoing protection of the landscape from inappropriate development and the boundaries between conservation and restoration.

Key Messages	*Application to Puffing Billy*
• Focus on particular periods/era's	• *Puffing Billy has a specific era of significance, and anything we do, where possible, should focus on restoration of the railway from that period.*
• How do we record and preserve the cultural heritage of our surroundings? ○ Scenic rail corridor ○ 360° view video record to show what is visible form the train ○ Map horizons	• *Locomotives, rolling stock etc. can easily be recorded, recreated and maintained, but how can we do the same with our scenic corridor, one of our most critical assets?* • *We need to protect and preserve not just the rail corridor, but, as part of the experience, the surroundings, the view.* • *Source 360° camera equipment and carry out a complete recording of the rail corridor from end to end; map the features, horizons etc.* • *Use to inform an updated heritage planning overlay which protects our heritage landscape from further inappropriate development.*
• Conservation Management Plan to detail sites, and manage/control any development with regard to preserving cultural heritage	• *Any industrial heritage site should have an active Comprehensive Conservation Management Plan (CCMP) in place to ensure the protection of any specific areas/features, covering the entire rail corridor, including infrastructure, rolling stock, historic features and indigenous sites.* • *Review the master plan and create detailed schemes for each precinct*
• The Riga Charter: ○ where does the compromise lie? ○ Static vs. dynamic restoration ○ Preservation of life-expired parts and records	• *Consider the work to be undertaken and the follow-on impact/repercussions this might have.* • *Any parts/records deemed to be condemned/obsolete should be retained, recorded and form part of the PBR archives collection.* • *How much material needs to be replaced in order to achieve dynamic restoration? Is it worth it, or should the existing fabric be conserved, and a replica constructed?*
• Heritage conservation/ preservation/recreation projects; list of nice-to-have or desirable projects which can be run by volunteer groups.	• *In order to assist in achieving preservation goals, and to further develop the railways heritage atmosphere, whilst develop a list of restoration/recreation projects.* • *Critical projects for staff to plan, organise and implement*

	• *Nice-to-have, non-time critical projects can be used to develop volunteer engagement/input into the heritage aspects of the railway.*

Sustainability

"Raise awareness that railway culture is a part of people's culture – raise profile and charisma of railways to justify the investment in their preservation"

When we talk about sustainability here, we are talking about the ability to sustain an ongoing authentic heritage steam railway, without a detrimental effect on the preservation of industrial and cultural heritage.

Key Messages	*Application to Puffing Billy*
• Always keep primary vision and mission in mind	• *Striving to be the best heritage steam railway in the world*
• Strive to be the best	• *Traditionally a very insular organisations with an attitude of superiority, Puffing Billy finds itself surpassed in quality of offering by younger, smaller and more dynamic organisations.* • *Our lack of engagement, goodwill and creativity means that we also loose a significant number of volunteers to these same organisations which aren't as impenetrable, and people find they are more able to get involved and have their input valued.* • *Currently signing up and starting as a volunteer is somewhat of a complicate and time-consuming rigmarole.*
• New design & build locomotives and rolling stock e.g. **Nilgiri Mountain Railway**	• *Build new locomotives based on original aesthetic, as with the new carriage project.* • *Increase capacity, reliability, availability and efficiency whilst reducing operating & maintenance costs and retaining the heritage image.* • *PBR could design and build 2 or 3 new locomotives to save money through economies of scale.* • *Reduce workload on heritage locomotives, thus extending their life and time/cost spend on maintenance; saved for heritage trains (***Premium product***).*
• Heritage rolling stock	• *Restoration of locomotive 3A, the last remaining unrestored NA class, sponsored by the PBPS, would be a huge PR opportunity* • *Plan a works program to restore heritage carriages and freight rolling stock for heritage trains, to be positioned along the line as part of the heritage ambiance/theatre, also useful as mobile storage* • *Sponsorship for a workshop equipped to carry out heritage restorations; woodwork and painting of rolling stock.* • *Living museum; workshop can be a feature of the museum, where craftsmen can be viewed at work.* • *Work with Tafe's to develop youth training schemes and apprenticeships in heritage skills such as coach building and painting.*

• Develop premium products for increased yield and to maximise use of heritage assets.	• *Rather than overwhelm the railway with patronage growth, how can we retain the charm of a bucolic rural narrow-gauge line in the 20's and 30's?* • *Increase opportunity for visitors to more easily spend their money; develop different and exclusive products:* ○ *Behind the scenes guided tours, workshops, signal boxes, museum etc.; "tour with an engineer".* ○ *Viewing galleries in workshops.* ○ *Drive a train product with a real heritage PBR loco and rolling stock (restored goods wagons). Make a day of it, not just a short trip.* ○ *Different train products: bar car with walk through carriages to enable food and drink service on the Gembrook train, regular freight and mixed demonstration trains for charters, parties and photo clubs….*or just for volunteer enjoyment!
• Connect with communities & schools; activities, working groups.	• *Build relationships with groups in each of the interconnected rail communities.* • *Could look at a particular area of each station which the group could arrange working parties to manage, such as maintaining the gardens and signage.* • *Best kept station competition between all the station care groups with an annual awards function.*

Collaboration

"Being able to see people's homes and lives from the train, you want to attain their co-operation and buy-in; this should be managed by the railway in order for it to assimilate into, and become a part of, people's everyday lives."

Working together. The interrelationship between railway and community in the past created a system of mutually beneficial support; communities and industry support the railway, which in turn acts as their lifeline. What does that mutual support look like today?

Key Messages	*Application to Puffing Billy*
• Work with Community groups, museums, historical societies, environmental groups etc.	• *Develop links to facilitate collaboration between PBR and history groups such as Emerald Museum, Knox historical society, with a view to creating more complete interpretation and storytelling.* • *Possibility of guest exhibitions in the museum, discovery centre, Gembrook station etc.* • *Continue and develop the work of the Green Army etc in maintaining the scenic corridor.*
• Partner with related industry bodies	• *Create partnerships with bodies such as:* ○ *DEWLP* ○ *Forestry Vic* ○ *Timber Industry Association* ○ *Light Railway Research Association*
• Partnership with universities and colleges with strong department in relevant fields; History, Heritage, Architecture, Engineering	• *Partner with University's History, Cultural Heritage, Architecture and Engineering Departments e.g. UniMelb has a master's degree in Cultural Heritage – Puffing Billy, VR Narrow Gauge or VR in general could form the basis of research projects.*
• Develop sister relationships with like-minded railways • Look for like-minded organisations with elements of connection: ○ Similar locomotives & rolling stock ○ Same or similar gauge ○ Mountain/timber railways ○ Heritage/steam	• *Creation of these twinning relationships opens up a multitude of possibilities:* ○ *Displays/interpretation* ○ *Attendance at International events* ○ *Cross-promotion & marketing* ○ *Member discounts* ○ *Letters of introduction* ○ *Networking and exchange* ○ *Work experience/development exchanges for staff, young volunteers etc.* • *Some that should be considered might include:* ○ *Lynton & Barnstaple Railway, UK* ○ *Welshpool & Llanfair Light Railway, UK (Currently informal, needs fomalising)* ○ *Wiscasset, Waterville & Farmington Railway, US* ○ *Alishan Forest Railway, Taiwan* ○ *Darjeeling Himalayan Railway, India* ○ *Walhalla Goldfields Railway, Australia* ○ *Ffestiniog & Welsh Highland Railways, UK*

Accessibility

The main areas to consider here are accessibility for all; creating an inclusive experience where anyone, no matter their culture, language or ability, can have the same experience and gain the same knowledge.

<table>
<tr><th>Key Messages</th><th>Application to Puffing Billy</th></tr>
<tr><td>Historic material made accessible to all for interest, education and research</td><td>Makeover of Archives, Library and Office Buildings at Kings Road:
Make accessible; all records, photos etc. online via Vic Collections which has new improved software functionality, is free to use and accessible anywhere.
Seek professional advice in setting up new systems in collaboration with archives team; Vic Collections and aMaGA Curatorial programs.
Define purpose and objectives
Separate ETRB Corporate Archives from the general PBPS and VR/Railway archival materials</td></tr>
<tr><td>The Accessibility barrier</td><td>Cater for people with disabilities both at all facilities and onboard all trains
Discovery Centre will be DDA compliant, but none of our other facilities are, stations, access ways, carriages etc.
Arrange compliance audit and work towards a plan to make changes as resources are available.
Consider disabled carriages which are enclosed, protecting the old and vulnerable from extreme weather conditions (hot/cold, wet etc.)
Disabled dining carriages: all products should be accessible to all.
Investigate grants/funding sources for projects, community engagement</td></tr>
<tr><td>The language barrier</td><td>Translation of all interpretation, storytelling and guided tours to make them accessible for visitors from all countries.
Consider language students and overseas students who may be able to assist as tour guides or with interpretation as part of work experience – good for the resume!</td></tr>
</table>

Education

“Participant → practice - beholder → experience”

“How to better connect to modern/urban living so as to boost community participation?”

Integrated with interpretation, education covers the story telling to the visitor, but it also covers areas such as the ongoing training and development of staff and volunteers, creating roles for guides but also passing on the intangible skills inherent in heritage steam railway maintenance and operation and – most importantly – youth and succession planning.

“Raise awareness that railway culture is a part of people’s culture – raise profile and charisma of railways to justify the investment in their preservation”

Key Messages	*Application to Puffing Billy*
• Educate funding sources, focus on intangible benefits such as improved mental health resulting from volunteering	• *Ensure funding providers and the community are educated and aware of the intangible benefits of volunteering to mental health and wellbeing.* • *Considers a Victorian sector-wide approach to this, in order to ensure full support for Tourist & Heritage railways in the region.*
• Continuous growth and development of staff and volunteers, streamline recruitment & training, succession planning	• *Training of trades staff in the intangible skills necessary to keep an historic transport system operating are critical to future success.* • *Succession planning, youth recruitment, support, training and development.* • *Adequate work also required on the training and development of future management and Board members, with particular focus on legal aspects, regulatory compliance, finance and strategy.*
• Specialised training and education of staff and volunteers’ sector-wide, centre of excellence, RTO, AQTF Training course	• *Incorporate modern training techniques, online learning, videos, graphics & animation.* • *Work with ATHRA on continued develop of T&H sector wide specialised training courses.* • *Remove Puffing Billy’s age old and irrational ban on RPL from other railways…we’re training using the same manuals, but we don’t accept people with the same qualification from other railways...?!!* • *Provide resources to develop specialised training in heritage railway skills.* • *Grow PBR as a training and resource centre of excellence for the Asia-Pacific T&H railway sector, advice and assistance, contract engineering works & training.* • *Offer on-site corporate training experiences e.g. VicTrack/V-Line gangs completing team building trackwork projects as part of their CPD.*
• Youth: Future volunteers & staff = youth programs → succession planning	• *Renew the focus of the Young Volunteers:* ○ *Revise the age range to be relevant (e.g. 16-25)* ○ *Collecting/recording stories, interviews* ○ *Products and marketing opportunities* ○ *Training/mentorship opportunities* ○ *Raising the profile of the railway, its history, and connection to the community*

14. What might these ideas look like for Puffing Billy?

Track Upgrades – A Case Study of Heritage vs. Sustainability in Line with the Riga Charter

Rail

After 120 years, the rails upon which Puffing Billy runs are starting to wear out. Some are believed to already be second hand when first laid!

There are 2 options for replacement, we can source new rail to the same profile (60lb per yard) or purchase new, heavier weight rail.

The question is why would you purchase different rail rather than more of the same?

- Puffing Billy, as a narrow-gauge line, was meant to be laid with light rails, that's their underlying ethos; cheap, lightweight construction.
- Light rails are easily handled, worked, laid and maintained.
- The lighter rail naturally contains less material and is therefore cheaper.
- Rail can be replaced directly, using the same fixings, fishplates, sleepers etc.
- No issues joining different profile rails together
- We are here to preserve an authentic heritage railway, method, technology, aesthetic and charm. Experience on other heritage railways shows this can easily be lost.

Sleepers

Conversely, a change in sleeper material should be considered. Redgum is about the only suitable hardwood for track, yet it is not a sustainable timber and our environmental conscience tells us not to keep cutting down the remaining old growth forests when we could explore other options, such as recycled plastic sleepers.

Virtually every T&H railway in Victoria has been a part of the trials, with many now choosing to continue using them. Indeed, a large part of Richmond station is to be re-laid with plastic as part of obtaining type approval for main line use, something which will pave the way for increased production runs and economies of scale; PBR could benefit from this.

Some of the reasons we should consider plastic sleepers include:

- Can be worked the same as timber, retaining the heritage methods of track maintenance.
- The same track fixings can be used, unlike concrete which requires all new fixings
- Lifespan can be infinite, rather than 10-15 for timber and 30-40 for concrete
- Tolerate poor drainage, something Puffing Billy is notorious for, and not something beneficial to the longevity of timber.
- No deterioration due to rot, fungus, insects
- Quickly weather on the surface to look just like timber
- At end of life, or when damaged, can be recycled and reused again
- No heavier than timber sleepers
- Facilitates the recycling of considerable amounts of waste plastics

Plastic sleepers are currently in use all over the world in main line and heritage railway applications, including narrow gauge lines like the Talyllyn and Ffestiniog & Welsh Highland Railways. The same material can also be used for bridges, decking, fencing, seating, signage etc. with similar benefits.

15. PBPS – Puffing Billy's 'Heritage Conscience'

"Stories cost nothing
But they are my treasures
I am a rich man
With my father's stories"
(With thanks to Mark Seymour)

The Puffing Billy Preservation Society has many past achievements to be rightfully proud of. The PBPS strove hard, they saved Puffing Billy from the scrap man's torch, bringing it back from the brink in the days when railway preservation was essentially non-existent; the PBPS was the second ever railway preservation group in the world, after the Talyllyn Railway in Wales.

It may not have the ability to achieve such physical feats now, with a largely aging membership, no connection with the operation of the Railway, and growing regulatory & compliance requirements, but it has the **stories,** the **collective knowledge** and the **history**.

With that in mind, there is a lot that the PBPS can bring to the table, much of it under the banner of:

'Heritage Conscience'

- *Recording and documenting the stories and interviews*
- *Improved governance and guidance of archives, managing, storing, cataloguing, displaying and publicising the 'Puffing Billy' collection.*
- *Historical research projects in co-operation with Uni's and TAFE's*
- *Developing Engaging content and concepts for graphics, maps, photo, videos and illustrations*
- *Work with the Railway and local authorities to develop the concept for a 'Puffing Billy heritage trail' – Upper Ferntree Gully to Gembrook and beyond, including trackside, station precinct and rail trail-based interpretation.*
- *Work within PBR brand and style guide to implement the above*
- *Continue to develop high quality periodicals and publications*
- *Support a revitalised Heritage Advisory function.*
- *Consider the possibility of an advisory role to the Board, consulting on heritage aspects*
- *Liaise with management, staff and volunteers on heritage matters*
- *Support & resource management of Heritage standards manual, its reviews and distribution*
- *Develop engaging training based on HSM and Riga Charter as a core focus of the business*
- *Investigate & Develop knowledge to implement technology for use in interpretation*
- *Scholarships in related subjects for volunteers, staff and locals; grow people for the future.*
- *Sponsorship for heritage projects such as heritage rolling stock, 3A, interpretation, uniform, restoration facilities.*
- *Fundraising, donations and bequests, corporate sponsorship*

It is the opinion of the authors that the above themes should be combined and developed to create a very distinct and focussed role for the PBPS moving forward. Collaborating on these projects with the PBR will provide a renewed sense of purpose and a distinct point of difference, whilst working in with the strategy for the business and assisting in areas where improvements are critical to the future success of Puffing Billy.

16. ETRB – Ensuring A Sustainable Future

Whilst the Board's attention has, until now, been focussed on the review and repair of the businesses corporate level, there are many projects which could be planned and initiated as part of the future strategy which are of a more practical or tangible nature.

Of the many ideas listed above, the following are perhaps some of the more significant recommendations we feel are important to pursue:

- The scenic corridor is part of our unique selling point: Commission/create a full 360° video (camera is approx. $300 per day to hire) covering the entire rail corridor as a record. Work with local councils to define the Puffing Billy Heritage Corridor, right up to the horizon, thus protecting the historic rail journey from further inappropriate development.
- The Masterplan proved to be a wish list with very little detail explaining how current constraints would be overcome. Create a working group to expand on each precinct, one at a time, and through appropriate research and consultation, create a detailed final design covering operational, environmental, security & access, parking and heritage restoration/recreation aspects, including wayfinding and interpretation.
- Make Industrial and Social Heritage a more important part of the organisation; focus revenue on achieving our mission of being a world class heritage steam railway; engage with the PBPS in a bilateral relationship to progress restoration, recreation and interpretation projects. The Riga Charter should be a recognised document informing PBR decisions.
- Reintroduce a heritage authority within the railway, with a charter to develop informative and engaging training for management, staff and volunteers (This should be part of all inductions), and to work with other stakeholders, such as the Heritage Council of Victoria.
- Integrate with the community in ways which benefit the local people rather than just Puffing Billy, in order to gain them as supporters; support businesses, schools and community groups; attend festivals and shows, hold an open-house day for locals to better understand what we do; opportunities for community involvement; work experience and scholarships for local kids.
- Create more premium products which better use our heritage assets and are more historically themed; lets do more to promote this feeling of stepping back in time.
- Collaboration: Universities (research projects) & Tafe's (practical work experience), T&H sector – both local and international (training & assessment, skills and resources)
- Accessibility needs a funded program of audits and redress works to achieve DDA compliance where possible – everyone should, as far as practical, be able to have the same memorable experience at Puffing Billy.

And last, but by no means least…

- People! Young or old, we need them all. A review of our recruitment policy, induction process and training programs needs to identify the sticking points and ensure any barriers to an enjoyable and rewarding volunteering experience are removed.
  A review and reboot of the Young Volunteers Team, with reviewed age range, charter and more consistent railway support might go a long way to reinvigorating the group and growing its numbers as a way of ensuring a secure future for Puffing Billy.
  Goodwill, support and an understanding that as a heritage railway, not everything we do has to make a profit are important concepts; there is not always a tangible return in

preservation or restoration, merely a service to the community by preserving yesterday for tomorrow.

Volunteer satisfaction and engagement is derived from enjoying what they do!

17. With Our Forces Combined…

Many of these suggestions would only be successful with considerable input from both the ETRB and the PBPS, both of whom have, as we have discussed above, skills and knowledge in specific areas.

The railway has some 600 volunteers, many of whom also make up the 1200 dedicated PBPS members. Between the members, volunteers and staff are many and varied skills:

ETRB	*PBPS*
• Management	• Fundraising
• Training	• Publications & Content
• Regulatory compliance	• Historic material archives
• Finance & Risk	• People & Stories
• Civil & Mechanical Projects	• A Legacy of Pioneers

18. So, where to from here…?

The prompt review by the PBPS of its core aims and objectives, coupled with a mutually beneficial working agreement with the ETRB could see renewed enthusiasm and teamwork drive success for many of these projects, and the railway as a whole.

This should also pave the way for the PBPS to refocus and develop as a critical function of the Puffing Billy family, particularly in the area of interpretation. When we talked it through, we were amazed to realise how little PBR actually does to tell its story currently, especially when you consider that the railway has been in preservation longer than it was operating commercially under Victorian Railways.

We consider Gembrook to be one of the greatest opportunities for restoration, recreation and interpretation, and feel that this be the initial focus of the suggested precinct planning group. Some of the suggestions for this location include, and a paper containing more detail is being prepared:

- A theme of timber and tramways
- Reconstruction of the timber tramway exchange sidings with buildings, crane, rolling stock and even locomotives
- Restored locomotive shed, crew room, heritage station building, cattle race and goods shed.
- Recreated Departmental Residence (Stationmasters house), could be used as a residence for a precinct manager/station manager (improved site security) or as premium accommodation for visitors perhaps (Airbnb Experiences?)
- Map of tramways and sawmills, animated to show the growth, development and decline of the hundreds of k's of timber tramways in the bush
- Dray loaded with a giant log; statues of bullockies and bullocks.
- Statues of men lading/transferring timber
- Timber tramway sheds and interpretation areas
- Goods shed could be used as a bike hire location in line with rail trail and bike train product
- Consider a bike trail from Gembrook, following the line of the tramway, with interps panels at significant points along the way, stables, loco sheds, sawmills etc.

- Development of increased car and bus parking.

There is a lot more discussion to be had around the ideas raised, and some in-depth consultation with volunteers and members might help inform and pinpoint directions for the future.

It is recommended that a working group, made up of the relevant stakeholders, should be formed to develop detailed precinct plans for each location. Following the creation of these plans, funding should be made available for engagement of a landscape consultant to create final precinct drawings and artists impressions. These final designs will be set in stone and will provide direction for the railway when considering capital projects and PBPS sponsored heritage projects.

It is expected that this working group, made up of staff, volunteers and PBPS members as necessary, would repeat the same process for each precinct along the line, thereby creating a final vision for what Puffing Billy should aspire to look like in the future.

19. Conclusions

The Field School in Taiwan was an amazing experience, hopefully not 'once in a lifetime', but we are indeed incredibly privileged to have been invited to attend. The opportunity to learn and be inspired by some of the best in their field from around the world, and to share in the enthusiasm and passion for what they do, highlights just why a place such as Puffing Billy can be so important to so many people.

Being asked to write this report, for us, is a chance to try and translate that passion and enthusiasm into a vision for Puffing Billy; to take that drive and the love for what we do, and harness it in a way that could help influence the future direction of our favourite railway.

Puffing Billy is a world leader in dynamic steam preservation. We are in the unique position of having a strong and highly trained volunteer base, ample track, heritage rolling stock and locomotives and more passengers than most preserved railways can dream of.

Given all these strengths, and our rich cultural heritage, we have a responsibility to record and tell our story; to engage and educate our visitors about where we came from. Starting with the line's construction, through world wars and depressions, it's closure and the preservation era, the railway has been at the centre of social and industrial development in the Dandenongs, amidst a growing collection of experiences and stories from generations of men, women and children.

We must do better at telling these stories and sharing this history, if we are to deserve our title of "Australia's best-preserved Steam railway".

Appendix 1 – *A Brief History of Alishan Forest Railway Through the Century*

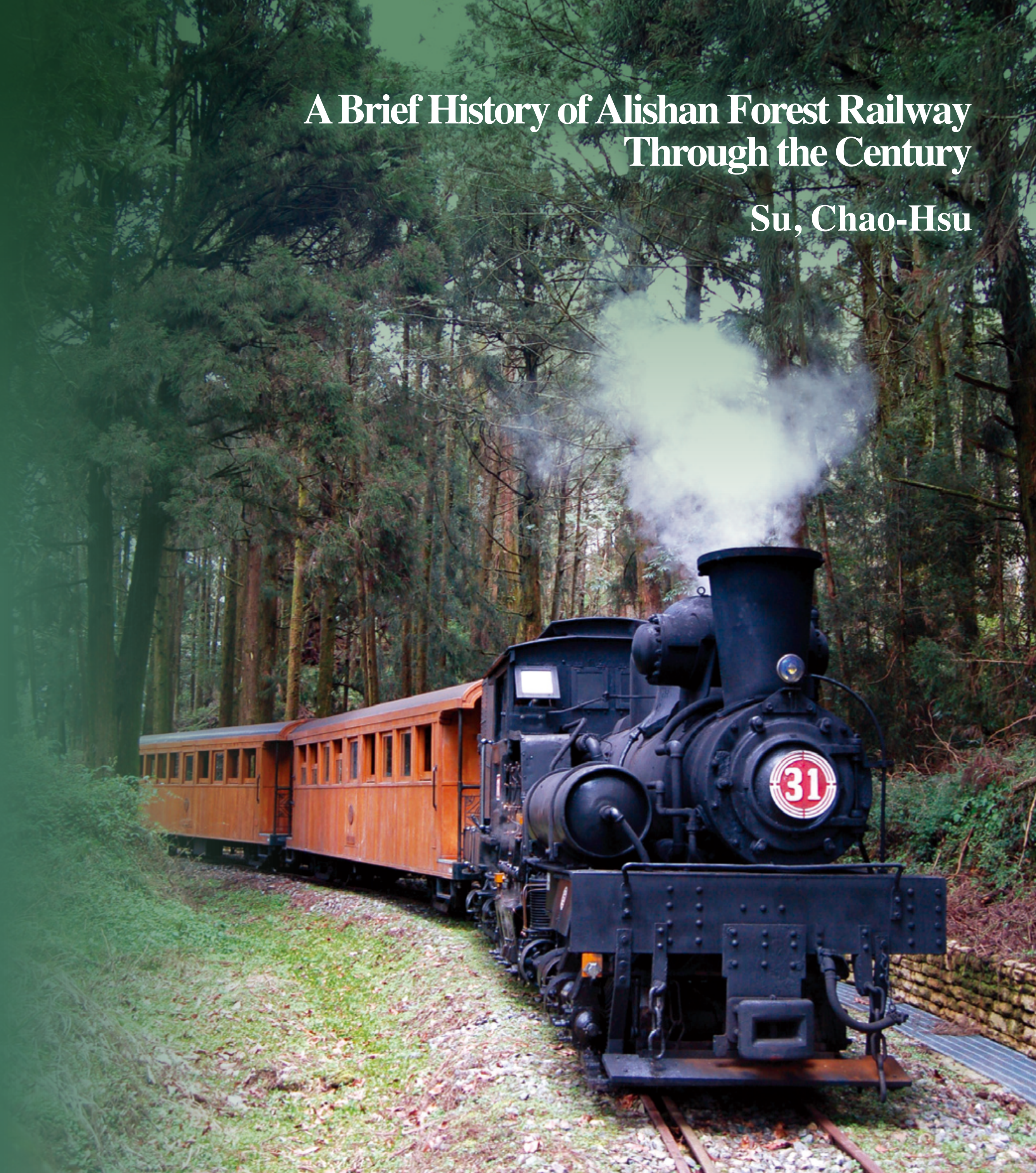
Chao-Hsu Su

COUNCIL OF AGRICULTURE, EXECUTIVE YUAN
FORESTRY BUREAU

ISBN 978-986-05-0642-6
9789860506426
GPN : 1010502364

A Brief History of Alishan Forest Railway Through the Century

Su, Chao-Hsu



Foreword
by Lee, Tao-Sheng, the Director General of Forestry Bureau

Alishan Forest Railway
A Treasure and a Potential World Heritage Site

Built in 1912, Alishan Forest Railway was originally used to facilitate the logging and transportation of forest resources. As time goes by, it is no longer used to transport woods, but to explore the beauty of Alishan forests. In the meantime, people of the nation have gradually recognized the precious cultural value of Alishan Forest Railway. It is the reason why that we must dynamically preserve it to witness the history of Taiwan and well-manage it to let our future generations experience the profound forest culture.

Many thanks to Professor Su, Chao-Hsu's years of research and appeals that made more and more people know about the features of Alishan Forest Railway. According to his research and analyses, Alishan Forest Railway has numerous Distinctive features comparing with the railways around the world: (1) a steam locomotive with barrel gear and cylinder vertical engine; (2) Dulishan spiral mountain route; (3) switch back (zig zag) mountain rail; (4) a landscape of tropical, subtropical and temperate forests; (5) narrow-gauge mountain rail. Comparing with railways around the world, Alishan Forest Railway is no less than breathtaking.

The renowned New Zealand world heritage expert Mr. Paul Mahoney was invited by Bureau of Cultural Heritage, Ministry of Culture, to visit Alishan Forest Railway in 2013 and 2014. Later, he released a report comparing Alishan Forest Railway with forest railways around the world and made a great compliment on Alishan Forest Railway. In Mr. Paul Mahoney's comparative research, he has assessed the world's forest railways based on their "outstanding value", "authenticity", "completeness", and "protection and management". Alishan Forest Railway was honored to be positioned in the first place. Forestry Bureau therefore started to launch application relevant works for Alishan Forest Railway to become a world cultural heritage.

Alishan Forest Railway has been confronted with all kinds of difficulties since its early construction and, only because of predecessors' unyielding efforts, it is managed to have today's look and be operated for a hundred years. As for the future, Professor Su, Chao-Hsu, through simple and comprehensive narratives, has brought out the essentials of the beauty of forest railway and shown its endless charm and elegance. This book is surely an important source for those who wish to learn more in the category of forest railways.

李桃生

Lee, Tao-Sheng

Foreword
by Liao, I-Kuang, Director of Chiayi Forest District Office, Forestry Bureau

The Past, Present and Future of Alishan Forest Railway

Alishan Forest Railway has been confronted with numerous challenges since the launch of its construction work in 1906. This construction project was originally conducted by Fujita Group from Japan and was then suspended as the construction cost was higher than the forest product revenue. In 1910, Office of the Governor-General of Taiwan took over the construction project; on the 25th of December 1912, the traffic from Chiayi to Erwanping was officially opened; on the 14th of March 1914, the opened route was extended to Zhaoping Station.

During the investigation and construction period, not only many people such as Koike Sankuro and Kawai Shitarō had done a great contribution to this railway, but also some unsung heroes sacrificed their lives for this project. For example, there were "Monument to the Sacrificed Jushichi'I (Junior Seventh Rank) Shindō Kumanosuke (Historic Site)" and "Monument of Technician Ninomiya Hideo" erected in Erwanping. Besides, "Monument of the Sacrificed" was also established in front of Alishan Temple (Ci Yun Temple) to memorize many unknown field workers.

Many thanks to the author, Professor Su, Chao-Hsu, who makes this book easier for readers to understand Alishan's past and present. It also helps us to establish a comprehensive understanding towards Alishan Forest Railway, so that we will not forget predecessors' contributions and efforts.

Although the operation of Alishan Forest Railway has been entrusted to Taiwan Railways Administration (TRA) due to its specialty in railways, our Office still needs to make more efforts to provide TRA continuous financial and administrative supports in order to make the Alishan Forest Railway safer and to provide passengers a better service.

Besides, the Office also continues to fortify our contacts with worldwide countries. After becoming a sister railway of Japan's Ōigawa Railway in 1986, Alishan Forest Railway signed another sister railway agreement with Kurobe Gorge Railway in Japan on the 20th of April 2013. With a close contact, both parties have formed a good relationship due to Professor Su, Chao-Hsu's great effort. In the future, we will further expand our vision and horizon, trying to build friendships with worldwide renowned railways to enhance Alishan's global reputation. We will emulate the world remarkable Alishan Forest Railway and try our best to build up its sustainable operation for a great aim of becoming one of the world heritages. As we also need more recognition, supports and encouragements, it is expected that, by publishing this book, more people will learn about Alishan Forest Railway and love it, protect it and make efforts for its future.

廖一光

Liao, I-Kuang

Preface
by Su, Chao-Hsu, the author

Developing a Global Perspective for Alishan Forest Railway

Alishan Forest Railway was completed in 1912. Its main line is only about 72km that climbs up from the level ground to 2,274m and passes through tropical, subtropical and temperate forests. With amazingly beautiful landscape and a great reputation in the world, Alishan Forest Railway is an epitome history of the development of Taiwan's industrial railways and an important historic site that represented human's achievement in the industrial railway technology of the 19th century. A rapid decline of this kind of mountain railways occurred in the middle of the 20th century due to industrial transformation. Alishan Forest Railway has been operated for over a century and is worth preserving as it is a sketch history reflecting the mountain railway technology.

The most intense period of constructing mountain railways was between 1869 and 1912, following the huge demand of required raw materials at the end of industrial revolution. The world's first rack railway (cog rail) –Mount Washington Railway in the U.S. – was constructed in 1869 and then Switzerland's Rigibahnen was opened in 1871. As for U.K. (Darjeeling Railway in India), Germany and Austria, they have all completed their mountain railways during this period. Nevertheless, people have a better choice to overcome terrain obstacles after the invention of aircrafts in 1903. During the World War I (WWI) period from 1914 to 1918, aircrafts were used as combat weapons and helped to enhance the development of civil aviation industry. Besides, not only had the technology for tanks and diesel engines improved, but also automobiles were well-developed. Afterwards, the development of world's mountain railways started to decline.

At that time, Taiwan was under the colonization of Empire Japan. On the 25th of December 1912, Alishan Railway was open to traffic for the forestry development. Apart from the racks, the Railway gathered almost all the mature techniques and technology – not mentioning its altitude was higher than India's Darjeeling afterwards. It created Empire Japan's railway apogee in 1915 (Tashan Station 2,346m) and Asia's railway apogee in 1934 (Dongpu Station 2,584m). Today, Zhushan Station at 2,451m is Taiwan's railway apogee. Jungfrau Railway opened on the 1st of August 1912 is also featured with the same ingenuity that, instead of adopting steam car, it adopted the innovative wooden cogwheel train powered by three-phase alternating current. Besides, Jungfrau Station also changed the mountain railway history in the later stage. All of these made the centennial period from 1912 to 2012 extraordinary.

In recent years, I have appealed the government to pay attention to Taiwan's Alishan Railway in public speeches. In the three books of the "100 Years Anniversary of Alishan Forest Railway" series, I listed the world's top 100 mountain railways with statistics and Alishan Forest Railway was among the bests with a number of exceptional engineering data.

▼Zhongxing (Limited) Express passing through the bamboo forest (Drawn by Su, Chao-Hsu)

As Alishan Railway's apogee and elevation drop are surpass than other recorded by United Nations Educational, Scientific and Cultural Organization (UNESCO), world heritage railways, its universal value must not be ignored. After the suffering of Typhoon Morakot, Alishan Railway is scheduled to have all of its routes re-opened in 2015, which makes the present time an extremely important moment for propagations.

In the past, people of the nation often connect Alishan Railway with the "high green mountains and deep blue water" ballad and "Five Wonders" – cloud sea, sunrise, sunset glow, forests and railway. The vision of Alishan Railway was therefore not broadened. Instead, people often get lost in a mistaken myth that only focus on its value as a transportation tool and tourism economic values. To change such local view and upgrade it into a universal value, Forestry Bureau has specially published this book as a promotional material for more people to get to know Taiwan's Alishan Railway.

It is my great honor to write and summarize all the important facts of Alishan Railway in this book. It is my expectation that this pocket book will help people in the nation to have a better understanding of Alishan Railway and to broaden their international vision. In other words, either this book is used as a promotional material in the nation or abroad, it is a preparation for Alishan Railway to be registered as world heritage and become an internationally known mountain railway.

蘇昭旭

Su, Chao-Hsu

Contents

CHAPTER 1
INTRODUCTION OF ALISHAN FOREST RAILWAY

▼Alishan Express in front of Zhaoping Park during the cherry blossom season

The World Renowned Alishan Forest Railway

Alishan has been one of the best sightseeing attractions in Taiwan and is a worldwide-famous scenic spot all along. Alishan's forests, sunrise, sunset glow, sea cloud and railway are reputed as Alishan's "Five Wonders". Among them, the forest railway has the highest reputation and can be considered as a national treasure or cultural asset. When the railway was firstly opened in 1912, it was originally used as a lumbering railway that transported Alishan's abundant forest sources down to the mountains. Due to the needs of residents along the railway, more trains on this rail were launched to transport both the freights and passengers after 1920. Nevertheless, after the retrocession of Taiwan in 1945, it was difficult to carry on the lumbering industry as the primary forests had been excessively deforested. The self-operated lumbering business was therefore terminated in 1963, and all the forest compartments were sold through auctions. The Alishan forest railway also headed to the direction of tourism. Today, this railway is now already 100 years old, which is at the same age as Republic of China.

Alishan Forest Railway is definitely an epitome development history of Taiwan's industrial railway and an important historic site that represented human's achievement in the industrial railway technology of the 19th century. The historic sites of this kind of forestry railways declined quickly in the middle of 20th century due to industrial transformation and only few were preserved around the world. Alishan Forest Railway, which has been operated for a century till today, possesses a universal value as it equals to the short development history of Asia's industrial railways in the 20th century. Furthermore, it has adopted four out of five technological solutions of hill-climbing railway, where Dulishan's spiral route and the switch back route before reaching Tashan are the most appealing part to the masses. Moreover, after the world's five railways – including Austria's Semmeringbahn, India's Darjeeling Himalayan Railway and Switzerland' Bernina and Albula Bahn – registered as world heritage in 1998, 1999 and 2008, the spiral and switch back routes that seem to be quite averaged proved that Alishan Railway is a great railway engineering project.

In 2003, Alishan Forest Railway was evaluated as Type A of Taiwan's potential world heritage site by Council for Cultural Affairs, making Alishan logically the tourism and cultural representative of Taiwan. Although a serious accident occurred between the New Station and Shenmu on the 1st of March of the same year and caused 17 deaths, the accident does not shatter its position in history or impair its importance as a cultural asset. Indeed, Alishan Railway is not listed as one of the world's top three mountain railways and I also explained it in two books of "The Scenic Wonderland of the Great Mountain Railway". Nevertheless, for most people, Alishan is merely a time-honored scenic spot and Alishan forest train is a romantic but out-of-date transportation tool with no necessity to take it. Therefore, notwithstanding this Taiwanese industrial railway completed in the first year of Republic of China once flourished due to transporting lumbers and enjoyed a great reputation around the world for its unique landscape and mountain railway, it is now defeated by the competitions of highway and impacts of natural disaster, and is challenged by operation and existence crises. Looking back the past and confronting the future, Alishan Forest Railway may, if succeed in transformation, be positioned as a cultural asset instead of a primitive transportation tool and even be registered as a world heritage. The, under the name of world heritage, Alishan Forest Railway will not only have its position upgraded and operation crisis solved, but also lead Taiwan's tourism industry to the world stage.

A comparison table of the construction methods adopted by Alishan Railway and world heritage railways.

Railway Name	Horseshoe curve and U-Turn	Loop Line and Spiral Routes	Rack Railway (Cog Rail)	Switch Back (Zig Zag)	Special Engined Mountain Rail	Track Gauge
Alishan Forest Railway, Taiwan	★	★		★	★	762
Semmeringbahn, Austria (Registered as the world heritage in 1998)	★					1435
Bernina Bahn, Rhaetian Railway in the Albula, Switzerland (Registered as the world heritage in 2008)	★	★				1000
Darjeeling Himalayan Railway, India (Registered as the world heritage in 1999)	★	★		★	★	610
Kalka Shimla Railway, India (Registered as the world heritage in 2008)	★					762
Nilgiri Mountain Railway, India (Registered as the world heritage in 2005)	★		★		★	1000

A comparison table of Alishan Railway and world heritage railways' background information.

Railway Name	Opening Year	Length of Main Route	Apogee	Perigee	Maximum Gradient	Railway Track Gauge
Alishan Forest Railway, Taiwan	1912	71.9 km	2451m Zhushan Station	30m Chiayi Station	6.25%	762 mm
Semmeringbahn, Austria (Registered as the world heritage in 1998)	1854	41.8 km	898m Semmering Tunnel	495m Gloggnitz	2.5%	1435 mm
Albula Bahn, Switzerland (Registered as the world heritage in 2008)	1903	67 km	1820m Albula Tunnel	604m Reichnau-Tamins	3.5%	1000 mm
Bernina Bahn from Switzerland to Italy (Registered as the world heritage in 2008)	1910	60.7 km	2253m Bernina Ospizio	429m Tirano	7.0%	1000 mm
Darjeeling Himalayan Railway, India (Registered as the world heritage in 1999)	1881	86.0 km	2257.6m Ghum	113.8m New Jalpaiguri	5.55%	610 mm
Kalka Shimla Railway, India (Registered as the world heritage in 2008)	1903	96.54 km	2076m Shimla	656m Kalka	3.0%	762 mm
Nilgiri Mountain Railway, India (Registered as the world heritage in 2005)	1908	46.0 km	2345.1m Lavedale	325.8m Mettupala-yam	8.33%	1000 mm

Features and Values of Alishan Forest Railway

When Alishan Forest Railway was initially opened in 1912, it was only used to transport lumbers. In 1918, freight cars were remodeled to transport passengers and the era of transporting passengers began. Later in 1920, the number of passenger and freight mixed trains was increased and the railway built for the lumbering industry was shouldered with the new traffic function between flat areas and mountains. The operation of Alishan Forest Railway also put on the right track.

In the 10th year of Showa, Taiwan Alishan's most superior lumber were transported to Yasukuni Shrine as building materials. Also because of its beautiful landscape, a large number of Japanese tourists visited Alishan Railway during Showa period and turned it the primary railway attraction of Taiwan during the Japanese colonization. Around 1920, Alishan Railway decided to attach locomotive behind the carriages in a reverse way to push up the train up to the mountains in order to maintain the railway safety. At that time, Alishan Railway not only synchronized its mountain railway technology with the world, but also adopted the advanced ET6 air brake. Its technology was therefore above all the railway systems in Taiwan that time.

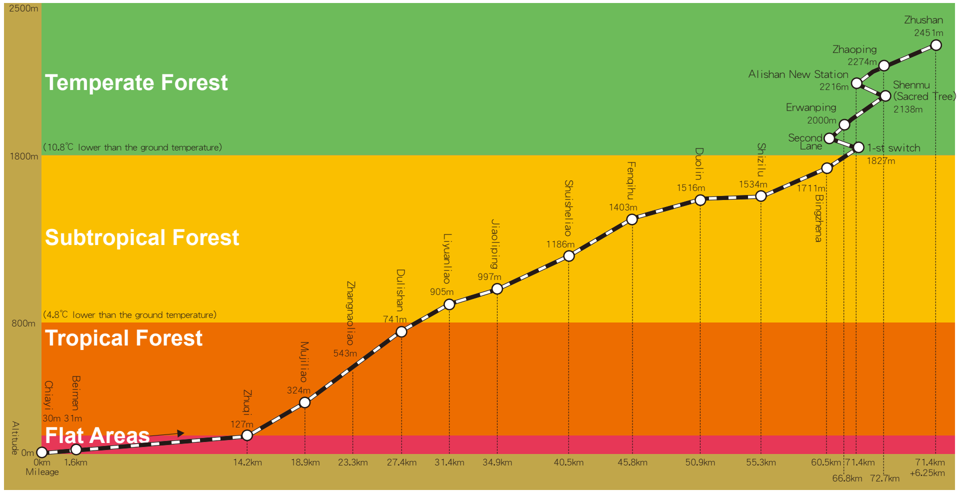
As the matter of fact, during Alishan Railway's construction and traffic opening period, the development of world's mountain railway actually reached the top. In 1908, the Swiss-French TMR (Train Mont-Blanc Express) mountain railway was open to traffic; in 1909, China's Beijing Zhangjiakou Railway that also adopted switch back route was open to traffic; in 1910, the Chinese-French Yunnan–Vietnam Railway and Switzerland's Bernina Express (Bernina Bahn) was open to traffic; in 1911, Switzerland's BLS thank linked Alps' Lötschberg Tunnel was open to traffic. On the 1st of August 1912, Switzerland's Jungfrau Mountain Railway opened its traffic to the peak of Jungfrau. This not only created the new apogee of European railways at 3,454m, but also wrote a new page for the "Top of Europe". In the same year on the 25th of December, Alishan Railway opened its traffic to Erwanping at altitude of 2,000m, created the "Top of Japan" and "Top of Taiwan". At that moment, Taiwan was not absent from the international stage of mountain railway.

Under the construction of Japanese Empire, Alishan Railway was apparently designed as a world-class mountain railway in terms of its scale. The Japanese government therefore released the information that the highest mountain railway of the Far East was completed. This was the origin of the world's top three mountain railway in early years. Although the Alishan Railway during the Japanese colonization possessed the world-class scientific technology, it was not foreseen that this historic railway that positioned in the same place as other world-class mountain railways would be arbitrarily dismantled and damaged due to the short vision of people living in on this island. This is the reason that this highest narrow-gauge mountain railway in the Far East did not receive its deserved position and attention regrettably.

To adapt the unique forest railway and mountain railway environments, Alishan Railway is basically featured with: (1) a steam locomotive with bevel gear and cylinder vertical engine (2) Dulishan spiral mountain route; (3) switch back (zig zag) mountain rail (so-called "Alishan Express running up against the wall"); (4) a landscape of tropical, subtropical and temperate forests and then to areas above cloud seas due to the big altitude gap; (5) the highest narrow-gauge mountain rail, which is higher than India Darjeeling's DHR, and the longest 762mm narrow-gauge mountain railway. All of these features have created a rich tourism resource for Alishan Railway and facilitated its transformation from the forestry to tourism industry. In comparison, due to differentiated development technology, the Luodong Taipingshan Baxianshan forest railways adopted the Hotta cable way since 1924 were unfortunate that they eventually went into the history due to disasters caused by typhoon.

▼A close-up of Alishan's Shay SL cylinder vertical engine .

A comparison diagram of routes and altitude of Alishan Forest Railway



From today's technological and economic perspectives, developing primary forests to build forest railway is a 19th century construction method of the U.S. instead of being an economical and efficient method. As the cost of developing forest railway routes and facilities remained relatively high, intensive bridges and tunnels also increased the difficulty of development. In early years of Showa, Hotta Somita from Japan invented "Hotta cable way". That is, to transport lumber carriers through double cable way and then connect the sectioned railways. The invention not only solved issues caused by steep slope, but also reduced the total railway length, lowered the cost and increased production efficiency. This technique, which was firstly applied in Taipingshan Forest Area in 1924 and then in Dongpu forest depot, largely increased the forestry production volume. If Alishan Forest Area had been developed later and adopted the cable-way technique as Taipingshan Forest Area did, the 72km long Alishan Forest Railway would not be existed and surely there would not be a world-known mountain railway that represents Taiwan.

Besides, Alishan Forest Railway is not listed as one of the world’s top three railways because it cannot be competed with other European and U.S. mountain railways in terms of the gradient, height and length. Nevertheless, its value is on its abundant diversity. That is, “forest railway”, “mountain railway” and “high elevation mountain railway” all rolled into one. It was an industrial railway


▼2-nd switch. The train needs to move backward in order to move forward into the mountain.


▼Landscape of flat areas


▼Landscape of tropical forest


▼Landscape of Subtropical forest


▼Landscape of temperate forest

originally built to develop the forest resources, which conforms to the definition of forest railway; its maximum gradient reaches 62.5 out of 1,000, which conforms to the definition of mountain railway; its altitude is over 2,000m that covers high altitude mountainous areas from Zhaoping at 2,274m to Zhushan at 2,451m, which makes it a genuine high elevation mountain railway.

It is not easy for Alishan Railway to perfectly conform to the definition of three railways. Although other countries may have high-altitude mountain railways or railways with a great gradient, they may not have a railway featured with such rich diversity. It is especially so that, in the field of forest railways, there are not many railways have 72km long main route. (For detailed information, please refer to “The Scenic Wonderland of the Great Mountain Railway” written by Su, Chao-Hsu)

Route and milestone of Alishan Forest Railway (2009)

Route	Type	Station	Mileage between two stations (m)	Accumulated mileage (m)	Altitude (m)	Remarks
Main (Mountain) Line	Flat Areas	Chiayi△	0.0	0.0	30	※Abandoned commuting station △Existing fixed intermediate station. One passenger car (Alishan Express) is scheduled to go up and come down the mountain every day.
		Rongting※	0.9	0.9	--	
		Beimen△(Peimen)	0.7	1.6	31	
		Lucuo※	1.3	2.9	--	
		Qixia※	2.4	5.3	--	
		Wanqiao※	2.1	7.4	56	
		Pozipu※	1.5	8.9	--	
		Lumachan※(Luman)	1.9	10.8	82	
		Xinzhuqi※	2.6	13.4	--	
		Zhuqi△(Jhuci)	0.8	14.2	127	
	Tropical Forest	Mululiao (Mujiliao)	4.7	18.9	324	
		Zhangnaoliao(Jhangnaoliao)	4.4	23.3	543	
		Dulishan	4.1	27.4	743	
	Subtropical Forest	Liyuanliao	4.0	31.4	905	
		Jiaoliping△	3.5	34.9	997	
		Shuisheliao(Shueisheliao)	5.6	40.5	1186	
		Fenqihu△(Fenchihu)	5.3	45.8	1403	
		Duolin (Duoluoluo)	5.1	50.9	1516	
		Shitzulu	4.4	55.3	1534	
		Pingzhena (Bingzhena) (Pingjhena)	5.2	60.5	1711	
	Temperate Forest	1-st switch	2.5	62.7	1827	
		Erwanping	4.1	66.8	2000	
		Shenmu (Sacred Tree)	2.8	69.6	2138	
		Alishan Station△	1.8	71.4	2216	
		Alishan (Zhaoping) (Chaoping)	1.3	72.7	2274	
Old Forest Farm Lines	Dongpu Line	Alishan (Zhaoping) (Chaoping)	0.0	0.0	2274	
		Dongshan	5.0	5.0	--	Bifurcation to Shuishan Line
		Eryu (Zizhong)	3.0	3.0	2305	
		Xingaokou (Japanese: "Niitaka", refers to "new highest")	2.7	2.7	2332	Bifurcation to Xishan Line and Shishuishan Line
		Dongpu	20.0	20.0	2584	
	Tashan Line	Alishan (Zhaoping) (Chaoping)	0.0	0.0	2274	Bifurcation to Tashanli Line and Duigaoyue Line
		Tashan	4.2	4.2	2344	
		Mianyue	2.5	6.7	2303	
		Cableway	7.6	14.3	--	Bifurcation to Dalongxi
Today's Tourist Branch Line	Shuishan Line	Alishan (Zhaoping) (Chaoping)	0.0	0.0	2274	Currently not available.
		Shuishan	1.6	1.6	2320	
	Mianyue Line	Alishan Station	0.0	0.0	2216	Currently not available.
		Shizifendao (Cross-Turn Lane)	2.9	2.9	2332	
		Shihou	6.36	9.26	2318	
	Zhushan Line	Alishan Station	0.0	0.0	2216	Two passenger cars are scheduled to go up and come down the mountain every day, plus extra run on the weekend.
		Shizifendao (Cross-Turn Lane)	2.9	2.9	2332	
		Duigaoyue	2.0	4.9	2405	
		Zhushan (Chushan)	1.35	6.25	2451	

◎Mianyue Line was disconnected on the 21st of September 1999 due to earthquake. The Line was reopened in 2009, but only to Tashan
◎The Main Linewas originally 71.9kmand is now 72.7km. The length of the Main Line varies according to the reconstructed parts after a natural disaster.
◎From Alishan Station to Shenmu is Shenmu Line and to Zhaoping is Zhaoping Line. These lines are used as branch lines for tourism.

The Past and Present of Alishan Forest Railway

After Office of the Governor-General of Taiwan took over the construction project of Alishan Railway in 1910, Alishan Railway was officially opened on the 25th of December 1912 from Chiayi to Erwanping. After the end of railway was extended to today's Zhaoping Station on the 14th of March 1914, the following sections of Alishan mountain railway's main route was then settled. The 71.9km Main (Mountain) Line of Alishan Forest Railway was completed.

When Alishan Forest Railway was firstly opened, the distance between Chiayi and Alishan Zhaoping Station was 71.9km. After the retrocession of Taiwan, Forestry Bureau then gradually improved the route conditions. Today's Alishan Forest Railway starts from Chiayi Station and there are 18 stations along the way, including Beimen, Lumachan, Zhuqi, Mululiao, Zhangnaoliao , Dulishan, Liyuanliao, Jiaoliping, Shuisheliao, Fenqihu, Duolin, Shizilu, Bingzhena, 1-st switch, Erwanping, Shenmu and Alishan Station. As the Alishan New Station located on the Fourth Lane was seriously damaged after the September 21 Earthquake, the station was dismantled and the terminal returned to the old Zhaoping

▼Zhaoping Station in the past (Drawn by Su, Chao-Hsu)

▼The classic view of having Alishan Zhongxing (Limited) Express parked in front of the Shenmu Station is now a memory.

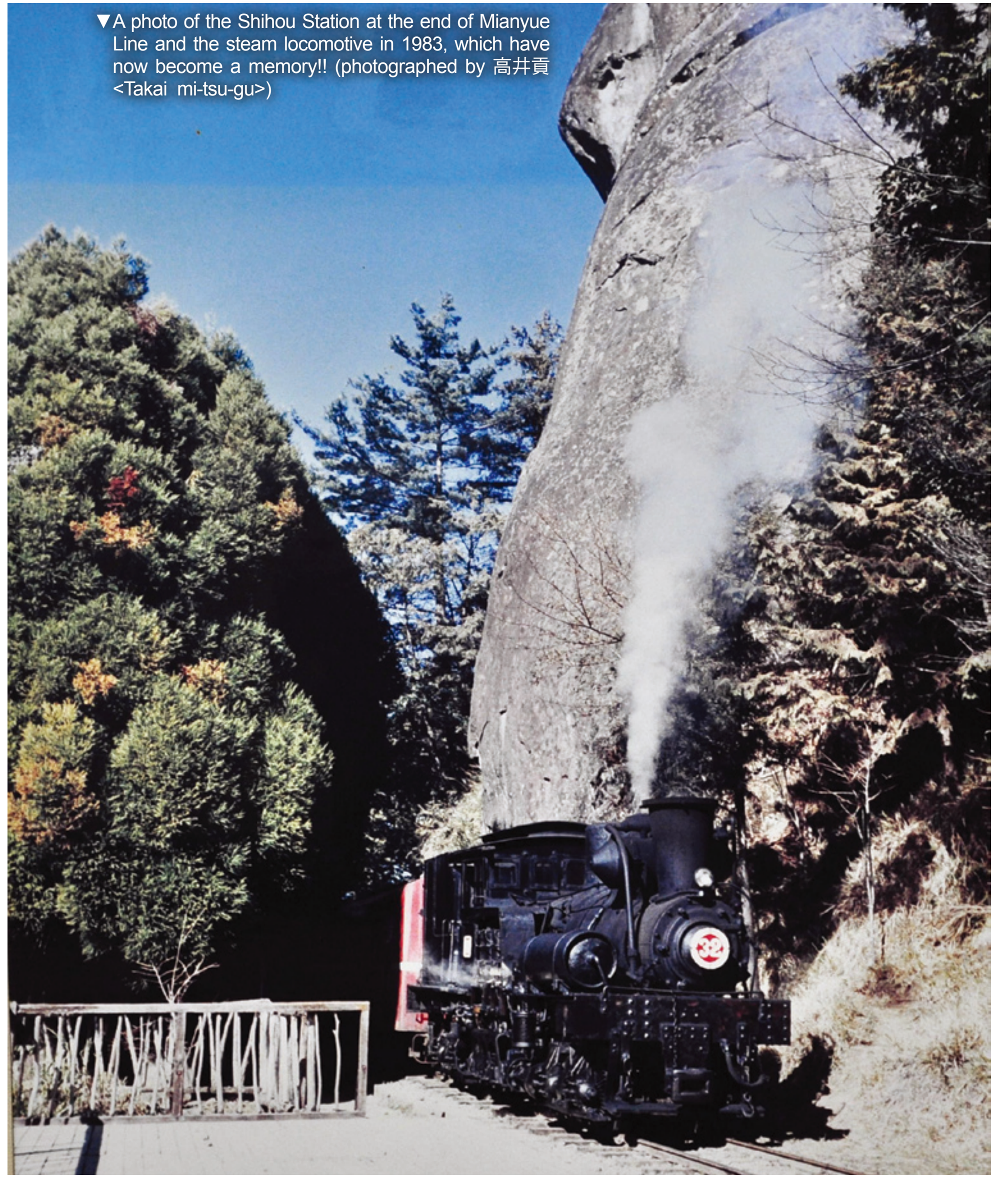
Station used before 1981. In September of 2007, the wooden Alishan New Station was reopened and named the Alishan Station. At the end of 2008, the reconstruction project of Zhaoping Station was contracted out. On the 22nd of April 2013, the reconstruction project of Zhaoping Station was completed and the station was opened.

Alishan Railway was confronted by an unprecedented challenge in the 1990's. On the 1st of September 1997, Shenmu (Sacred Tree) was partially collapsed and this landmark of Alishan Forest Railway was placed in jeopardy; when another half of Shenmu was put down on the 26th of June 1998, the landmark of Alishan Railway's Shenmu officially walked into the history. Later, when Forestry Bureau planned to set "Shihou" as Alishan's new landmark, the September 21 Earthquake occurred. The head of Shihou fell off and shattered into pieces, so-called "double trouble".

Alishan Forest Railway was seriously damaged during the September 21 Earthquake in 1999 that Mianyue Line and Alishan New Station had to be rebuilt. The end of the mountain railway was temporarily replaced by the new station until the completion of Alishan New Station. Nevertheless, Alishan Railway was never spared from natural disasters: In 2009, Typhoon Morakot seriously damaged Alishan Railway again. All the routes were paralyzed and suspended. Although this big flood was indeed a misfortune, it somehow aroused people's attention to Alishan Railway.

Today, the prosperity of Main Line as a tourism railway no longer exists after the launch of Alishan Highway on the 1st of October 1982. Although Alishan Express with the air conditioning system was launched in 1984, after the closure of Guangfu Passenger Car in 1983, it still cannot compete with the highway in terms of fare and traveling time. The launch of Alishan Highway also changed the pattern of mountain freight transport, where freights are now transported through highway instead of the railway. Alishan Railway's freight transport therefore exists only with the name. In 1988, Alishan Railway officially abolished the 60 year old mixed passenger car, so-called the ordinary train in tradition. Small stations along the route were also downgraded to staffless stations. In 1990, Zhongxing Diesel Passenger Car, which had been driven for about 30 years, was closed and only Alishan Express was preserved. Today, there is only one train going up and coming down the mountain every day, showing the lowest point of railway depression

In the future, the main route of Alishan Railway will stick with Alishan Express. In ordinary days, there will be one train going up and coming down the mountain every day regularly. During summer vacation and holidays, the number of traveling trains will be increased to two and, in blossom season, three in total. Nevertheless, it is undeniable that the number of people visiting Alishan through the highway is much more than those through the railway. In the past, passengers of forest railway's branch lines – Zhushan Line and Mianyue Line – are much more than passengers of the Main Line. Thanks to the crowd for the sunrise, Zhushan Line has actually become a profitable mountain railway.



▼A photo of the Shihou Station at the end of Mianyue Line and the steam locomotive in 1983, which have now become a memory!! (photographed by 高井貢 <Takai mi-tsu-gu>)

Railway Branch Lines with a Greater Reputation than the Main (Mountain) Line

During the Japanese colonization, the construction project of forest farm line was launched in 1912 to further and efficiently develop Alishan's forest resources. On the 25th of May 1912, the first forest farm line was launched from Zhaoping to Wansuishan and Xiangxueshan Saddle in the south, so-called the Xiangxueshan Line. In 1934, this earliest forest farm line was extended to TatajiaSaddle 20km away and formed the Dongpu Line. The end of Dongpu Line is at altitude of 2,584m, which is the highest mountain railway in Taiwan. This railway was closed in 1978 and Dongpu Line became the roadbed of New Central Cross-Island Highway opened in 1991. Dongpu Line, the highest mountain railway in Taiwan, then disappeared from people's memory.

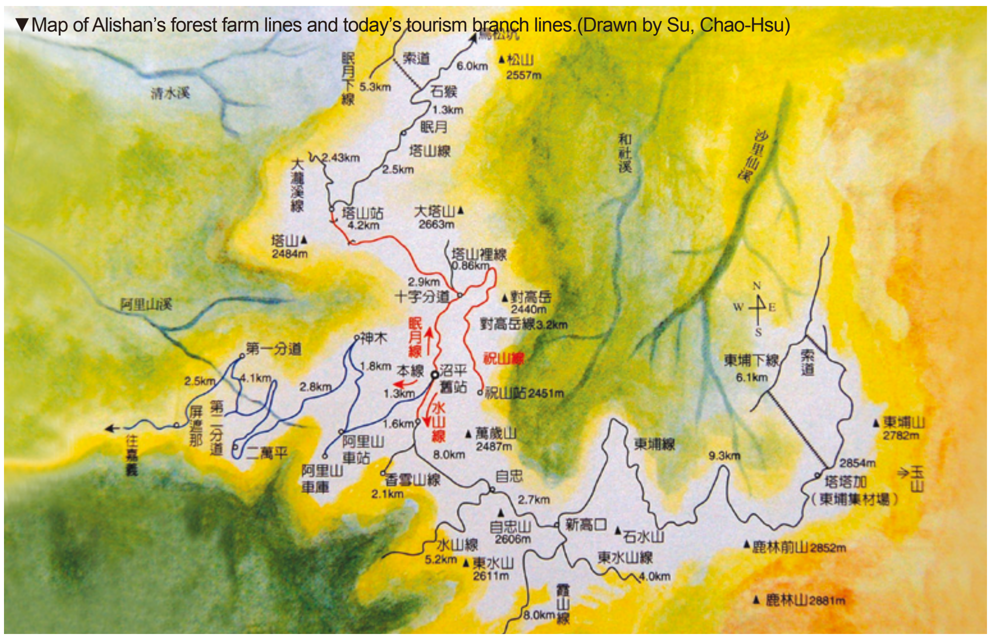
On the 3rd of December 1912, a northward forest farm line was built from Zhaoping to Tashan, so-called Tashan Line. Tashan Line was then extended to Wusongkeng with a total length of 14.3km. The 9.26km long section from Alishan to Mianyueis the Mianyue Line that leads to the scenic spot "Shihou" (Stone Monkey), which was severely damaged during the September 21 Earthquake in 1999 and the reconstruction project is still to be completed. The reconstruction of Mianyue Line was delayed for a very long time and eventually was completed before the end of 2007. Unfortunately the reconstruction results still need to be survey and the Line is therefore not opened to the public.

▼Taiwan's highest train station "Zhushan Station", which is at altitude of 2,451m.

Regarding the forest farm branch lines, Dongpu Line and Tashan Line were closed in later 1970. In 1982, the front section of Tashan Line, so-called Mianyue Line, was reconstructed to facilitate the development of tourism and to build tourist branch lines. Ended at Shihou, Mianyue Line runs tourist trains periodically. In 1986, Shizifendao (Cross-Turn Lane), a station 3km away from the Mianyue Line, and some roadbeds of Tashanli Line were used to build Zhushan Line, a bifurcation to Sunrise House in Zhushan, to provide tourists the service of watching sunrise. Ended at Zhushan Station at altitude of 2,451m, this is the first high elevation mountain railway built by the people of the nation after the Retrocession of Taiwan. Since then, this station is the apogee of Taiwan's railways, Top of Taiwan, and the highest train station.

Besides, the long abandoned Dongpu Line had its front section repaired, that section was 1.6km long of the Shuishan Line, and can be connected to the head of the New Central Cross-Island Highway tunnel. Plus the revival of Alishan's Shay steam locomotive No. 26, 31 and 25 in recent years, these locomotives can be operated with cypress carriages as local trains to build an atmosphere of forest railway travel. It is planned to use No. 31 in Shuishan Line, which will have its operation resumed soon; and No. 25 will be used in flat areas from Chiayi to Zhuqi and low altitude mountain routes. Having itself gradually positioned as a cultural asset, Alishan Forest Railway is reborn with a new life.

Although the Main Line was suspended in 2009 after Typhoon Morakot, the branch lines were not seriously affected. Alishan Railway has four branch lines of high elevation mountain railways including Zhushan Line, Mianyue Line, Shuishan Line, and Shenmu Line, the rear section of the Main Line. Having all of them operated with cypress carriages and steam locomotives, Alishan Forest Railway will become the nation's exemplar of preserving historic railway sites.

▼Map of Alishan's forest farm lines and today's tourism branch lines.(Drawn by Su, Chao-Hsu)


CHAPTER 2
A SCENIC TOUR OF THE ALISHAN FOREST RAILWAY

▼ The Fenqihu Garage of Alishan Forest Railway.

Railway Journey to the Flat Areas: Altitude between 30m and 127m

Chiayi Station

In 1902, the Kaohsiung-Chiayi section of north-south railway line in the west was completed, and Chiayi Station started to operate on the 20th of April. Completed in 1933, Chiayi Train Station is Taiwan's only consolidated train station that gathers TRA (Taiwan Railway Administration), sugar and forest railways. The first one was designed with 1067mm narrow gauge and the later two were designed with 762mm light rail. At altitude of 30m, Chiayi Station was once Taiwan's only union station of TRA, sugar and forest railways. Despite of the fact that sugar railway already disappeared today, Chiayi Station still maintains its operations of TRA and forest railways. From the angle of Platform 1, people can still see TRA's 1067mm track gauge lined up with Alishan's 762mm track gauge. A competition and pulling in activity of TRA and Alishan's steam locomotives was therefore taken place here before.

Peimen (Beimen) Maintenance Plant

Known as "Beimen Maintenance Workshop" during the Japanese colonization, Beimen Maintenance Factory was originally established in Beimen train depot in October of 1910, when sections in flat areas were open to traffic. However, it was officially launched only two years later in 1912 after a series of expansions of Alishan Railway. Beimen Maintenance Factory has a long history and is still the biggest maintenance base of Alishan Forest Railway. Today, a range of out of service trains can still be seen inside. For example, the locomotive maintenance depot on Linsen Road for diesel locomotives, the Emperor railcar of the Crown Prince Hirohito and accompanying service car, passenger car of Luodong Forest Railway, and Shay steam locomotive. Only the few very precious railcars are preserved in the garage.

Peimen (Beimen) Station

Beimen Station is 1.6km away from Chiayi Station and is located at altitude of 31m. As the gradient from Chiayi Station to here is only 16 out of 1,000, this section has the most gradual slope of Alishan Railway and people hardly notice that it is a part of mountain railway. Beimen Station is the inception point for the section from Beimen to Zhuqi when Alishan Express firstly operated in flat areas in 1910. Beimen wooden station, a Japanese style train station built with Alishan's Chamaecyparis, is located on the right side of Alishan Railway on the direction to the mountain. TRA's Baoan Station, which was completed in 1914, is also a Japanese style-train station made of Alishan's Chamaecyparis.

▼Beimen Station

Lumachan Old Station

Lumachan is 10.8km away from Chiayi at altitude of 82m and has two lines. Lumachan and Wanqiao were once the two biggest train stations in flat area between Beimen and Zhuqi, and the station building of Lumachan has been magically preserved. Lumachan, Zhuqi and Beimen old stations, which looked very shabby in the past, are the last three wooden train stations of Alishan Railway in flat areas. In December of 2004, the reconstruction work of the wooden Lumachan Station was completed and then the living quarter of station master in April of 2006, making the cypress station vintage, appealing, reminiscent and alluring.

▼Lumachan Old Station

Railway Journey to the Tropical Forest: Altitude between 127m and 800m

Zhuqi (Jhuci) Station


▼Zhuqi Station

Originally built in 1910, Zhuqi Station was renovated in 1952 to have today's look.In the age of steam locomotive, all the trains had to stop at Zhuqi for a period of time to change locomotive's position from the front to the back in order to push the train up to the mountain. Besides, the 18 ton steam locomotives had to be replaced by the 28 ton steam locomotive before went up to mountains. This is the reason why that Zhuqi Station is well-known among all Alishan Railway stations. Another feature of Zhuqi Station is "wye" (triangular junction), which was originally designed to turn around the locomotive. Nevertheless, as Alishan Express has fixed the train nose at the end of the train to hold the carriages after 1920, wye is no longer used as the train nose is now maintained on the direction to Chiayi.

Entrance of the Mountain: Niuchouxi Bridge

When it was firstly established in 1907, Niuchouxi Bridge was an ordinary wooden bridge. After the destruction of a number of typhoons and floods, it was rebuilt with Alishan's cypress and created something like Xiluo Bridge's Truss Bridgeto reduce the number of piers and to increase the bridge span. In the 1964, Alishan Railway built a new cement bridge to increase the bridge's driving safety, but the rear bridge piers were collapsed due to typhoon and flood. The authority therefore placed newly purchased steel beams on piers and created another look of the Niuchouxi Bridge. In 2008, Forestry Bureau took a reference of the wooden Truss Bridge built during the Japanese colonization and rebuilt the bridge with steel beams. This bridge then became only operating truss steel bridge for forest railway in Taiwan.

The Two Marvelous Horseshoe Curve and U-Turns

From Zhuqi to Mululiao, there are two big horseshoe curve and U-turns that the train track is almost bent into a circle and then turned back. One of the U-turns is 16km away from Chiayi, right in front of the path to Hudi Guanglu Temple; another one is 17km away from Chiayi, right next to County Highway 115 on the direction to Jiarenshan. This U-turn design is also known as "Ω type turn" and, among the world's five technological solutions of hill-clibing railway, it is the most often seen method that decreases the gradient by lengthening the route. If passengers look at the right side window when the train passes the U-turn, they will see the railway that they have just passed through on the bottom right. After a 180 degree turn, the altitude of the railway will be increased unwittingly and passengers will be able to enjoy a wide vision again.

Zhangnaoliao (Jhangnaoliao) Station

At altitude of 543m, Zhangnaoliao Station is 23.3km away from Chiayi. During the Japanese colonization, this place was once an important site for producing camphor and the station was known for camphor trees planted all around it.Planted by the station master of Zhangnaoliao Station, the two rows of camphor trees have become a boulevard of flourishing camphor trees. Something special about Zhangnaoliao Station is that it is a switch back station. To prevent trains being stuck in climbing route and having difficulty to move upward, the main routes with a gradient over 5 out of 1,000 were designed with an alignment built on the left of the track in flat areas to let the train enter the station during the Japanese colonization. This is the reason that this station's railway track was designed with an "X"shaped switch back. If an upward train enters the station to wait for the incoming train, it shall drive into the lateral alignment in flat area, park and then reverse to enter the right station track. As for the downward train, it can directly pass through and drive away.


▼Zhangnaoliao Station

Dulishan Loop Line and Spiral Route

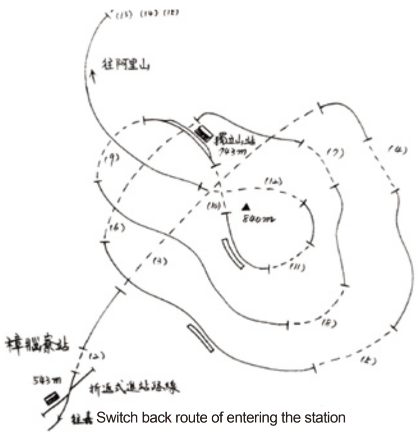
Loop Line and Spiral Loop of Mountain Railway

The most appealing parts of the Alishan Forest Railway are the switch backs, so-called “Alishan Express running up against the wall”, and the “mountain railway” of Dulishan’s spiral loop. Spiral loop is the second method of the world’s five technological solutions of hill-climbing railway and the one with most loops of Alishan Railway.

Dulishan’s spiral mountain route is known far and wide for a very long time. At altitude of 816m, Dulishan is not a steep mountain, but a very peculiar one. If visitors look down at Dulishan from the mountain top on the opposite side, they will see the train appeared at four different altitudes and observation decks established in the first and third loop of the railway.

For passengers who climb up to Dulishan to Zhangnaoliao by taking Alishan Express, they may choose to sit on the left side window, which provides you a good position to see Zhangnaoliao Station four times at the different altitude. They are 25.3km away from Chiayi at the exit of Tunnel No. 5 (the first loop); 26.9km at the exit of Tunnel No. 8 (the second loop); 27.8km at the exit of Tunnel No. 10 (the third loop) and 28.5km at the exit of Tunnel No. 12 (the fourth loop). For the first, second and fourth loops, the station can be seen from the left side window; for the third loop, the station can be seen after passed through Dulishan Station from the right side window. “Look back the past roads and here they are beneath the window at the foot of hill” – this is the marvelous feeling of climbing up the mountain through spiral route by taking the train.

▼The loop line and spiral route of Dulishan



▼An overview of the Dulishan railway

Dulishan Station

Situated at altitude of 743m and 27.4km away from Chiayi, Dulishan Station is right inside a valley between the inner side of Dulishan and southern side of Hongnankeng. Therefore, Dulishan Station cannot be seen from Zhangnaoliao, but from Jianqingtai (Jianqing Deck) situated in the "C" shaped mountain range after the train leaves Dulishan and makes a big turn, and from Yizhishan located on the ridgeline behind Dapingshan. Today’s Dulishan Station still preserves the water crane used to add steam locomotive’s water. As there are many visitors visiting Dulishan now, almost every train stops by during the holidays. The station and surrounding facilities have also been repaired, making the station a new popular sightseeing spot.

Dulishan Station is located between Tunnel No. 9 and Tunnel No. 10. The old brick entrance of Tunnel No. 10 was very characteristic, but was unfortunately reconstructed. In the past, people could also see the fourth loop train passing through from the top of the tunnel. Today, the spot has been covered by weeds and bushes that people can only hear the train behind the bushes instead of seeing it.

▼Dulishan Station

Railway Journey to the Subtropical Forest: Altitude between 800m and 1,800m

Jiaoliping Station

Jiaoliping Station is at altitude of 997m. Jiaoliping is only 3.5km away from the Liyuanliao Station and this section is the only climbing route of Alishan Railway that has no “tunnels”, but only switch backs. The length from Chiayi Station to Alishan Station is 71.4km and Jiaoliping is at 34.9km, around the middle of the Alishan Railway. As Jiaoliping is also connected with highway, Alishan Express that used to go up and come down the mountain every day would meet here at 3:13pm in the past. Today, as Alishan Express must exchange train tokens in front of Jiaoliping Station before continuing its journey, passengers who wait here to watch trains intersecting each other will see the interesting view of conductors exchanging the tokens.

Shuisheliao (Shueisheliao) Station


▼Shuisheliao Station

At altitude of 1,186m, Shuisheliao Station is located at the end peak of Sitianwangshan (formed by four mountains above1,400m), which is right in the cove exit between Sitianwangshan and Shipanlongshan. The exit, which faces the south and is featured with a great view, used to be a compulsory route for people who hiked Sitianwangshan and Shipanlongshan (1,380m): with only 45 minute hiking from the train station, people can reach the peak of Sitianwangshan. The most interesting thing about this station is that its trackforms into a shape of “Ω”. In other words, trains will make a 180 degree turn from entering to leaving the train station. Among all Alishan Railway stations, only Shuisheliao and Erwanping have this kind of design. Today, Shuisheliao has become a bat ecological and educational guide station, with a new prosperous beginning.

Fenqihu (Fenchihu) Station

Fenqihu Station is at altitude of 1,403m. Originally named "Benjihu" (literally means “dustpan”), Fenqihu is located in a triangular basin beneath Guanglunshan (1,815m). As it is surrounded by mountains on three sides, it was therefore named after its dustpan-like shape. Despite of being called the “lake” (“-hu”), it is actually not a lake and definitely no water as “-hu” here refers to the “basin”. Benjihu was then renamed Fenqihu because of homonym. In the past, Fenqihu was known for its boxed meal and square bamboo. In early years, Alishan


▼Fenqihu Station

Railway was mainly used to transport lumbers and it had one passenger and freight mixed train going up and coming down the mountain. The upward train departed from Zhuqi in Chiayi at 9:00am, arrived in Fenqihu at 11:45am and reached Alishan at 2:20pm; the downward train departed from Alishan at 9:30am and arrived in Fenqihu at 11:47am. As these two trains would meet and park here for a while during the lunch time, local catering business was therefore prospered and turned Fenqihu “The City of Boxed Meal(Lunch Box)”.

Fenqihu Old Station and locomotive depot are one of the local scenic spots.Fenqihu Old Station is a wooden train station located on the right side of the old Fenqihu Street entrance. Before the new station was launched, this station was used as the Fenqihu Railway Maintenance Section. Later, as therestoration of historic sites became a trend, this building was fully renovated in 2004. At the moment, Alishan Railway has six wooden old train stations including Beimen, Lumacha, Zhuqi, Fenqihu, Alishan and Zhaoping. Apart from Beimen and Zhuqi which and restored according the original look of the historic site for preservation, others were rebuilt after dismantled the historic sites.

Shizilu (Shitzulu) Station

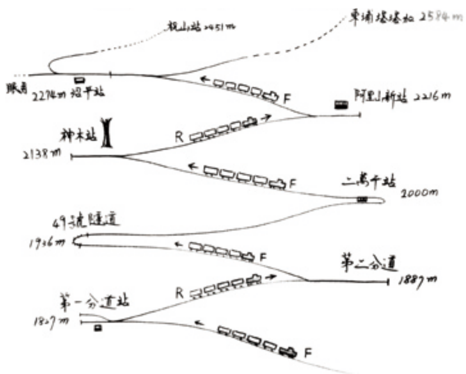
Shizilu Station is located on the ridgeline at the southern foot of Shizilushan (1,558m). Southwards, it can access the hill tribe of Tapang hosa (Tsou people) and, northwards, reach Fengshan, Laiji (Pnguu tribe) and Taihe (Haliwei tribe). As the place was the entrance of entering Alishan Historical Trail and other historical trials to Laiji and Tapang tribes, it was named “Shizilu” (literally means the “crossroad”). Before Alishan Highway was constructed, aborigines often got on and off at this station. The station therefore had its importance until Alishan Highway was open to traffic. The station has a “S” shaped railway and Tunnel No. 39 on the uphill direction has a unique stone-made entrance. Besides, two sides of the railway on the downhill direction were planted with Cryptomeria, making it a great place to find tranquility and have a good exploration.

As landslides often occur in sections above Shizilu, this place is often used as the transfer station of Alishan Railway and highway apart from Fenqihu. With frequent passengers, Shizilu Station and Shifen Station share a similarity: the trains are very close to houses. Besides, it also has European-style B&Bs that look exceptionally eye-catching. After 2003, Shizilu Station even built a wooden observation desk that enables visitors to watch the romantic sunset and cloud sea of Tashan. All of these have turned this place a new scenic spot with a great potential in tourism.

Switch back (zig zag) mountain route

Switch back (zig zag) mountain railway

▼ The Switch Back Route of Alishan Railway



Switch back mountain railway is also known as "Alishan Express running up against the wall". To overcome the problem of not being able to turn at the curves on the mountain due to little space after Bingzhena, Alishan Railway has adopted the switch back (zig zag) mountain railway design. The train was originally pushed up to the mountain from the left-side railway and then, after parked and reversed the turnout, climbed up from the right-side railway. This kind of "Z" shaped railway is formally called "Switch Back" and is often applied in mountain railway design in many countries.

Here in this place, Alishan Railway has adopted both "switch back" and "U-turn" to climb the mountain. Apart from two big U-turns in Erwanping Station and Tunnel No. 49, there are four turning points for switch back, including: 1-st switch, 2-nd switch, Shenmu Station and Alishan Station. If today's Shuishan Line (i.e. Zhaoping Station to the direction of Dongpu and Tatajia) is also counted, there are totally five points that "run up against the wall" and seven zig zags. This unique vertical climbing method – sometimes forward and sometimes backward – has therefore become the best selling point of railway traveling for this section.

Switch back turning point is important for trains to make a reserve and to intersect. After Alishan Express stops, the conductor will jump off the train, reverse the turnout, and then jump on the train when the train slowly moves. Their agile moves often impress many foreign tourists and some even applaud them! After knowing about it, many passengers on the Alishan Express often pop their head out with the camera to watch the conductor's performance at the switch back turning point!

1-st switch

"1-st switch" is at altitude of 1,827m and is 62.7km away from Chiayi. Starting from here, all the trains climb up the mountain in switch back. The place also has a station building and dual tracks for trains to intersect. However, they are no longer be used. In early years when Alishan mixed passenger car (ordinary train) was still available, at least two trains would intersect here every day! From the 1-st switch to 2-nd switch of Alishan Forest Railway, the trains were "pushed up" to the mountain instead of being "pulled up" as it is today. From the appearance, the pushed up Alishan Express seemed to be back to normal here. However, as the train's moving direction was on the opposite side of the seat, passengers inside the carriages would feel like moving backwards and quite uncomfortable. When the tourism of Alishan just started to be developed, some people had little knowledge about it: they thought that they went too far and ran up against, so that they had to return backwards. This is how the hearsay "Alishan Express running up against the wall" was created.

▼1-st switch

Railway Journey to the Temperate Forest: Altitude between 1,800m and 2,274m

Erwanping Station

After passing through three zig zags – 1-st switch, 2-nd switch and Tunnel No. 49 – continuously, Alishan Express will eventually reaches the fourth zig zag “Erwanping Station”. As it arrives in Erwanping, it is actually at altitude of 2,000m. The pronunciation of the word “-ping” originally used in its name refers to “spacious land” (Chinese: “坪”) instead of today’s “flatness” (Chinese: “平”). When Alishan Railway was firstly opened in 1912, Erwanping Station was its last station. At that time, the station was established not only with wye to reverse the train, but also a train depot. Later in 1914, Alishan Railway was extended to today’s Zhaoping Station and the depot also moved to the proximity of Zhaoping. Erwanping, which was originally designed as the end station, then gradually lost its function. Apart from the wye, Erwanping Station is also featured with a U-turn. As Erwanping is also one of the seven zig zags of the switch back route, the train has to make a U-turn behind the wye before going up to the mountain. In nowadays, only Erwanping and Shuisheliao have this kind of station with a big U-turn.

Shenmu (Sacred Tree) Station

Known for its “Five Wonders”, Alishan has another important symbol and landmark: the famous three thousand year old chamaecyparis “Shenmu” (Sacred Tree). As the matter of fact, Shenmu Station is the forest railway’s “Third Lane” that the train must stop first before heading towards Alishan Station. As the high and erect Shenmu is particularly lofty in the forest, it often becomes the lightning target. Around 4pm on the 7th of June 1956, Shenmu was struck by lightning in a dusk thunderstorm and got on fire. Not only was its trunk burned into hollow ragged hole, but also its height was reduced to 35m only. On the 1st of July 1997, a torrential rain caused cracks of Shenmu and made it half-falling due to loose soil and ponded water in the trunk. To avoid accidental collapse that may cause tourist casualties, an electric saw was used to lay it down at 12:53pm on the 29th of June 1998 and Shenmu officially entered the history. The renowned landscape of Shenmu under the bright sunshine has now become an eternal memory of Alishan.

Alishan Station

At altitude of 2,216m, today’s “Alishan Station” is the terminal station of Alishan Mountain Railway and the start point of Alishan Forest Railway’s branch lines (Zhushan Line, Mianyue Line).

As this end station of mountain railway and the start point of Alishan branch lines, Alishan Station is actually a switch back station: Downward to Shenmu is “Shenmu Line” and upward to “Zhaoping"is “Zhaoping Line”. This has divided the main route of mountain railway into two new branches.


▼Alishan New Station


▼Zhaoping Station (photographed by Liu, Chin-Yuan)

On the night of September 21 Earthquake in 1999, Alishan Station was damaged and concrete blocks scattered on the ground. The New Station therefore became a condemned building. It was firstly sealed and then, due to safety concern, dismantled. In September of 2007, the station rebuilt as a wooden building was launched. Today, Alishan Station is the biggest wooden train station in entire Taiwan.

Zhaoping (Chaoping) Station

On the 11th of March 1981, Alishan Forest Recreation Area was officially launched. At that time, hostel and the catering industry nearby by Alishan New Station sprang up like mushrooms. This not only took away visitors of the old Zhaoping Station, but also turned Alishan Forest Recreation Area a new hot tourist attraction. After Alishan Highway opened to traffic on the 1st of October next year (1982), a parking zone was built in the square in front of Alishan New Station.

Therefore, apart from those who made reservation at Alishan Gou Hotel that needed to take train to Zhaoping Station, others passengers would normally go to Alishan New Station directly and stayed in nearby hostels. Zhaoping Station therefore degenerated into a train station for branch lines such as Zhushan Line and Mianyue Line. At the end of 2008, the reconstruction project of Zhaoping Station was awarded. On the 22nd of April of 2013, the project was completed and the wooden station was officially launched. Among the six wooden stations of Alishan, it is at the highest altitude and is Taiwan’s highest wooden train station.

Branch Lines of Forest Railway: Altitude between 2,274m and 2,451m

Zhushan (Chushan) Line: The Highest Railway in Taiwan

The sunrise of Alishan is known far and near for a very long time. During the Japanese colonization, although there were trails to Duigaoyue and Zhushan for people to watch the sunrise they were winding paths that cannot be passed through easily. In 1971, Forestry Bureau started to develop tailored forest road, built the Sunrise Viewing House, and established Zhushan Bus to transfer passengers with middle size buses. Although the traffic condition was improved, there were still many illegal taxis soliciting customers on the Zhushan Forest Road and increasing the price arbitrarily, which have seriously damaged the quality of traveling and watching the sunrise.


▼Zhushan Station


▼The splendid sunrise

Forestry Bureau therefore gave an order to seal Zhushan Forest Road and only vehicles with the pass could enter this area. Nevertheless, after the launch of Alishan Highway in October of 1982, the enormous number of visitors who came to watch the sunrise really made the place overcrowded. Therefore, from May of 1984, Forestry Bureau started to build the railway (Zhushan Line) to serve people who come to watch the sunrise. Besides, among all the Alishan Forest Railways, Zhushan Line is the only railway built by our people.

Zhushan Line, which starts from Alishan New Station and ends at Zhushan Station, is extended eastwards from Shizifendao (Cross-Turn Lane), a station located in the middle way of Mianyue Line. As parts of its front section were built on the roadbed of “Tashanli Line” and the rear section was redeveloped according to the terrain, the entire line had no tunnels. Before reaching Zhushan Station, the train will firstly pass through “Duigaoyue Station” before reaching Zhushan Station. With a total length of 6.25km, Zhushan Line ends at Zhushan Station, which is Taiwan’s apogee and the highest train station at altitude of 2.451m. The construction work lasted for a year and half and the maximum gradient is 55 out of 1,000. On the 13th of January 1986, Zhushan Line was officially launched. Due to the enormous crowd for the sunrise, Zhushan Line is the most profitable branch line of Alishan Railway.

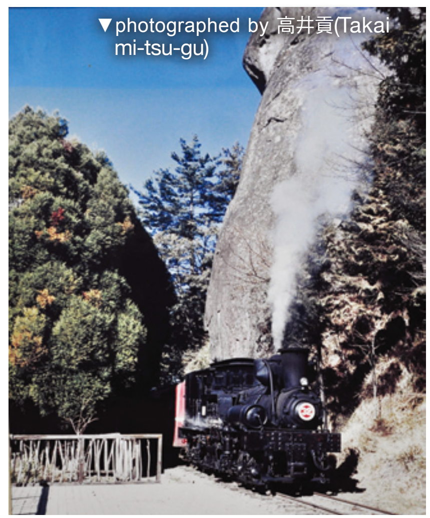
Mianyue Line: The Sad Legend of Kawai Shitarō

Mianyue Line was Tashan Line developed between 1913 and 1915. Its origin is a legendary history. When Fujita Group was constructing Alishan Railway in 1906, Dr. Kinzan Kawai, one of the contributors of developing Alishan, went to Shigupanxi (Shigupan River) to investigate the forest there. One day when he laid on a big rock, he saw the bright moon slowly climbed up the mountain and the erect old trees all surrounded him. Impressed by such natural landscape, he listened to the flowing water, mused over things of the earth, and could not sleep for a very long time. Thirteen years later (1919), he returned to the place where he stayed overnight before and found that all the old trees were cut down. All the vegetation on the mountain was gone that the ground was covered with giant lumbers to be transported down to the mountain. Crushed with a great sorrow, he wrote this poem:

“The axes entered the verdant tranquil mountain and cut down the forest of thousand-year old trees.

My stone pillow and moss mat were gone and only the flowing water reminds me the old good memory.”


▼Mianyue Line


▼photographed by 高井貢(Takai mi-tsu-gu)

To memorize the good memory of sleeping under the moon and being together harmoniously with the great nature, the place was named “Mianyue” (sleep under the moon) and the story was passed on to the future generation. This is the origin of the name “Mianyue”.

Formerly retired on its laurels in 1979, Tashan Lineis featured with forests of Chamaecyparis and cryptomeria. These local resources were also drawn to build wooden bridges, which look very impressive. Long before Mianyue Line open to traffic, “Axi Vertical Hiking Trail“ – a 36km long hiking route from Alishan to Xitou – was a prevalent trend. Due to its beautiful landscape and the beauty of forest railway with luxuriant trees, Mianyue Line was rebuilt and launched with steam locomotives on the 11th of February 1983. This not only attracted a surge of tourists, but also caused a great sensation inside and outside the country!

The specialty of Mianyue Line is “Taiwan Pleione” (Pleione formosana Hayata). Known widely around the world for its elegant flower form, Taiwan Pleione blossoms every March and April, and mainly grows on the palisades from Tunnel No.

5 to Tunnel No. 10. "Taiwan Pleione Nature Reserve" was then established to prohibit citizens from picking up Taiwan Pleione illegally. In 1996, Mianyue Line and Zhushan Line even launched the new type passenger carriages simultaneously to serve the tremendous crowd. In the past, Mianyue Line was always full of crowds in weekdays and holidays, which created a considerable tourism revenue for Alishan Railway suffered from a serious deficit, until its suspension after the September 21 Earthquake. Today, the earthquake has been gone for more than ten years. People of the nation all wish that this beautiful forest railway will "see the light of the day" again and that Mianyue Line will not be ended in this way. It is our expectation that, in the near future, Mianyue Line will be launched again.

Dongpu Line: The Lost Altitude at 2,584m

Among Alishan's forest farm lines, there is one legendary high elevation mountain railway that is above altitude of 2,500m and has 49 bridges. Featured with the beauty of forest and mountain railways, it has the romance of poem-like misty forest, splendidness of changing cloud seas and vastness of tremendous mountains. This Taiwan's highest railway is the disappeared Dongpu Line.


▼A model of Dongpu Line

In 1931, Japanese people started to rebuild the rear section a trial nearby Zizhong into a railway. After the railway from Zhaoping to Tatajia (Tsou: Tataka) through Xingaokou (Japanese: "Niitaka", refers to "new highest") was completed section-by-section in 1932, a direct train from Chiayi to Xingaokou was launched in 1933. In 1934, hikers to Yushan (also known as "Jade Mountain" and "Xingaoshan / Niitakayama") could take the Dongpu forest farm line to Xingaokou and started their hiking from there. As it helped to save hikers' time, the number of hikers therefore largely increased. In the same year, Lulin Lodge was also completed for hikers to take a rest. On the 17th of December 1937, Japan established "Xingao Alishan National Park (Japanese: Niitaka Arisan National Park)", whichcreated tremendous visitors to Xingaokou (Japanese: Niitaka) to hike Xingaoshan (i.e. Yushan, Japanese: Niitakayama). Taking Alishan Railway to hike Xingaoshan almost became a nationwide activity during the Showa era that even people lived in Japan also formed groups to visit the place. The name of Dongpu Line was therefore known nationwide and abroad. Apart from transporting lumbers, Dongpu forest farm line also became a "Scenic Railway for Hikers of Yushan" that revealed the beauty of mountains and cloud seas along the way to the world.

The end station of Dongpu Line was TatajiaDongpu Forest Depot at altitude of 2,584m. It was the apogee of Taiwan's railway in history and made Dongpu Line the highest narrow-gauge mountain rail in Asia. Unfortunately, no one ever realized that the Dongpu Line's importance was on the fact that it was the highest narrow-gauge mountain rail in Asia as people in that generation generally believed that highway was more important than railway. At the end of 1978, Dongpu Line was closed due to the completion of lumber collection works. Later in July of 1979, people started to dismantle this forest farm line and asphalt was poured over on the old railway bed to build "New Central Cross-Island Highway" (Provincial Highway 18, from Alishan to Tatajia). Dongpu Line therefore became a history.

Shuishan Line: The Re-launch of the Front Section of Dongpu Line

The front section of the past Dongpu Line is from the old tunnel of New Central Cross-Island Highway to the old railway in Zhaoping, which has a good roadbed in general. As for the rear part of Dongpu Line, it has now become the roadbed of New Central Cross-Island Highway. As the rear part was dismantled, the remaining railway was therefore extremely precious as it was the last remains of Dongpu Line. With a length of 1.6km, the last section – from Zhaoping to the old tunnel of New Central Cross-Island Highway – had long been preserved by Forestry Bureau, only it was covered by weeds and the collapsed bridges can no longer be passed.

In 2003, Forestry Bureau decided to repair and restore this section and its side slops and bridges were all rebuilt. The reconstruction work was completed in 2004 and officially named as "Shuishan Line". This branch line also became Alishan's newest tourist branch line after Mianyue Line and Zhushan Line. Nevertheless, due to failed privatization, natural disasters and other reasons, Shuishan Line was unfortunately suspended with an unknown schedule for reactivation. In the future, it is expected to have Shuishan Line re-launched with steam locomotive train and cypress carriages in order to show the charm of forest railway in the most primitive way. So let's wait with our great passion!


▼Shuishan Line

▼ Alishan Express entering the snow field of temperate forest.

CHAPTER 3
THE RISE AND FALL OF ALISHAN FOREST RAILWAY OVER THE CENTURY

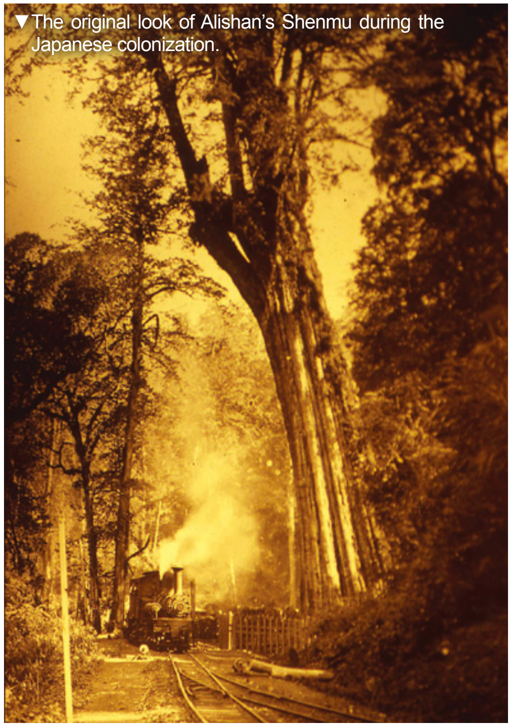
Japanese Colonial Period: Lumber Transport (1912 to 1945)

In 1910, Office of the Governor-General of Taiwan took over the construction project; on the 25th of December 1912, the traffic from Chiayi to Erwanping was officially opened; on the 14th of March 1914, the opened route was extended to Zhaoping Station and the following sections of Alishan Railway's Main Line was then finalized. With a total length of 71.9km, the Main Line of Alishan Forest Railway was completed.

When Alishan Forest Railway was firstly opened in 1912, it was used only to transport lumbers. In 1918, freight cars were remodeled to transport not only lumbers and freight, but also passengers due to the needs of residents along the railway. This was the beginning of Alishan Railway's passenger transportation service. In 1920, Forest Bureau was decommissioned and replaced by Forest Office of Production Bureau. Beimen Maintenance Plant under the Chiayi Branch Office of Production Bureau (today's Chiayi Forest District Office of Forestry Bureau)was requested to build passenger cars and to launch the operation of freight and passenger mixed trains. As the railway was then used to transport passengers and livelihood materials, the railway built for the lumbering industry was shouldered with the new traffic function between flat areas and mountains. The operation of Alishan Forest Railway also put on the right track.

From the 1st year of Showa in 1926, Alishan Forest Railway was becoming busy. As Alishan Railway was extended to Xingaokou in 1933, a direct train from "Chiayi to Xingaokou" appeared: departed from Chiayi at 9:38am, arrived in Alishan Zhaoping Station at 4:00pm, departed 4:10pm and headed towards Xingaokou, and then reached the destination at 5:25pm. This train schedule was designed for passengers who wished to hike Xingaoshan (Yushan), so that they could stay in the lodge overnight and started to hike Yushan the next day.

From the 10th year of Showa in 1935, an enormous amount of Alishan's best lumbers were exported from Taiwan to Japan as Yasukuni Shrine's building material. On the 17th of December 1937, Japan established "Xingao Alishan National Park (Japanese: Niitaka Arisan National Park)", which created tremendous visitors to Xingaokou to hike Xingaoshan. Taking Alishan Railway to hike Xingaoshan became a nationwide activity during the Showa era that even people lived in Japan also formed groups to visit the place. This made Xingaokou the primary scenic spot of Taiwan's railway during the Japanese colonization. Nevertheless, this boom was temporarily ended in 1941 as WWII exploded.


▼The original look of Alishan's Shenmu during the Japanese colonization.


▼Beimen Station in the past (Drawn by Su, Chao-Hsu)


▼Xingaokou in the past (Drawn by Su, Chao-Hsu)

What are the Differences of Alishan Forest Railway before and after the Retrocession of Taiwan?

When Alishan Forest Railway was firstly opened, the distance between Chiayi and Alishan Zhaoping Station was 71.9km in 1914. At that time, the entire route ever had 25 stations situated at different altitudes (from 30m to 2,274m), 72 tunnels with a total length of 9.857km, and 114 bridges with a total length of 2.8km. Its maximum gradient was 66.7 out of 1,000 (TRA is only 26 out of 1,000) and the minimum radius of curvature was only 40m (TRA's Main Line is 300m and branch line is 200m). Due to the long route, big gap, numerous tunnels and bridges, and steep and winding tracks, Alishan Forest Railway was therefore built into a great mountain railway due to the extreme environment.

After the retrocession of Taiwan, its operation was often interrupted mainly because of natural disasters and Forestry Bureau therefore gradually made improvement on the route conditions in order to repair them in time. Comparing its status in 2014, small tunnels were dismantled or merged, bridges were rebuilt or the route changed, the number of Main Line's tunnel reduced to 49 and bridges to 75, the maximum gradient reduced to 62.5 out of 1,000, and the distance from Chiayi to Alishan Station is 71.4km and to Zhaoping Station is 72.7km. All of these statistical data have now become the standardized information to introduce Alishan Railway.

But, does it mean that there will no more changes? No! Typhoon Morakot(2009) destroyed Tunnel No. 46 and it is a must to rebuild a long tunnel and a number of shielding tunnels. Typhoon Morakotal therefore flashed away many bridges that must be rebuilt. The frequently occurred natural disasters are the variants of Alishan Forest Railway's statistical data! Although Alishan Railway already restored its operation to Fenqihu on the 27th of January 2014, all the statistical data shall be finalized in 2015 when the entire route is open to traffic.

In the Early Years of Taiwan's Retrocession: Lumber and Passenger Transport (1945 to 1963)

After the retrocession of Taiwan, Alishan Railway was transferred from Taiwan Development Co., Ltd. managed by Japanese peopleto Forestry Bureau of Taiwan Province and managed as a forest railway. Continued its missions during the Japanese colonization, Alishan Railway not only transported livelihood materials and agricultural products between flat areas and mountains, but also relied mainly on lumber cars with little passenger cars. At that time, freight and passenger mix trains were still its main force.

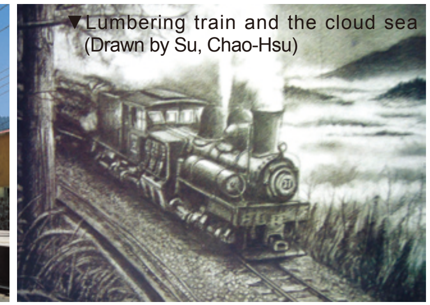
In the early years of the retrocession, two of the most famous trains of Alishan Railway were mixed train No. 51 and No. 52. No. 51 departed from Chiayi at 8:00am, arrived in Fenqihu at 11:45, reached Alishan at 14:40 and the same schedule continued until the 1980s; on the other side, the downward train No. 52 departed from Alishan at 9:00am, arrived in Fenqihu at 11:47 and met the upward train there, and reached Chiayi at 15:07. These two trains happened to meet in Fenqihu during the lunch time and stopped there for 15 minutes to reverse the locomotive and to add coals and water. Because of this, Fenqihu is also reputed as "The City of Boxed Meal".

Besides, during that period, there were at least 6 lumber cars going up and coming down the mountain every day in average. For example, the long-history upward train No. 111, No. 113 and No. 115, and the downward train No. 110, No. 112 and No. 114 all adopted Shay steam locomotive as the primary transportation force. When the steam locomotive came down the mountain, it could haul maximum 9 cars with full-load of lumbers or freight and its maximum speed per hour could reach 16km/h. Although the trains had less loads due to downgrade, it was still a must not to get overloaded to ensure a normal functioning of the train's brake power.

After the retrocession of Taiwan, the apogee of Alishan Forest Railway was maintained at Dongpu Forest Depot in Tataka instead of further developing the railway to remote mountains. In the 1960s, the transportation method of Alishan Railway also changed. For example, trucks and trains were both adopted to transport goods in areas around Dongpu Line and Nanzixianxi (Nanzixian River), and cable ways were used to transport lumbers. Besides, as Dongpu and Mianyue lower branch lines had relatively more forest resources, they also tended to be busier at transporting lumbers. However, at that time, forestry resources were already reduced due to the overdevelopment during the Japanese colonization and the lumbering industry could hardly be maintained. This is the reason that, 20 years after the retrocession of Taiwan, Taiwan's forestry transformed itself from lumbering to conservation and forestation.

From 1945 to 1963, two important things happened: one was the launch of diesel powered railway. Although Forestry Bureau's plan to purchase four diesel locomotives (11403-1 to 11403-5) was failed, this experience had built a good foundation for the future of diesel powered cars. Another one was the August 7 Flood happened in 1959 and its scale of damage was no less than Typhoon Morakot(2009), which happened 50 years later. The only difference was that, as Alishan Highway was not existed that time, it was a must to immediately resume the railway transportation as people lived in mountains were stuck there without food. This resulted not only in the crush accident of No. 27 steam locomotive and "the death of the driver," but also in the legend of Tunnel No. 24 – the first tunnel of Alishan Railway built by people of the nation.


▼Steam train at Fenqihu Station


▼Lumbering train and the cloud sea (Drawn by Su, Chao-Hsu)

Alishan Forest Railway
Transformation of the operation unit over the last hundred years

1906 – 1908	Fujita Group (Construction)
1910 – 1914	Alishan Work Station of Production Bureau (Construction and Operation)
1915 – 1918	Alishan Branch Office, Forest Office
1919 – 1919	Chiayi Branch Office, Forest Office
1920 – 1925	Chiayi Branch Office, Forest Office, Production Bureau
1926 – 1942	Chiayi Branch Office, Forest Office (Forestry) / The Taiwan Development Co., Ltd. (Railway)
1943 – 1943	Chiayi Forest Office, Production Bureau (Forestry) / The Taiwan Development Co., Ltd. (Railway)
1944 – 1945	Chiayi Forest Office, Tainan Prefecture (Forestry) / The Taiwan Development Co., Ltd. (Railway)
1945	Transferred to the government of Republic of Taiwan after the retrocession of Taiwan
1945 – 1947	Forestry Bureau Alishan Forest Farm, Department of Agriculture and Forestry, Chief Executive Office, Taiwan Province
1947 – 1960	Alishan Forest Farm, Forestry Administration Division, Department of Agriculture and Forestry, Taiwan Province
1960 – 1989	Forestry Bureau Yushan Forest District Office, Department of Agriculture and Forestry, Taiwan Province

Transformation from the Lumbering Railway into a Tourism Railway (1963 to 1982)

The 1960s was a crucial period for Alishan Railway's transformation from an industrial railway to tourist railway.

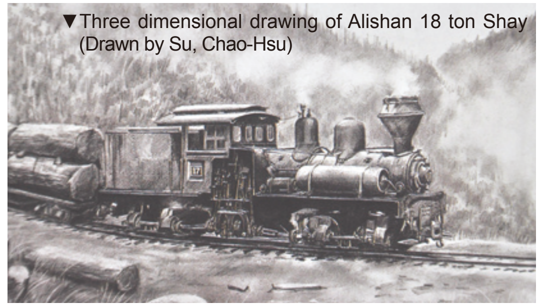
When Zhongxing Diesel Passenger Car was firstly launched in 1963, it was well-reputed for the fast speed and stability. As Alishan Railway just started to launch diesel powered railway at that time, the old steam locomotives, wooden bridges, primitive landscape of the railway were all preserved. The co-existed old forest landscape and new railway services created a special atmosphere that attracted lots of Japanese tourists to experience Alishan Forest Railway.

In 1969, Alishan Railway started to replace steam locomotives with diesel locomotives, which was not good news at all. According to the dictation of Matsumoto Kenichi, a Japanese prestigious scholar of railway, the reason that Japanese media and tourists crowded into Alishan Railway in 1968 was that they had heard of the decommission of Alishan steam locomotives from the Main Line next year. Especially Alishan's Shay steam locomotive had a very long history and was truly compelling that many foreigners loved to take ordinary trains pushed by steam locomotive in order to experience its special climbing method – not even mentioning the natural landscape along the route was truly a feast for the eyes.

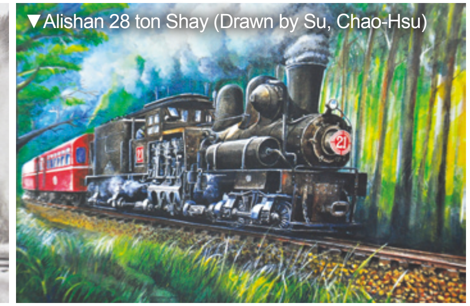
Although most of the steam locomotives used in the Main Line was successively decommissioned in the 1970s, few Shay steam locomotives still remained to haul freight cars and to be used for extra trains. Besides, Few Shay steam locomotives were still preserved at Alishan and Chiayi stations. For example, No. 12 and No. 17 locomotive at Alishan Station, which were the attractions at that time. In 1971, Alishan Shay steam locomotives still existed and, due to media reports, they were known nationwide and abroad that almost every tourist train was crowded with people. Therefore, "Guangfu Passenger Car" was launched and, during the period around 1976, Alishan Railway's traffic volume reached the highest point.

In the later stages of the 1970s, Taiwan had no idea about cultural assets and railway preservation that time. Forestry Bureau therefore cooperated with the Department of Transportation of Taiwan Provincial Government to rebuild tunnels and bridges to increase the safety of railway operation. This resulted in a gradual disappearance of many historic sites including wooden passenger cars. The most regrettable thing is that, since 1978, all the railways of forest farm lines were suspended and the railway bed of Dongpu Line was used to build New Central Cross-Island Highway (Provincial Highway 18). Since then, the railway to the clouds from Alishan to Tatajia eventually disappeared!

Today, when we look back this crucial period, we may realize that we have already missed the golden of preserving Alishan Railway. The government at that time did not have a person of vision to propose environmental conservation and cultural asset policies. The officials also lacked of the total amount control concept and let the highways be developed arbitrarily. This resulted in an unbalance of soil and water conservation, damages of the national land, weakened competitiveness of mountain railway, and irrecoverable risks that caused the decline of Alishan Railway.



▼Three dimensional drawing of Alishan 18 ton Shay (Drawn by Su, Chao-Hsu)



▼Alishan 28 ton Shay (Drawn by Su, Chao-Hsu)

▼In the later stage of 1970s, Forestry Bureau started to rebuild new tunnels and bridges to enhance the safety of railway operation.

The Launching of Alishan Highway and the Decline of Railway (1982 to 1999)

The 1980s was a crucial period for Alishan Railway as it started to decline.

In March of 1981, Alishan Forest Recreation Area was officially launched. Following the launch of Alishan Highway in October of 1982, Main Line passengers taking Alishan Railway to the mountain could no longer be seen as passengers of the mountain railway were swept by vehicles. Since then, the traffic volume of forest railway dropped to the bottom and, despite of the launch of Guangfu Passenger Car in 1983 and new Alishan Express with an air-conditioning system in 1984, Alishan railway was not managed to compete with the highway in terms of fare and traveling time.

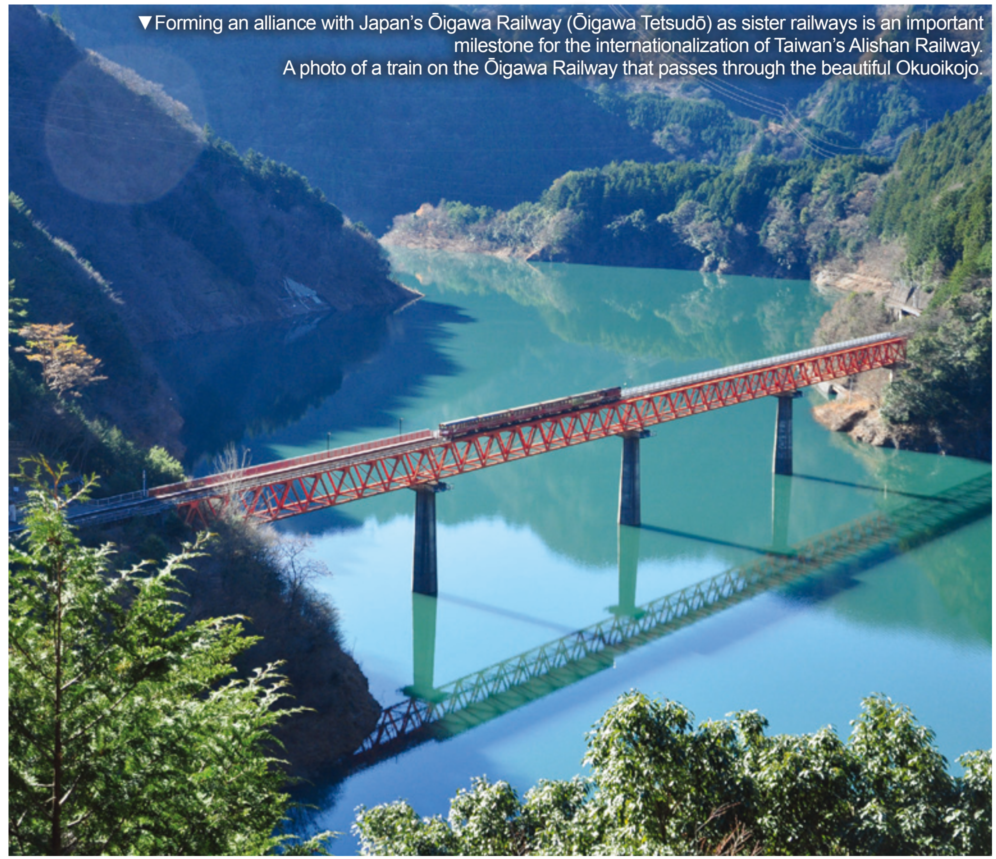
When we turn back the time, we see that the great deficit of Alishan Railway was mainly caused by the unlimited competition with highway vehicles and the tremendous amount of tourists also worsened the quality of Alishan Forest Recreation Area. As the matter of fact, many countries have not only set the policy that only mountain railways can reach the peak and highways only reach surrounding areas, but also applied total amount control measures. As Alishan Railway was suffered from deficit for many years, the privatization of Alishan Railway was then proposed.

Besides, the launch of Alishan Highway also changed the freight transport pattern in high mountain areas. Replaced by highway, the freight transportation of Alishan Railway only had the name existed. In 1988, Alishan Railway officially decommissioned freight and passenger mixed trains, which had a history over 60 years. Besides, small stations along the route were also downgraded to staffless stations. In 1990, Zhongxing Diesel Passenger Car, which had been driven for almost 30 years, was closed and Alishan Express only had one train going up and one train coming down per day. The railway operation was therefore dropped to the bottom and only counted on the tourism revenue of Alishan Railway's branch lines and Alishan Forest Recreation Area to have its operation maintained.

Nevertheless, these difficult years were also the years of brightness. In February of 1983, the Mianyue Line inaugural ceremony was taken place and its steam locomotives also caused a great sensation nationwide and worldwide. On the 23rd of January 1986, Alishan Railway Zhushan Line was officially open to traffic and created the legend of Taiwan's railway apogee at altitude of 2,451m. In the same year, Alishan Railway officially signed a "sister railway" agreement with Japan's Ōigawa Railway (Ōigawa Tetsudō) and became the first example of forming an alliance with overseas railway and jumping onto the international stage.


▼Guangfu Passenger Car (Drawn by Su, Chao-Hsu)


▼Mianyue Line (Drawn by Su, Chao-Hsu)


▼Forming an alliance with Japan's Ōigawa Railway (Ōigawa Tetsudō) as sister railways is an important milestone for the internationalization of Taiwan's Alishan Railway. A photo of a train on the Ōigawa Railway that passes through the beautiful Okuoikojo.

Resurgence after the September 21 Earthquake (1999 to 2008)

The later stage of the 1990s was a difficult period and test for Alishan Railway.

Confronted with the huge deficit and endangered existence caused by the launch of highway, Alishan Railway was also challenged by a series of unprecedented natural disasters. On the 1st of July 1997, Shenmu unfortunately became half-falling and this landmark of Alishan Forest Railway was in grave danger; on the 29th of June 1998, after another half of Shenmu was put down, this Alishan Railway's landmark officially entered the history. When Forestry Bureau planned to use "Shihou" (literally means "Stone Monkey") to replace Shenmu as Alishan's new landmark, September 21 occurred next year in 1999 that the head of Shihou fell off and crushed all over. Besides, Shihou Station and its platforms tilted and Mianyue Line was forced to close, known as so-called double trouble.

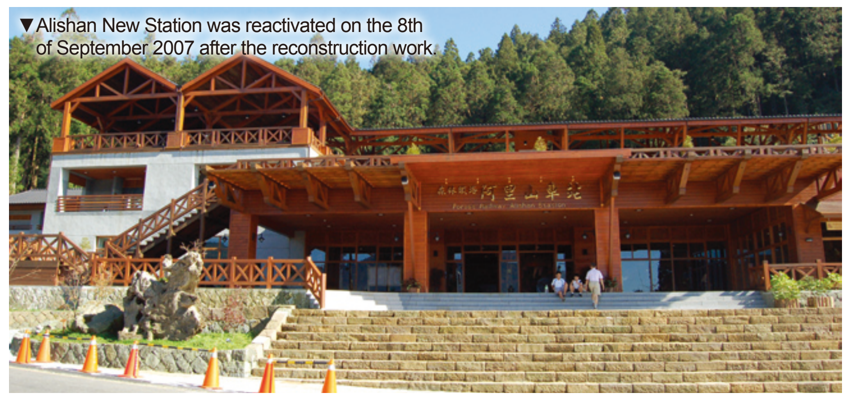
Although Alishan Forest Railway was severely damaged in September 21 Earthquake that Mianyue Line and Alishan New Station had to be rebuilt and the end station of mountain railway had to be replaced by a new station temporarily, this unfortunate earthquake also aroused all citizens' attention towards Alishan Railway due to frequent disasters. Fortunately, Alishan Railway was managed to come to life again. In 2000 (next year), Alishan Railway had resumed its entire operation apart from the Mianyue Line. Besides, Alishan New Station was dismantled due to severe damaged and the new wooden Alishan Station was only launched in 2007.

In 2000, Alishan's No. 26 Shay steam locomotive was revived for the first time and wooden stations were also repaired. This was the moment that the cultural assets of Alishan Railway became splendid again and people had found back their passion toward it. Following the reminiscent trend of railway in the 2000's, Alishan Shay steam locomotive No. 31 and No. 25 revived, four wooden stations were renovated, and cypress carriages joined the line of the railway operation – Alishan Forest Railway gradually positioned itself as a cultural asset of railway through regenerations.

In 2003, Alishan Railway was evaluated as Taiwan's potential world heritage site by Council for Cultural Affairs, which left a big exclamation mark for the renaissance of railway culture after the September 21 Earthquake!

▼The original look of Alishan Station before the September 21 Earthquake

▼As Alishan Forest Railway was severely damaged after the September 21 Earthquake, Alishan New Station was forced to be rebuilt



▼Alishan New Station was reactivated on the 8th of September 2007 after the reconstruction work.

Privatization and Severe Damages Inflicted by Typhoon Morakot (2008 to 2010)

Without this railway accident, this miserable life might not be arrived.

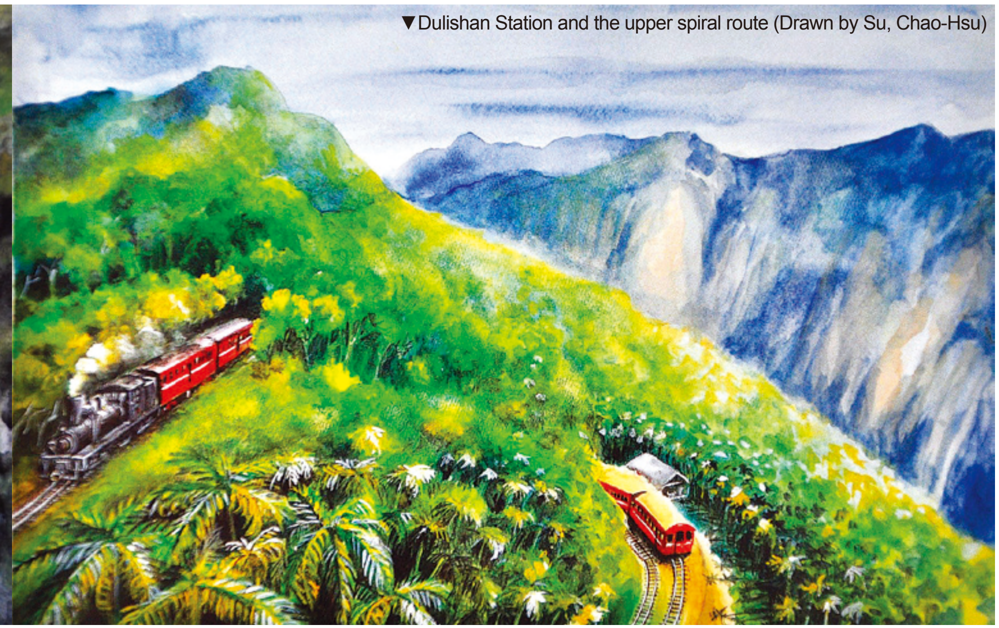
On the 1st of March 2003, a severe railway accident occurred between Alishan Station and Shenmuand caused 17 deaths. At that time, the decision-making level believed that BOT(Build, Operation, Transfer) could help not only to enhance the forest railway operation and efficiency effectively, but also to combine the creative operation and multi-directional development of private companies. The BOT of Alishan Railway was awarded to Chiayi Hungtu Developmenton the 30th of December 2005. The company obtainedthe 30-year management right to run the project in a 3R pattern: Resort, Railway and Restaurants; the two hotels in Beimen and Alishan were BOT projects and the railway's operating revenue belonged to OT. The contract was officially signed on the 19th of June 2006 with two years of preparation period. In 2008, Alishan Railway was officially transferred to the private company Hungtu Alishan Co. with 30-year BOT franchises on the 19th of June. Since then, Alishan Railway entered the new era of privatization and this was truly a crucial turning point for Alishan Railway.

Shortly after the privatization, the railway at 23K from Chiayi (on the direction from Zhangnaoliao to Dulishan) collapsed on the 13th of October in the same year. Hungtu breached the contract unilaterally and refused to repair it as it believed the damage was not caused by natural disaster, but Forestry Bureau due to a poor conservation of soil and water. The operation of Main Line was therefore suspended with an unfixed schedule and the privatization of Alishan Railway entered a deadlock. In 2009 Hungtu put its focus entirely on the hotel side and tried to pass the Environmental Impact Assessment of its Zhaoping hotel instead of paying attention to the railway operation. The high decision making level was enraged with the 23K incident and decided to repair the damage first under the cost of Forestry Bureau. Nevertheless, at that time, the privatization of Alishan Railway only remained with a piece of contract as Hungtu already had a cracked credit. There was no solution to end all of these.

On the 8th of August 2009, Typhoon Morakot attacked southern Taiwan and Alishan Forest Railway was seriously damaged: Scenes of devastation were seen everywhere and railways were collapsed especially the two big collapses in Duolin and Bingzhena, which were caused by serious landslides. Not only was Hungtu unable to maintain the operation and repair the railway, but also the Environmental Impact Assessment of its hotel in Zhaoping was failed.

The privatization of Alishan Railway was then officially terminated.

▼Zhongxing (Limited) Expressat Alishan Forest Railway's Tunnel No. 1 (Drawn by Su, Chao-Hsu)



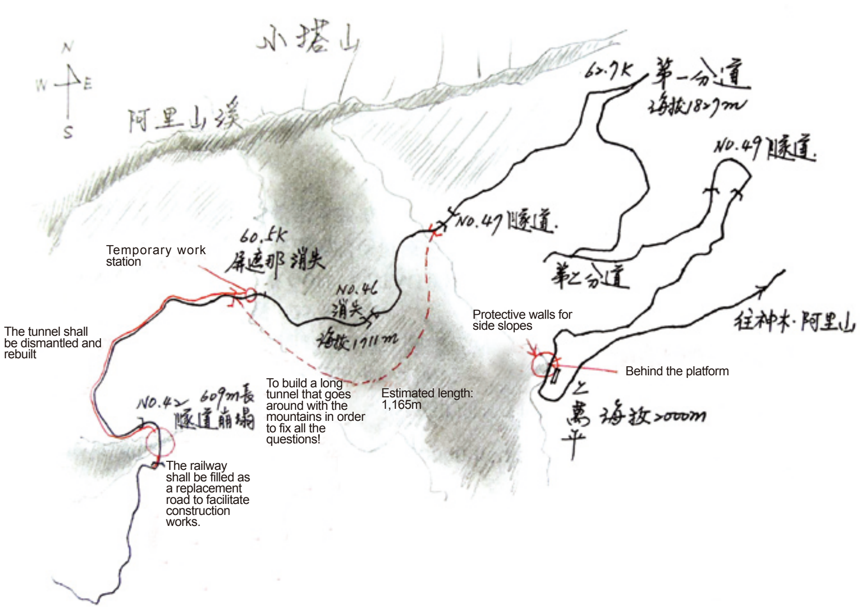
▼Dulishan Station and the upper spiral route (Drawn by Su, Chao-Hsu)

The Resume of Forest Railway from the Ashes since the Government Took Over (2010 till now)

On the 22nd of March of 2010, Forestry Bureau terminated BOT and took back the management right of Alishan Forest Railway according to terms stated in the contract. The operation of Alishan Railway eventually returned to Forestry Bureau. At this moment, the railway was ravaged by Typhoon Morakot and many things needed to be handled and settled. Forestry Bureau actively fixed chaos left behind by Typhoon Morakot. On the 19th of June, Zhushan Line and Shenmu Line resumed their operation. Forestry Bureau also attempted to, with few years, resume the operation of Alishan Railway's Main Line in order show all citizens the beauty of Alishan once again.

At the end of 2010, Forestry Bureau had been quite active to introduce more constructions including the installation of "Top of Taiwan (2,451m)", a monument for the apogee of Taiwan's railway, at Zhushan Station and the establishment of Agricultural Product Exhibition Center in Beimen of Chiayi in order to promote Alishan Forest Railway innovatively and creatively.

▼An investigation map of the Bingzhena collapse in Alishan Railway (Drawn by Su, Chao-Hsu)



Nevertheless, everything did not go smoothly as expected. On the 27th of April 2011, an accident occurred in Alishan's Shenmu Line: The broken branch of a giant wood on the side slope fell down and accidently hit the carriage. The carriage overturned and resulted in the death of 5 passengers. Because of this accident, Alishan Railway was once again suspended: Zhushan line had its operation resumed in December of the same year, whereas Shenmu Line re-activated in January of the next year in 2012.

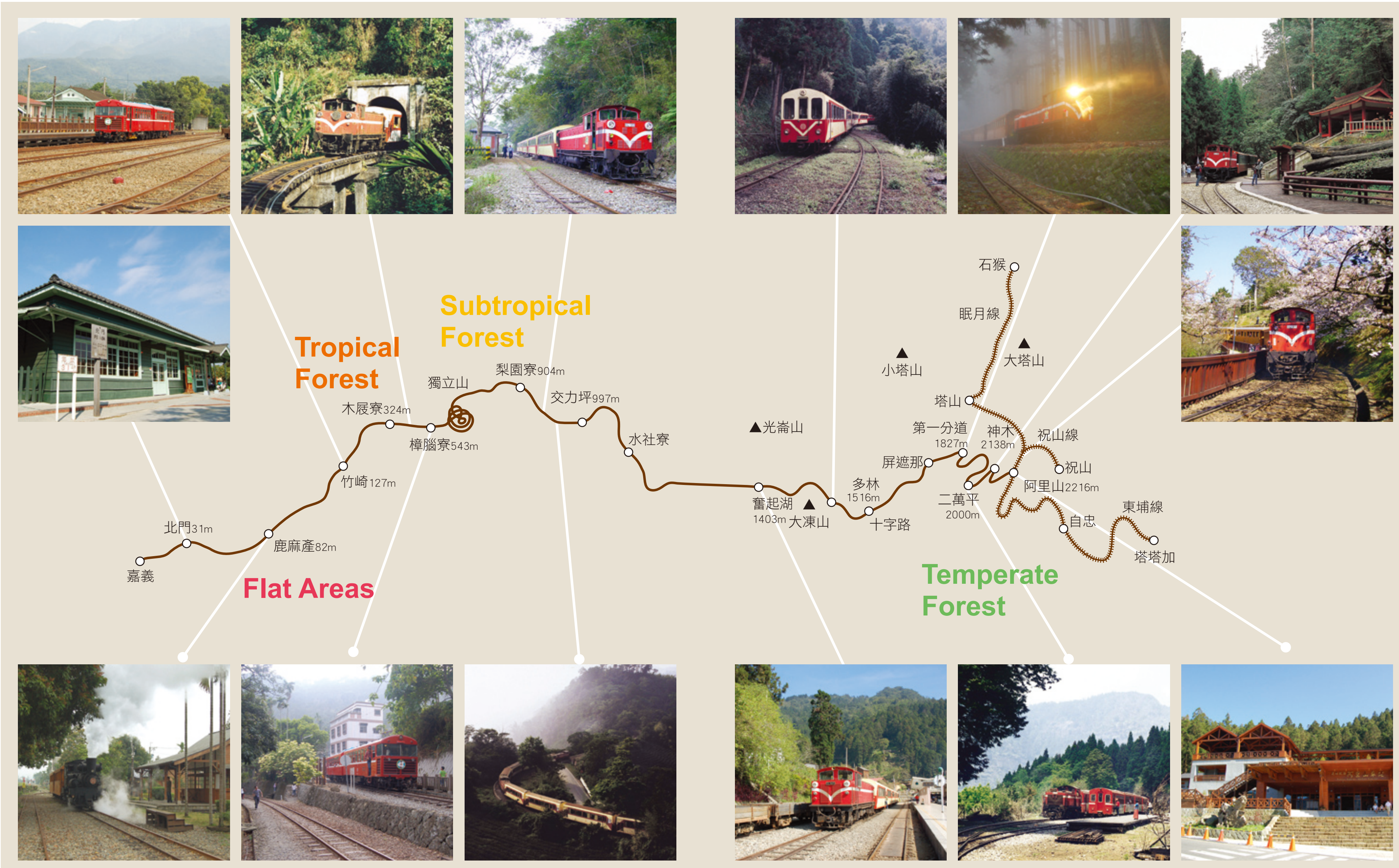
Furthermore, although the reconstruction work of 23K was eventually completed in December of 2011 and trains from Chiayi to Fenqihu could pass through, the authority was suffered from hiring freeze and therefore lacked of sufficient manpower to run the operation officially. All of these had created more variables for the post-disaster reconstruction of Alishan Railway.

On the 26th of April 2013, Executive Yuan officially entrusted the operation of Alishan Forest Railway to TRA. On the 27th of January 2014, the Chiayi-Fenqihu section was open to traffic and the bottleneck of the post-Morakot reconstruction works – Bingzhena Tunnel – was officially linked up. As long as Duolin Tunnel and Bingzhena Tunnel are fixed, the Fenqihu-Alishan section can then be open to traffic. It is expected to have the entire line's traffic resumed in 2015. Besides, the length of Bingzhena Tunnel is 1,141m and, together with the extended part at tunnel entrance and exit, its total length is 1,165m. In other words, Bingzhena Tunnel will overtake India's Kalka Shimla Railway Barog Tunnel No. 33 (with a total length of 1,143.61) and become the world's longest tunnel with 762mm narrow gauge railway, making people really looking forward to it.

▼ Bingzhena Tunnel Breakthrough Ceremony (photographed by Yang Shu-Wei)

Appendix

Route Map of Alishan Forest Railway



History Timeline of Alishan Forest Railway

A.D.	Year of Colonization	Major Events
1895	The 28th year of Meiji	Taiwan was ceded to Japan in the Treaty of Shimonoseki.
1896	The 29th year of Meiji	Japan's First Lieutenant Nagano Yoshitora became the first person who climbed up to Yushan; In November, the Head of the Office of Pacification and Land Cultivation of Linpipu (Zhushan) Saitō Oto-Saku led a team and his team climbed up to Yushan.
1897	The 30th year of Meiji	In July, Yushan (at altitude of 3,952m) was announced as the "Xingaoshan" (Japanese: *Niitakayama*, literally means "the new high mountain).
1899	The 32nd year of Meiji	In April, the technical worker Koike found the primitive forest of Alishan and reported to the Production Bureau of Office of the Governor-General of Taiwan.
1900	The 33rd year of Meiji	In March, the assistant engineer of Railway Department Iida Toyozi conducted a survey on the possibility of constructing Alishan Forest Railway and Ogasawara Tomijirō conducted a survey on Alishan's forest resources.
1902	The 35th year of Meiji	It was decided to adopt U.S. forest railway's development and transportation solutions to develop the forestry of Alishan.
1903	The 36th year of Meiji	In February, Office of the Governor-General of Taiwan commanded Dr. of Forestry Kawai Shitarō proposed Alishan forest and railway development plans.
1904	The 37th year of Meiji	The Alishan Forest Development Plan was submitted to Japan's National Diet for deliberation and was rejected due to financial retrenchment caused by Russo-Japanese War.
1906	The 39th year of Meiji	In February, Alishan Forest Development Plan was passed and the development was entrusted to Osaka's "Fujita Group". The construction of Chiayi-Zhuqi was launched in July.
1907	The 40th year of Meiji	In October, Dulishan spiral mountain route was completed and the railway was built to Liyuanliao Station. The U.S. Lima Shay steam locomotive (13 ton) was firstly introduced to Taiwan.
1908	The 41th year of Meiji	In February, Fujita Group terminated Alishan Railway's construction plan due to insufficient financial resources. The total expense was JPY 1,312,772.
1909	The 42nd year of Meiji	Personnel of Japan's Ministry of internal affairs and Ministry of Agriculture and Commerce accompanied Kawai Shitarō to conduct a new survey in Alishan and decided to retreat the government operation.
1910	The 43rd year of Meiji	In February, National Diet passed the government-run Alishan Forest Development Project and the deliberation was made to complete the railway construction within 5 years. In April, the Alishan Work Station of Production Bureau was established. The area was divided into 10 sections and the construction work was conducted successively. In October, the Chiayi-Zhuqi section was open to traffic and the 18 ton Shay steam locomotive was purchased in November.
1911	The 44th year of Meiji	In October, the Alishan Post Office was established.
1912	The 1st year of Taisho	In May, No. 11 steam locomotive accidentally "veered off track" and fell off the bridge outside the Fenqihu Station. The accident caused 3 death and 10 injuries. In October, the 28 ton Shay steam locomotive was purchased. On the 25th of December, the Chiayi-Erwanping section was open to traffic and the construction period was shortened to two years and half.
1913	The 2nd year of Taisho	In April, the railway was extended to Alishan Zhaoping with a total length of 71.9km. Alishan'sTaiwan Cypress and Chamaecyparis were transported to Japan.
1914	The 3rd year of Taisho	In February, No. 30 steam locomotive "veered off track" and fell accidently nearby the Bingzhena Cliff. Shindō Kumanosuke, who made a great contribution to the development of Alishan, passed away due to severe injury. On the 14th of March, Chiayi-Zhaoping launched the freight and passenger mixed operation. Forest farm lines such as Xiangxueshan Line and Tashan Inner Line were developed.
1915	The 4th year of Taisho	In July, Forest Bureau was established and the Alishan Work Station was reformed to Branch Office of Forest Bureau. In December, the construction of Chiayi's Beimen lumber basin was completed and Japan's biggest lumber field started to operate. The construction work of Tashan's Mianyue Line was completed and areas around Tashan were lumbered. The lumbers were transported down to the mountains.
1916	The 5th year of Taisho	This year's lumber production volume reached 75,180 cubic meters per day, which was the highest record over the past years.
1917	The 6th year of Taisho	The construction work of Mianyue's branch line from Shihou to Wusongkeng was completed and it started to conduct lumber collection works.
1918	The 7th year of Taisho	In December, Alishan Railway started to take passengers for their convenience (so-called the "convenient ride") and replacement passengers cars started to appear. 20 stations were established. Besides, Alishan's Chamaecyparis was transported to Japan as the building material specially for Meiji Shrine's Torii.
1919	The 8th year of Taisho	In March, a fire accident occurred as the embers spurted out from steam locomotive's chimney. Forests around Zhaoping were totally destroyed.
1920	The 9th year of Taisho	In April, Alishan Railway started to provide passenger transportation service for the section from Chiayi to Zhaoping. Freight and passenger mixed trains were officially launched and the second and third class passenger car with bogie also appeared. In September, Forest Bureau was decommissioned and relevant affairs returned to Production Bureau. Chiayi Branch Office was set to manage Alishan Forest Farm.
1921	The 10th year of Taisho	10 years after Alishan forest started to be lumbered. It had been 10 years when Japan started to lumber Alishan forest. Forest Office started to introduce Japanese Cedar for forestation.
1925	The 14th year of Taisho	In November, the trail from Alishan's Zhaoping to Xingaoshan (Yushan) through Eryu, Xingaokou and Tataka was completed.
1926	The 1st year of Showa	Introduced Kawasaki-made coal and gas internal combustion locomotive for forest farm branch lines. The locomotive was used in branch lines of Mianyue.
1927	The 2nd year of Showa	Alishan was elected as "Taiwan's Eight Landscapes" in an activity held by Taiwan Nichinichi Shinpo (Taiwan Daily News).
1928	The 3rd year of Showa	Abolished Alishan's Entry Permit to Mountain District system.

A.D.	Year of Colonization	Major Events
1931	The 6th year of Showa	Japan promulgated National Park Act and Alishan Xingaoshan was designated as the greenfield site. Kawai Shitarō, who made a great contribution to the development of Alishan, passed away in Tokyo due to disease. The branch line from Alishan to Zizhong was completed.
1932	The 7th year of Showa	Zizhong Line was extended to Xingaokou. Time required to hike Xingaoshan was largely reduced and the number of hikers also abruptly increased and created a hiking trend. Xingaokou became Alishan Railway's new end station, which provided passenger transportation service. The original end station was Zhaoping.
1933	The 8th year of Showa	Introduced two Kawasaki-made petrol passenger cars, which were used in flat areas from Chiayi to Zhuqi.
1934	The 9th year of Showa	The railway from Zizhong to Tataka was completed and Dongpu Forest Depot was launched. Tataka was the end station at altitude of 2,584m, created the new apogee of Taiwan's railway. Lulin Lodge was open to public for hikers of Yushan to take a rest.
1935	The 10th year of Showa	Pagoda of the Tree Spirit was built in Alishan in September to comfort the spirits of old trees. In October, "Alpine Museum" was built to celebrate the 40th anniversary of Japan's colonization.
1936	The 11th year of Showa	In June, Taiwan Development Co., Ltd. was established. Alishan Forest Farm was transferred to its Department of Forestry and three branch offices were established in Alishan, Taipingshan and Baxianshan to manage lumbering relevant affairs. This only ended in 1945 after the retrocession of Taiwan.
1941	The 16th year of Showa	In December, Attack on Pearl Harbor exploded and Taiwan was in a war.
1942	The 17th year of Showa	Japan was in a disadvantageous position and the export of camphor was terminated due to U.S. army's blockage. The military started to deforest camphor trees along the forest railway arbitrarily. The raw materials and market were both gone.
1943	The 18th year of Showa	Production Bureau allowed the military to supply their own lumbers for military use through lumber companies and the volume of lumbers exceeded 1,000,000 cubic meters every year. As Alishan had been deforested excessively, its forestry resources eventually dried up. Passenger and postal car with brake vans appeared.
1944	The 19th year of Showa	Along the Alishan Railway, all the stations of lumber fields were bombed by the U.S. military aircrafts. The Beimen Lumber Basin located in Chiayi was severely damaged for several times.
1945	The 20th year of Showa	In August, Japan surrendered unconditionally. In November, Alishan Forest Farm was listed under the management of Forestry Bureau, Department of Agriculture and Forestry, Department of Agriculture and Forestry, Chief Executive Office, Taiwan Province
1946	The 35th year of the Republic	In March, Alishan Forest Farm's first Director after the retrocession of Taiwan Yi Chuan-Duotook up the post. Continued their missions during the Japanese mission, the mixed trains went up to the mountain once per two days and came down the mountain once per day.
1947	The 36th year of the Republic	In December, the government announced that Xingaoshan would have its name changed back to "Yushan". A new branch line Shishan was added to Xingaokou.
1948	The 37th year of the Republic	When No. 27 steam train transported lumbers down to the mountain, it accidently overturned and the driver deceased.
1949	The 38th year of the Republic	Nationalist government moved to Taiwan. In November, the Former President Chiang Kai-Shek made his first inspection tour to Alishan.
1951	The 40th year of the Republic	Former President Chiang Kai-Shek took his second investigation tour to Alishan's Dongpu Line. Eryu was renamed to Zizhong.
1953	The 42nd year of the Republic	Introduced the first-generation Mitsubishi-built (Japan) diesel locomotive 11403-1 to 11403-2. In October, the monument "Ode of Shenmu" (Ode of Sacred Tree) and "Shoubi Shenmu" (Live as long as Shenmu / the Sacred Trees) were established to celebrate Chiang Kai-Shek's birthday.
1955	The 44th year of the Republic	Introduced the second-generation Mitsubishi-built (Japan) diesel locomotive 11403-3 to 11403-5.
1956	The 45th year of the Republic	In June, Alishan Shenmu was unfortunately struck by lightning and its trunk was burned into a hollow ragged hole. Chiang Kai-Shek investigated Alishan for the third time and, for the first time, took the VIP Passenger Car hauled by the new diesel locomotive.
1959	The 48th year of the Republic	In August, Alishan Railway was severely damaged by August 7 Flood caused by Typhoon Gloria. On the 17th of September, No. 24 accidently turned over nearby by Erwanping during its mission of transporting foods to mountains. The conductor and driver deceased.
1960	The 49th year of the Republic	For the first time, flat passenger cars were constructed as the replacement passenger cars. The timetable was revised in November with one irregular group train.
1961	The 50th year of the Republic	Yushan Forest District Office drew the Alishan Railway diesel promotion and route improvement plans.
1962	The 51st year of the Republic	Diesel expresstrains were firstly launched in March as the beginning of running diesel powered operation.
1963	The 52nd year of the Republic	Alishan Forest Railway officially transformed into a tourism railway. "Zhongxing" Limited Express was launched in February and was extremely welcomed by people. Introduced Japan-built ZhongxingDPC1 and 2. In June, direct lumbering works were terminated. Chiayi Forest District Office started to dispose and auction the lumbers, and then clear and ship out the left-over lumbers until 1965.
1965	The 54th year of the Republic	In October, Alishan Railway officially changed the mixed trains' schedule to one train going up and one train coming down the mountain every day.
1966	The 55th year of the Republic	Introduced Japan-built Zhongxing DPC3 to 6 with upgraded dual big headlights. Made by TRA Taipei Plant, Zhongxing trail-car DTC1 to 2 were launched.
1967	The 56th year of the Republic	The timetable was revised. The number of express trains (Zhongxing Express) increased to two trains going up and two trains coming down the mountain every day. In August, Paiyun Lodge was completed and benefited many tourists to Yushan.
1968	The 57th year of the Republic	Lulin Lodge was decommissioned and was rebuilt into Yushan National Pak Management and Service Center in 1985.

A.D.	Year of Colonization	Major Events
1969	The 58th year of the Republic	Introduced the third-generation Mitsubishi-built (Japan) diesel locomotive DL-25 to 30. This move also showed a successful promotion of diesel powered locomotives.
1970	The 59th year of the Republic	Introduced Japan-built Zhongxing DPC7 to 9. In November, a joint operation of Zhongxing (Limited) Express and Juguang (Chu-Kuang) Express(TRA) was conducted.
1971	The 60th year of the Republic	“Guangfu” Express was launched in July with an irregular timetable. All passenger and freight cars adopted the new serial number. Wooden passenger cars were gradually decommissioned and replaced by steel trains.
1972	The 61st year of the Republic	Introduced the fourth-generation Mitsubishi-built (Japan) diesel locomotive DL-31 to 34. Steam trains used in the Main Line of mountain railway were decommissioned officially. For the first time, No. 14 steam train was transported to Australia’s Puffing Billy Railway for demonstration and preservation.
1973	The 62nd year of the Republic	The schedule of “Guangfu” Express changed to two trains going up and two trains coming down the mountain every day. In June, a joint operation was conducted for Guangfu Express, Zhongxing (Limited) Express, Juguang (Chu-Kuang) Express (TRA) and Formosa Express (TRA). In October, new Beimen Station was launched.
1975	The 64th year of the Republic	The reconstruction plan of Alishan Forest Recreation Area was completed and it was scheduled complete the project within two years. The operation of Alishan Railway reached the highest point around this year. Together with the development of the forest recreation area, it was expected to fully develop the tourism of Alishan.
1976	The 65th year of the Republic	Introduced the fifth-generation O&K-built (Germany) diesel locomotive DL-35 to 37, which were unfortunately eliminated due to a bad performance. Irregular ordinary express trains were launched in March. In November, a serious fire accident occurred nearby Zhaoping. Local residents rushed to rebuild their homes arbitrarily, but the houses were dismantled by the police forcibly. The fire site was rebuilt into a nature park.
1978	The 67th year of the Republic	On the 30th of April, the extra Alishan Express overturned in front of Shizilu due to a loose roadbed caused by heavy rain. 26 people were injured. Started from this year, all the forest farm lines were suspended and the railway bed of Dongpu Line was used to build New Central Cross-Island Highway (Provincial Highway 18).
1980	The 69th year of the Republic	Introduced the sixth-generation Japan-built diesel locomotive DL-38, which was the last introduced 25 ton diesel locomotive.
1981	The 70th year of the Republic	In January, Alishan New Station (the original Fourth Lane) was launched. In March, Alishan Forest Recreation Area was officially launched. On the 24th of April, a tunnel collapsed and crushed the train, which caused 9 deaths and 13 injuries.
1982	The 71st year of the Republic	Introduced the sixth-generation Japan-built diesel locomotive DL-39 to 44. It was the first diesel locomotive with air-conditioning power. In October, Alishan Highway was open to traffic and swept mountain railway passengers. Since then, the traffic volume of forest railway dropped to the bottom.
1983	The 72nd year of the Republic	In November, Zhongxing (Limited) Expresswas upgraded to Zhongxing Direct Express and broke the record: it took only 2 hours and 50 minutes from Chiayi to Alishan. Mianyue Line’s adoption of steam locomotive created a great sensation nationwide and worldwide. On the 11th of February, the inaugural ceremony of Mianyue Line (tourist railway) was taken place. In July, Guangfu Express was eliminated from the operation and, due to a great deficit over the years, Alishan Railway planned to open privatization.
1984	The 73rd year of the Republic	On the 27th of January, the high-class “Alishan Express” with an air-conditioning system was launched with a special “999” promotion. The train went up the mountain every Saturday night and came down the mountain every Sunday afternoon. On the 21st of May, the construction work of Zhushan Line was launched. In August, the Zhaoping carriage hostel was completed. Mianyue Line switched to diesel locomotive and all the steam locomotives were suspended.
1985	The 74th year of the Republic	In May, a freight car of Alishan Railway that carried sandstone went off the track. DL32 was damaged and the Conductor deceased. DL32 was destroyed in a fire occurred in Beimen Maintenance Plant in 1993.
1986	The 75th year of the Republic	Zhushan Line was officially open to public on the 23rd of January. On the 24th of January, Alishan Railway and Japan’s Ōigawa Railway (Ōigawa Tetsudō) officially became sister railways. The timetable was revised this year: Two Zhongxing Direct Express (one went up and one came down the mountain) per day.
1988	The 77th year of the Republic	In February, it was approved that “Labor Standards Act” could be applied to Alishan Railway and the cost of manpower increased abruptly. The timetable was revised in November that the 68-year old mixed trains were suspended and ordinary trains that stopped at every stop were replaced by Zhongxing Express.
1989	The 78th year of the Republic	To cooperate with the policy of authority simplification, the original Lumber Transport Section and Construction Section were integrated into the Forest Railway Management Section.
1990	The 79th year of the Republic	The timetable was revised on the 15th of January that Alishan Railway only had one Alishan Express going up and one Alishan Express coming down the mountain every day. Zhongxing Express was officially suspended and the operation of Alishan Railway entered the lowest point.
1991	The 80th year of the Republic	In July, a passenger car ran through the railroad crossing and "collided with" Alishan Express, which caused 1 death and 4 injuries. On the 1st of January, New Central Cross-Island Highway (From Alishan to Shuili) was officially open to traffic.
1992	The 81st year of the Republic	In May, Alishan Railway cooperated with PTS to record the track legendary program and No. 26 steam locomotive was fired up and activated again. In October, Alishan Reservoir collapsed and destroyed 5 bridges and the railway bed of switch back route. The operation was resumed on the 26th of February next year.
1993	The 82nd year of the Republic	In August, Conservation and Recreation Division proposed the Alishan Railway Power-Up Plan with an expectation to fix the great deficit. On the 23rd of August, Beimen Maintenance Plant was suffered from a big fire, where No. 15 steam train, DL-32 diesel locomotive and a number of passenger cars were destroyed.
1995	The 84th year of the Republic	To improve the service quality of tourist railway’s branch lines, Zhushan Line like passengers cars were handed over and the operation were initiated to replace the original red ordinary passenger car. In April, the half-falling Shenmu attracted all people’s attention as it could collapse at any time. Local representatives requested Alishan Railway to dismantle tracks in Chiayi (flat areas) due to traffic hindrance. After several negotiations, this dispute was eventually settled down, but only in few years later.
1996	The 85th year of the Republic	Privatization of Alishan Railway was under the plan. In April, Director He Wei-Zhen accompanied Chairmen of FPCC and Tuntex Group to survey Alishan and requested their opinions. Unfortunately, no company wanted to take over the operation of Alishan Railway. In August, Typhoon Herb severely damaged Alishan Railway. The west exit of Tunnel No. 1 was collapsed and built. Alishan Railway had its operation resumed at the end of December.
1997	The 86th year of the Republic	On the 1st of July, half of the Shenmu already fell down and another half, which was also in a dangerous condition, was temporarily fixed with steel cable.
1998	The 87th year of the Republic	Cultural Affairs Bureau of Chiayi City and Forest District Office decided to fix SL26 on the 26th of June. On the 29th of June, another half of Alishan Shenmu was put down and Shenmu officially entered the history. In October, Mianyue’s Shihou became the new landmark. On the 17th of July, Ruili Earthquake occurred and the Dulishan-Liyuanliao section of Alishan Railway was severely damaged. The traffic was resumed at the end of this year. Besides, Chiayi Eirin Club (Alishan Forest Farm Guest House) and Alishan’s Beimen Old Station were also listed as the city’s historic sites.

A.D.	Year of Colonization	Major Events
1999	The 88th year of the Republic	Cultural Affairs Bureau of Chiayi City held the “Forest Railway Legend” activity on the 27th of February. Alishan’s No. 26 steam train was officially revived at Beimen Station and created a great sensation around the world. Alishan Railway was severely damaged during the September 21 (Jiji) Earthquake. Mianyue Line was fully paralyzed, the head of Shihou fell off and Alishan New Station was collapsed.
2000	The 89th year of the Republic	Zhushan Line resumed its operation on the 1st of January 2000, Alishan New Station was dismantled, and Zhaoping Station became the end station of mountain railway and the start point of tourist branch lines once again. The Main Line of mountain railway had its entire operation resumed on the 1st of February 2000.
2003	The 92nd year of the Republic	Alishan Forest Railway was evaluated as Type A of Taiwan’s potential world heritage site by Council for Cultural Affairs. On the 1st of March, a serious railway accident occurred between the New Station and Shenmu, which caused 17 deaths.
2004	The 93rd year of the Republic	The temporary new end station of the mountain railway was launched. The reconstruction of the wooden Alishan Station started. The first 1.6km of Shuishan Line was reconstructed.
2005	The 94th year of the Republic	In January, the heavy oil boiler locomotive SL31 was revived and was planned to be used in Alishan branch lines. On the 30th of December, Alishan Railway BOT was awarded to Chiayi Hungtu Development Co. with a 30 year management right.
2006	The 95th year of the Republic	In September, the heavy oil boiler locomotive SL25 was revived. Alishan Railway, which now possessed three steam locomotives including No. 25, No. 26 and No. 31, had become the nation’s No. 1 traffic business unit that successfully brought back most steam locomotives. On the 24th of December, Zhongxing Diesel Passenger Car DPC7 and DPC8 revived and were used only for group trains. All of these showed a great performance in terms of preserving the railway culture.
2007	The 96th year of the Republic	Holiday steam train and cypress carriages were officially launched on the 15th of September for the section from Chiayi to Zhuqi. Alishan Station was severely damaged during the September 21 Earthquake and the reconstruction was completed on the 8th of September.
2008	The 97th year of the Republic	Alishan Railway was officially transferred to private company on the 19th of June. Hungtu Alishan obtained the 30-year BOT franchises and Alishan Railway headed to the new era of privatization. Nevertheless, on the 13th of October, the railway at 23K from Chiayi (on the direction from Zhangnaoliao to Dulishan) collapsed and Hungtu refused to repair the damage. Privatization of Alishan Railway entered a deadlock.
2009	The 98th year of the Republic	On the 8th of August, Typhoon Morakot severely damaged Alishan Forest Railway. Not only was Hungtu unable to fix all the damaged, but also the Environmental Impact Assessment of its hotel in Zhaoping was failed. The privatization was terminated.
2010	The 99th year of the Republic	On the 22nd of March of 2010, Forestry Bureau terminated BOT and took back the management right of Alishan Forest Railway according to terms stated in the contract.
2011	The 100th year of the Republic	On the 27th of April 2011, an accident occurred in Shenmu Line: The broken branch of a giant wood on the side slope fell down and accidently hit the carriage. The carriage overturned and resulted in "5 deaths". Alishan Railway was suspended and the management right was forced to be transferred once again after the privatization.
2012	The 101th year of the Republic	The 100th anniversary of Alishan Railway on the 25th of December.
2013	The 102nd year of the Republic	On the 20th of April, Alishan Railway and Japan’s Kurobe Gorge Railway became sister railways. Since then, Alishan Railway had two international sister railways. On the 26th of April, a contract was signed to transfer Alishan Railway’s management right to TRA.
2014	The 103rd year of the Republic	On the 27th of January, the Chiayi-Fenqihu section was open to traffic with an expectation to have the entire line’s traffic (to Alishan) resumed in 2015.


▼Brand New Alishan Station


▼Brand New Zhaoping Station

References

1. *Records of the Taiwan Provincial Forestry Bureau* (Published in March of 1997)
2. *Annual Statistical Report of Transportation of Taiwan* (Transportation Department of Provincial Government)
3. *Rail News* (Railway Culture Society, Taiwan, R.O.C.)
4. *Forestry Bureau Work Report* (Director He Wei-Zhen, 1995)
5. *Reflections on Jade Mountain* (Yushan National Park Press)
6. *Alishan: Alishan Forest Century Story* (Chiayi Forest District Office, Forestry Bureau).
7. Zhang, Xin-Yu, *Stories of Alishan Forest Railway.*
8. Hong, Zhi-Wen, *The Monograph of Alishan Forest Railway.*
9. *International Conference on Alishan Forestry for its 100th Anniversary* (2011)
10. Su, Chao-Hsu, *Alishan Forest Railway (1912-1999): Landscape* (Jen-Jen Publishing, 2001)
11. Su, Chao-Hsu, *Alishan Forest Railway (1912-1999): Vehicles,* (Jen-Jen Publishing, 2001)
12. Su, Chao-Hsu, *The Scenic Wonderland of the Great Mountain Railway · Europe*, (Jen-Jen Publishing, 2006)
13. Su, Chao-Hsu, *The Scenic Wonderland of the Great Mountain Railway · Asia, Oceania and America*, (Jen-Jen Publishing, 2006)
14. Su, Chao-Hsu, *The Legend of Alishan Forest Railway", Jen-Jen Publishing*, 2009.
15. Su, Chao-Hsu, *The Illustrated Handbook of Taiwan Light Rail and Industrial Rail Rolling Stock*, (Jen-Jen Publishing, 2011)
16. Su, Chao-Hsu, *A Tour of Alishan Forest Railway and World Heritage Railways*, (published by the Headquarters Administration of Cultural Heritage, 2011)
17. Su, Chao-Hsu, *100 Years Anniversary of Alishan Forest Railway: Rolling Stocks of Alishan Forest Railway through One Hundred Years*, (Yuan-Liou Publishing, 2012)
18. Su, Chao-Hsu, *100 Years Anniversary of Alishan Forest Railway: Legend of Alishan Forest Railway through Hundred Years*, (Yuan-Liou Publishing, 2012)
19. Su, Chao-Hsu, *100 Years Anniversary of Alishan Forest Railway: A Survey of Mountain Railways around the world in comparison with Alishan Forest Railway*, (Yuan-Liou Publishing, 2012)

Book Collection Stamp

A Brief History of Alishan Forest Railway Through the Century

Publisher	Lee, Tao-Sheng
Chief Planner	Liao, I-Kuang
Planner(s)	Yang, Rui-Fen ; Li, Ding-Zhong ; Liu, Jin-Yuan
Author	Su, Chao-Hsu
Pictures	Su, Chao-Hsu ; Liu, Chin-Yuan ; Zhang, Xin-Yu ; Yang, Shu-Wei ; 高井貢(Takai mi-tsu-gu) ; Chiayi Forest District Office of Forestry Bureau
Proofreader	Lo, Riki ; Liu, Jin-Yuan ; Liu, Wen-Yi ; Weng, Pei-Yu ; Wang, Fan
Execution Unit	Book Republic Cultural Enterprise, Ltd.
Project Editor In Chief	Wang, Fan
Artistic Designer	Li, Jun-Hui
Production House	Book Republic Cultural Enterprise, Ltd.
Publishing Unit(s)	Chiayi Forest District Office of Forestry Bureau, Council of Agriculture, Executive Yuan
Date of Publication	November 2016
ISBN	978-986-05-0642-6
GPN	1010502364

Appendix 2 – *The Riga Charter*

PURPOSE

The Riga Charter is a statement of principles which guide the conservation, restoration, maintenance and repair and use of historic railway equipment, which is being operated. It is hoped that this will help our members make wise decisions.

DEFINITIONS

Heritage Railways referred to in this Charter, may also include historic or preserved railways, museum railways and tramways, working railway and tram museums and tourist railways, and may extend to heritage trains operating on the national network and other railways.

Railway Equipment referred to in this Charter may include buildings or infrastructure which form part of the railway ensemble.

Preservation is the process of keeping an object safe from harm and decomposition, by maintaining it properly so that its condition, quality and memory is retained

Conservation is the process of stabilising the condition of an object without compromising the historical or material evidence in any way

Restoration is the process of repairing or replacing missing parts in an attempt to regain an earlier state of the object. The restoration may increase the strength of the object before work started, and may generally go further than conservation. It should neither be invisible or glaringly obvious.

Repair is the process of adjustment or replacement of the components. The specified standard of mechanical condition is achieved irrespective of the historic integrity of parts that may be altered or discarded

Article 1

Scientific and technical skills, together with the facilities needed to preserve and operate historic railway equipment, within a culture of safety, should be used to safeguard railway heritage.

Article 2

The aim of preserving and restoring historic railway items and associated working practices is to safeguard them, whether they are significant technological artefacts, evidence for transport history or a means of perpetuating traditional skills.

Article 3

Maintenance of all aspects of their equipment, and operation on a regular basis is essential for the survival of heritage railways. Operating historic and valuable railway equipment with traditional operating procedures, and presenting it to the public, is an important means of interpreting that material.

Article 4

Identifying socially useful purposes for historic railway items will help facilitate their preservation, but such use should involve the minimum change necessary, and such changes should be fully reversible.

Article 5

A heritage railway should reflect not only the importance of its own role as a transport system, but also, when appropriate, its own historic origins and its impact on the community.

Article 6

The process of restoration is a highly specialised operation. Its aim is to preserve and reveal the aesthetic, functional and historic value of traditional railway equipment. It should be based on respect and an understanding wherever possible of the original designs and specifications.

Article 7

The original or historically correct materials and techniques should be used in the conservation of historic railway items, unless they can no longer be adopted for reasons of safety, legislation or availability. In such cases appropriate contemporary substitutes for such materials or techniques should be used.

Article 8

The restoration of a piece of historic railway equipment does not require that it must be restored to its original as built state. Some equipment acquires its historic importance later on in its working life. Restoration to any period should be executed only after thorough consideration of historic records, and available documentation covering the chosen period, after which a restoration plan should be written and adopted. Material that is replaced with new should be readily identified as such with a simple permanent marking system.

Article 9

Added mandatory safety equipment should if possible, blend harmoniously with the conserved or restored item but the fact that it is an addition or alteration to the original make-up of the item should be clearly indicated.

Article 10

Any other necessary later modifications to the item that are introduced for whatever reason should be as sympathetic as possible to the make-up and appearance of the original item. Ideally any such modification should be reversible, and any significant original parts removed should be retained for possible future re-use.

Article 11

Every stage in the conservation or restoration work on an historic railway item should be systematically planned and recorded. The resultant record of these processes retained for a minimum of the life of the item.

Article 12

All bodies involved in the repair, restoration, maintenance, conservation and operation of heritage railways and railway equipment must make proper arrangements for the conservation of their records and archives.

Appendix 3 - *The Preservation Context & Value Practice of Railway Heritage*

Ming-Hsun Hsieh

遺產鐵道保存脈絡與價值實踐
The Preservation Context and Value Practice of Railway Heritage

謝　明　勳　Ming-Hsun Hsieh

Former Vice President,
Asia Pacific Heritage & Tourist Railway Organization

為什麼動態保存？
Why is it preserved dynamically?

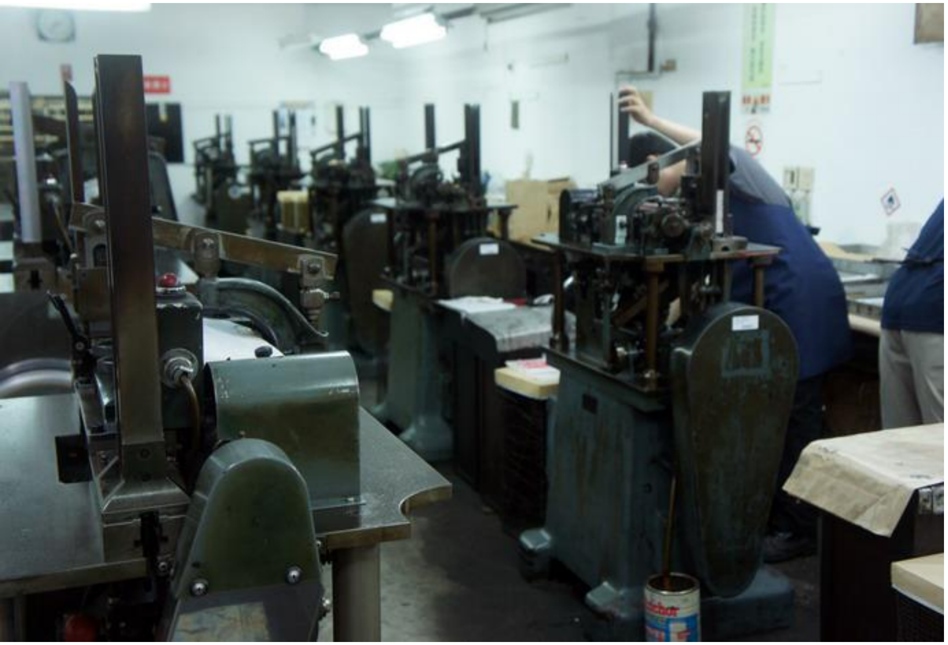
- 古蹟、歷史建築 Monument、Historic Buildings
- 水力發電廠、碾米廠 Hydroelectric power plant Rice milling
- 火車、汽車、飛機、輪船 Train, car, plane, ship

- 動態保存的價值:永續存活的遺產彰顯其文化價值
- The value of dynamic preservation : The heritage of perseverance shows its cultural value

- 動態保存的做法:以今日的技術保存昨日的歷史
- Dynamic preservation practice: Preserve history with today's technology

古蹟的動態保存可能性 Dynamic preservation possibility of monuments


541




PAO
792

動態保存的要求

Dynamic preservation requirements

- 安全運轉
- Safe operation
- 保持原有功能
- Remain the original function
- 傳統操作方式
- Traditional mode of operation

最美的風景是人
The most beautiful scenery is people

操作者 > 實演

Participator > Practice

觀看者 > 體驗

Beholder > Experience





里加憲章The Riga Charter

- 威尼斯憲章(國際文化紀念物與歷史場所維護與修復憲章), 1964
- The Venice Charter (International cultural monument and historical site maintenance and restoration Charter)1964
- 國際觀光文化憲章, 1999 International Charter on Cultural Tourism 1999
- 里加文化資產真實性與歷史性重建關係憲章, ICCROM, 2000
- The Riga Charter on Authenticity and Historical Reconstruction in Relationship to Cultural Heritage.

- FEDERCRAIL (European Federation of Museum & Tourist Railways) ，2005 FEDERCRAIL 歐洲博物館及觀光列車聯盟
- WATTRAIN (World Association of Tourist Trams and Trains) ，2012 WATTRAIN 世界列車觀光組織
- APHTRO (Asia Pacific Heritage and Tourist Rail Organization) ，2012 APHTRO 亞太觀光遺產鐵路組織
- 中華民國鐵道文化協會，2013 Railway Cultural Society, Taiwan

里加憲章The Riga Charter

- **Article 1**
- Scientific and technical skills, together with the facilities needed to preserve and operate historic railway equipment, within a culture of safety, should be used to safeguard railway heritage.
- 第**1**條
- 保存及營運歷史性鐵道設施，應該在安全的文化下，利用科學上及技術上的技能與設備，保護鐵道遺產。

- **<u>Article 2</u>**
- The aim of preserving and restoring historic railway items and associated working practices is to safeguard them, whether they are significant technological artefacts, evidence for transport history or a means of perpetuating traditional skills.
- <u>第**2**條</u>
- 欲保存之歷史性鐵道物件及其附屬作業，無論是否明顯為技術上的遺蹟、交通史上的證物或延續傳統技藝的方法，均應列為保存與修復之對象。

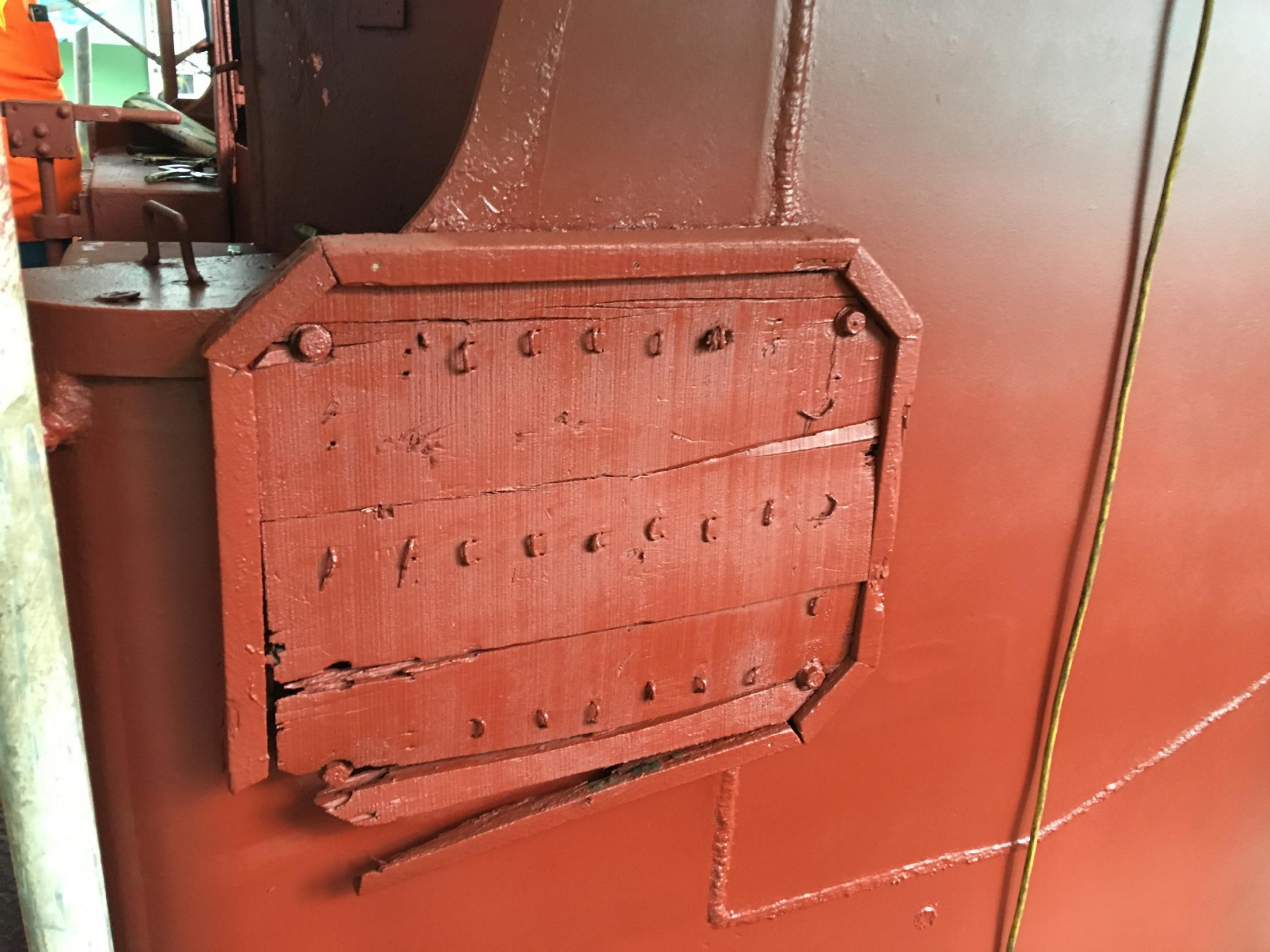
- **Article 3**
- Maintenance of all aspects of their equipment, and operation on a regular basis is essential for the survival of heritage railways. Operating historic and valuable railway equipment with traditional operating procedures, and presenting it to the public, is an important means of interpreting that material.
- 第**3**條
- 上述鐵道設施之維護與保持規律的營運，對於遺產鐵道的永續存活是必要的。以傳統操作程序營運具有價值的歷史鐵道設施，並對公眾展現，是詮釋此一資產的重要方式。

- **<u>Article 4</u>**
- Identifying socially useful purposes for historic railway items will help facilitate their preservation, but such use should involve the minimum change necessary, and such changes should be fully reversible.
- <u>第**4**條</u>
- 界定出歷史鐵道對社會有用的貢獻，將有助於促進其保存，惟類此運用可能涉及不可避免的微小改變，然而此類改變應屬完全可逆。

- **Article 5**
- A heritage railway should reflect not only the importance of its own role as a transport system, but also when appropriate, its own historic origins and its impact on the community.
- 第**5**條
- 遺產鐵道不應只反映它在交通系統上的角色，並應儘可能地呈現其歷史淵源，以及對社會的影響力。

- **Article 6**
- The process of restoration is a highly specialised operation. Its aim is to preserve and reveal the aesthetic, functional and historic value of traditional railway equipment. It should be based on respect and an understanding wherever possible of the original designs and specifications.
- 第**6**條
- 修復的過程極為專業，其目標是爲了保存與彰顯傳統鐵道設施在美學上，功能上，以及歷史上的價值。修復工作應儘量尊重與瞭解原始設計及其規格。

- **Article 7**
- The original or historically correct materials and techniques should be used in the conservation of historic railway items, unless they can no longer be adopted for reasons of safety, legislation or availability. In such cases appropriate contemporary substitutes for such materials or techniques should be used.
- 第**7**條
- 若非安全因素、法律限制、或已無法取得，應使用原始或歷史上正確的材料與技術以維護歷史鐵道物件。但在無可避免之情況下，可適當使用當代的替代材料與技術。



- **Article 8**
- The restoration of a piece of historic railway equipment does not require that it must be restored to its original as built state. Some equipment acquires its historic importance later on in its working life. Restoration to any period should be executed only after thorough consideration of historic records, and available documentation covering the chosen period, after which a restoration plan should be written and adopted. Material that is replaced with new should be readily identified as such with a simple permanent marking system.
- 第**8**條
- 一件歷史鐵道設施並不一定需要修復至初造當時的狀態。使用期間所留下之痕跡反而可能更具有歷史價值。對任一時期的復原，只能在審慎評估歷史紀錄及涵蓋該時期的文件後，經描述及認可方得以進行修復。新置換的材料應以簡單永久的標示方式使其易於辨識。

- **<u>Article 9</u>**
- Added mandatory safety equipment should if possible blend harmoniously with the conserved or restored item but the fact that it is an addition or alteration to the original make-up of the item should be clearly indicated.
- <u>第**9**條</u>
- 若依法規定必須強制加裝某些安全設施，亦應與被修復之物件和諧共存，然而必須清楚標示此為新增或替換的物件。

- **Article 10**
- Any other necessary later modifications to the item that are introduced for whatever reason should be as sympathetic as possible to the make-up and appearance of the original item. Ideally any such modification should be reversible and any significant original parts removed should be retained for possible future re-use.
- 第**10**條
- 任何必需之後續修改項目，應儘可能與原物件外觀融和。最好任何此類修改均應具可逆性，而且從原件移取下來的任一顯要部分，也應妥予保留以備未來可能的使用。

- **Article 11**
- Every stage in the conservation or restoration work on a historic railway item should be systematically planned and recorded. The resultant record of these processes retained for a minimum of the life of the item.
- 第**11**條
- 對歷史鐵道物件維護或修復作業的每一步驟，均應有系統性的規劃與記錄。此項過程的竣工記錄保存期限應超出該物件之壽年。

- **Article 12**
- All bodies involved in the repair, restoration, maintenance, conservation and operation of heritage railways and railway equipment, must make proper arrangements for the conservation of their records and archives.
- 第**12**條
- 有關於修繕、修復、保養、維護、和操作遺產鐵道及鐵道設施的所有參與者之工作記錄和檔案文獻，均應妥善保存。

算不算「真實」？
How is the Authenticity

- 技術問題technical problem

Authenticity 真實性

- 新造鍋爐？ New boiler?
- 更新蒙皮？ Renew skin?
- 燒煤還是改吃油？Coal burning or Fuel
- 電子卡規格 Electronic card specifications
- 燈泡/LED Light Bulb
- 環保材質 Environmentally friendly material

大吉嶺喜馬拉雅鐵道Darjeeling Himalayan Railway

台北機廠Taipei Railway Workshop

英國 Haworth loco shed

英國 Haworth loco shed

英國電車博物館 British Tram Museum

蒜頭糖廠木造客車 Wooden train in Suàntóu Sugar factory

烏樹林糖廠無動力汽油車

Wushulin Sugar factory unpowered gasoline train

台鐵高雄港站/高雄輕軌C14車站

Taiwan Railway Kaohsiung port station/Kaohsiung light rail transit C14 station

EMU100 動態運轉的技術規格問題 Specification problem for dynamic operation

怎樣才算「安全」？How is safety issues?

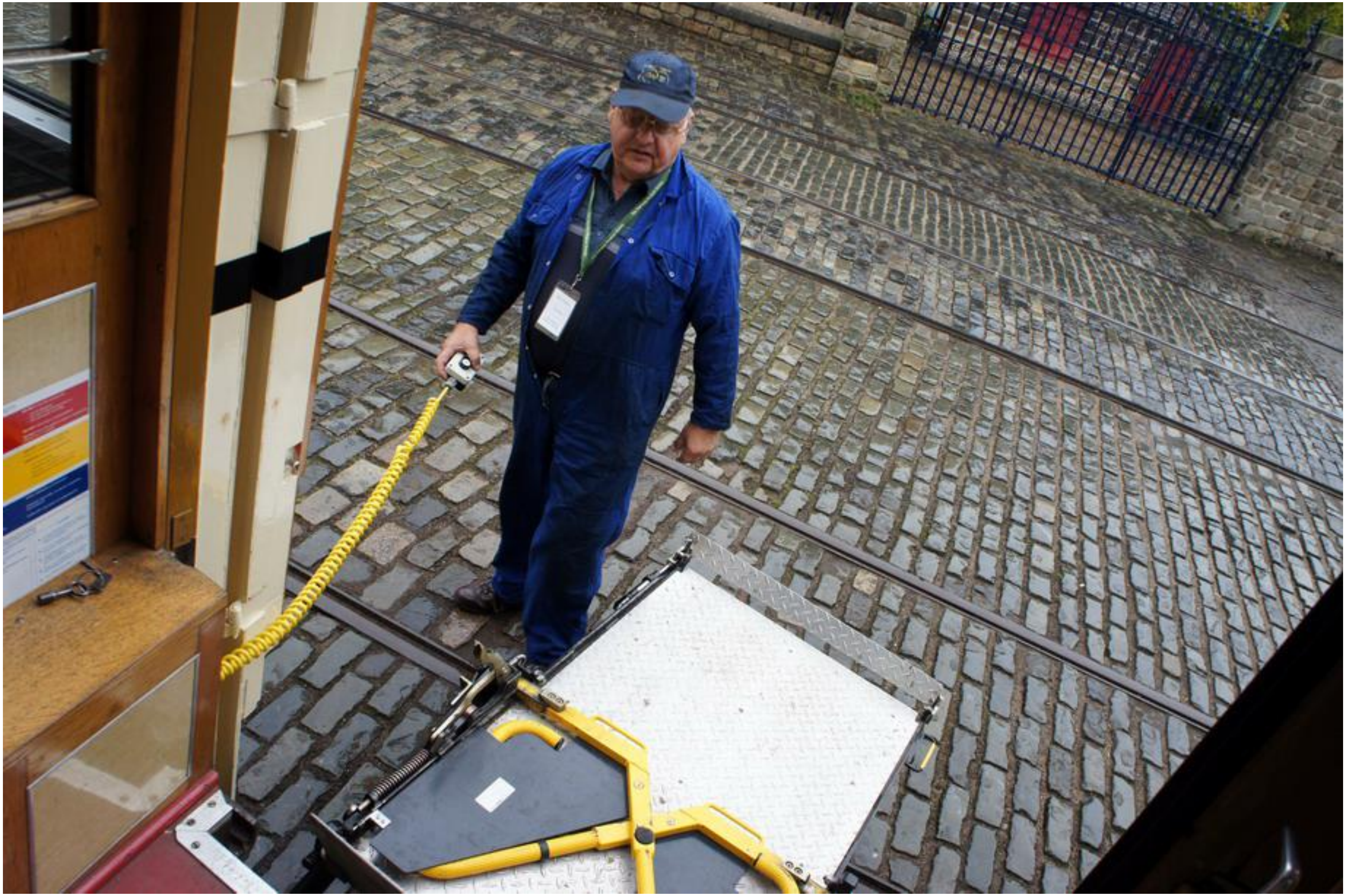
- 法規問題 Legislation

- 無障礙法規：月台高度(菁桐、高雄港、溪湖)
- Accessibility regulations：Platform height（Jingtong、Kaohsiung Port、Hsihu）
- 消防法規：防焰、耐燃、地下隧道、逃生口
- Fire regulations：Flame prevention、Flame resistant、Underground tunnel、Escape exit.
- 環保法規：排放標準
- Environmental regulations:emission standard
- 建技規則：橋梁載重、耐震、氯離子、護欄
- Structure and technique regulations：Bridge load 、Aseismatic design、chloride ions、Guardrail

怎樣才算「安全」？
How is safety issues?

- 勞安法規：鍋爐操作、危險性工作場所
- Rules of the Labor Safety Law：Boiler operation、Dangerous workplace
- 行車規章：ATP、ATS、號誌系統、防護無線電、尾燈、警戒色
- Driving regulations：ATP、ATS、Signaling system、Protection wireless、taillight、Warning color

英國電車博物館 柏林電車 British Tram Museum Berlin Tram



溪湖糖廠 轉車盤 Hsihu sugar factory Turntable

台鐵臨港線苓雅寮大橋
1936 Taiwan Railway
Lingang line Lingya Bridge

輕軌愛河橋 2016
Light rail transit love
river bridge

「安全」與「真實」的取捨

Making a choice of safety and authenticity

- 以阿里山鐵路為例
- For example : Alishan Railway

- 橋梁護欄、橋梁改建(木樑柱換成水泥)
- Bridge guardrail、Bridge reconstruction(Wood beam column replaced by cement)
- 電氣路牌閉塞器
- Electrical signal occlusion device
- 標誌式轉轍器
- Signal Switch
- 改為重軌水泥枕
- Replaced by heavy rail cement crosstie
- 錳鋼尖軌、岔心
- Manganese steel Point Rail, Crossings Frog
- 空氣彈簧轉向架？
- Air spring Bogie


25

動態保存與配套修法

Dynamic preservation and proposition to amend the legislature

- 就真實性而言，文資法規要鬆綁，觀念也要更新，不能完全用古蹟、古物的觀點，否則就是放著爛。In terms of authenticity, the cultural heritage legislation must be left free to act as well as updating concept instead of act of preserving monument, otherwise it is not helpful at all.

- 就安全性而言，監理、建築、消防、勞安、環境法規，都要考慮文化/技術處境合宜調整，否則原味盡失、不能動。In terms of safety, supervision, construction, fire, labor, environmental regulations are supposed to properly adjusted by considering cultural/technical situations, otherwise it can not be comprehensively achievable.

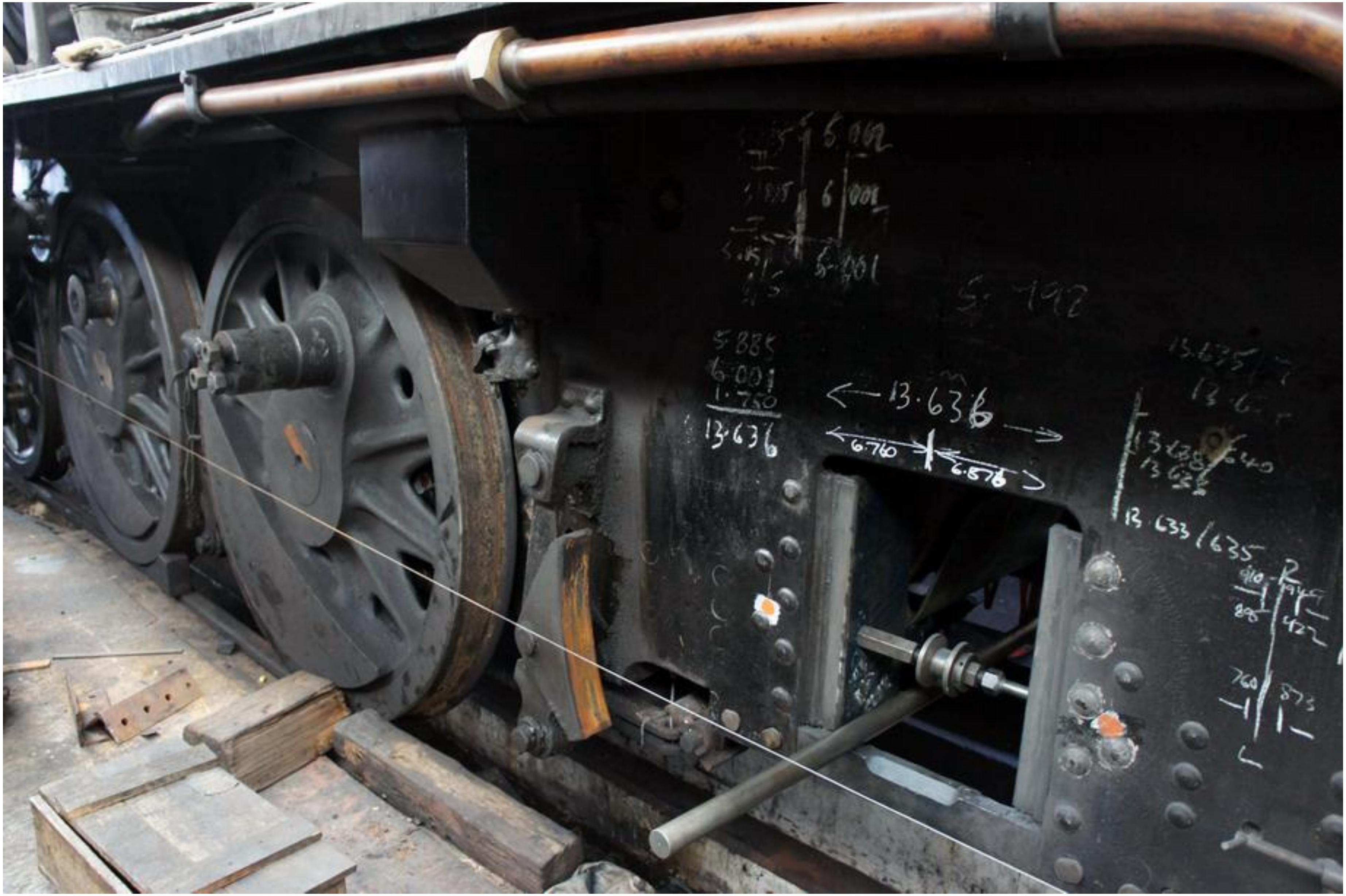
其他重要課題Other important issues

- 技術傳承
- Technic propagating and inheritance
- 監理 (體能檢定、駕照)
- Supervision (Physical examination, driving license)
- 環保 (空氣品質、道旁火災、排放控制、廢棄物、噪音、地下水、石化燃料)
- Environmental protection(air quality,roadside fire,emission control,waste,noise,groundwater,fossil fuel)
- 財務 (治理、政府補貼、養護、人事)
- Finance(Governance, government subsidies, maintenance,personnel expenses)
- 行銷 (募款、遊說、推廣教育)
- Marketing (Fundraising, lobbying, extension education)

技術傳承 英國鐵道博物館Shildon分館
Technic propagating and inheritance in British Railway Museum Shildon Branch

技術傳承 Technic propagating and inheritance

英國 Haworth loco shed in UK Haworth shed列車



曼谷中央車站 Bangkok Central Station

經費籌措 印度Rewari機廠

Financing in India Rewari Machinery Workshop

經費籌措 英國 Haworth loco shed
Financing in UK Haworth shed

營運、遊說、行銷 Operation, lobbying, marketing
英國Great Central Railway in UK

教育推廣 印尼爪哇島糖廠 Extension education in sugar factory Java Island, Indonesia

推廣教育 英國鐵道博物館 Extension education in British Railway Museum

推廣教育 英國鐵道博物館 Extension education in British Railway Museum

復活尚未成功　同志仍須努力

The revival not yet succeeds, comrades still have diligence

謝謝聆聽

Thank you for listening.

Appendix 4 - *Alishan as Industrial World Heritage*

Paul Mahoney

A scientific argument for **Alishan** as Industrial World Heritage

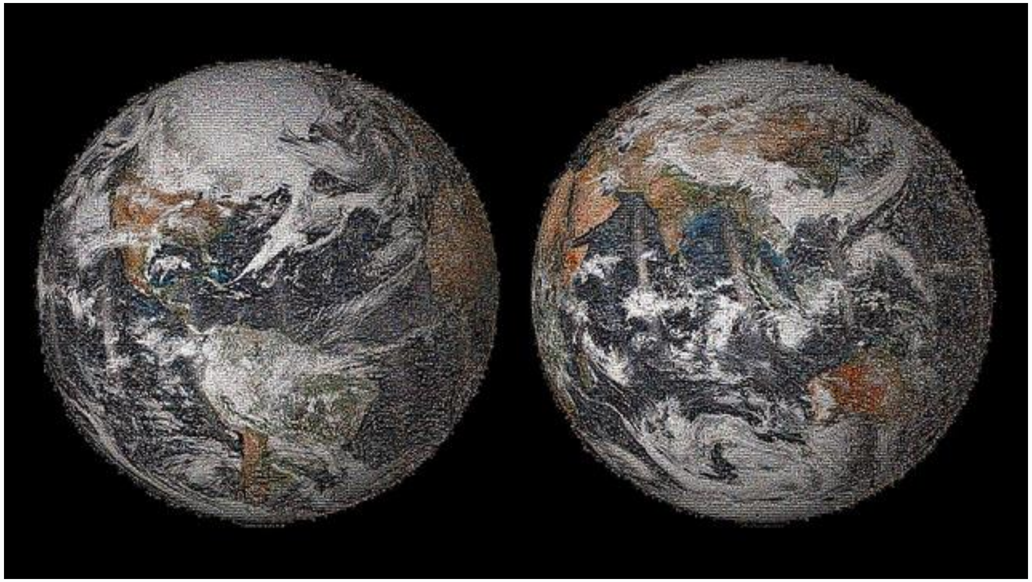
Paul Mahoney - New Zealand
World Heritage consultant
railways- forest railways-wood

Work visit 2013

Work visit 2013

Global Comparative Analysis World Heritage Sites Alishan Railway

42



Taiwan Potential World Heritage
Chiayi City
15 July 2014

Paul Mahoney
Department of Conservation
New Zealand

文化遺產的遺址

文化遺產的核心價值

文化遺產的價值

什麼是文化遺產的核心價值?

文化遺產的共性

是什麼因素構成了文化遺產的共同特征?

文化遺產的特點

是什麼因素賦予了文化遺址的特點?

Reconsider?

Process model for CA
Most CA work starts with a specific site
This reality is the opposite to the conceptual model

3: PROCESS MODEL

Mahoney July 2014

Alishan as World Heritage

1. Method
2. Application
3. Wider Vision

Inspiration 2007:

- **UNESCO World Heritage training** *Hiroshima*
- Duncan Marshall, Francois Le Blanc, Jeff Cody, Richard Engelhart

UNITAR

The 2007 UNITAR Workshop on the Management and Conservation of World Heritage Sites
Hiroshima, Japan, 15-20 April 2007

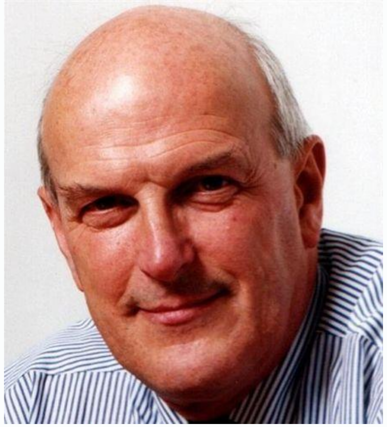
My Taiwan Connection

- At age 12 my father told me of Alishan. In 2012 …
- Met Professor Alex Yen
  at UNESCO Hiroshima
- Wrote my first Alishan report
  How to structure this report?
- Inspired at Taipei by TICCIH

Support from TICCIH

Taipei 2012

Sir Neil Cossons …



There is the need to articulate clearly and persuasively the values that underscore important heritage and why it should be preserved.

*This needs to be in plain language; comprehensible to the general public, **soundly** argued, simple, **clear** and **convincing**.*

The present danger is that the core principles and justifications are obscure to any but insiders. And maybe we don't even understand this ourselves …

World Heritage Value *Framework*

three key design features …

1 UNESCO basis *sound*

2 Scientific process *convincing*

3 Engages the public *clear*

design feature

1 UNESCO basis

- World Heritage definition basis …
- Sites[1] *of* Outstanding[2] Universal[3] Value[4]
- *Framework* is these 4 elements

World Heritage Value *Framework*

Value	**Universal**
Site	**Outstanding**

Elements *(4): Sites-Outstanding-Universal-Value*
Basis: UNESCO world Heritage definition

design feature

2 Scientific processes

- Decision Matrix Tool
- Competition Theory
- Multi Criteria Decision Analysis

Value	**Universal**
Site	**Outstanding**

Google this science …

design feature

3 Engages the Public

- Simple format suits collaborative working groups
- Summarise value on one page
- Clear logical argument shown

Value	**Universal**
Site	**Outstanding**

design feature

3 Engages the Public

Example from New Zealand 2019 – World Heritage case on one page:

A World Heritage Value Framework for Wellington Parliamentary Precinct

The Heritage Value Framework below used a systematic scientific process to develop a succinct summary of World Heritage value.

Paul Mahoney; status - technical advice; version 11 March 2019

Value. Attributes: *elements that contribute strongly to value*	**Universal. BIG Idea:** *the expression of value in a single sentence*
Suggest pick the strongest 5-8 laws from a list of 22, *for example*: • Women's suffrage 1893 • State housing schemes • State pension scheme • The key places - that still exist - where these ideas were developed and enacted • Maybe add key places that were created consequently: eg the first street of state houses .	▶ **World-leading progressive social legislation** This value links to UNESCO Criterion 4: *An outstanding example of a place which illustrates a* ***significant stage in human history****.*
Site. Understand: fabric + history + cultural associations	**Outstanding. Compare:** *other sites that strongly carry this value*
• Beehive • Parliament buildings • General Assembly library • Government building • All four buildings: listed heritage with conservation plans • Specify exactly what elements of each building are included	Global comparison of progressive legislation cited in the value, *for example* • Women's suffrage • State housing schemes • State pension schemes If needed compare the relative value of legislation using a systematic scientific methodology: Multi Criteria Decision Analysis MCDA. Don't have to compare any buildings – the value is based on the legislation
Risks	**Detail**

Framework - Key tasks

Tasks ❶ ❷ ❸ ❹

❷ **Value** *Develop the **attributes** of site value*	❸ **Universal** *Develop site value as a **BIG Idea***
❶ **Site** *Research **data** to understand the site*	❹ **Outstanding** *Scientifically **compare** the best sites*

Key Tasks Summary:

➊ *Research **data** to understand the site*

➋ *Develop the **attributes** of site value*

➌ *Develop site value as a **BIG Idea***

➍ *Scientifically **compare** the best sites*

Scientific basis: Competition theory

Alishan as World Heritage

1. Method ◀ *skip this today*
2. Apply method
3. Wider Vision

World Heritage is Sites of Outstanding Universal Value

❷ **Value** What makes forest railways **distinctive**?	❸ **Universal** Why are forest railways a **BIG Idea**?
❶ **Site** **Data** on forest railways then and now?	❹ **Outstanding** Which forest railway is outstanding?

This is a Framework of tasks

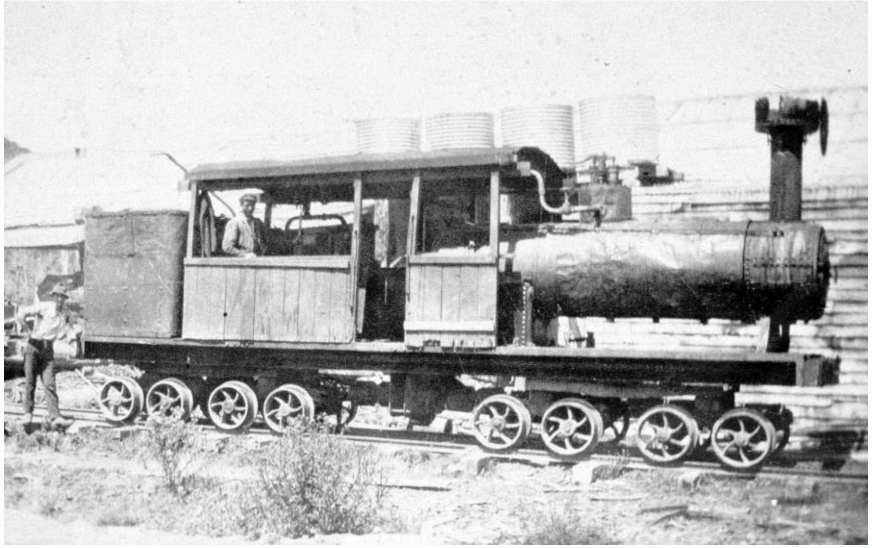
Data:

Value	Universal
❶ Site	Outstanding

Task ❶ in the Framework

- Data on forest railways then and now?

Data:


New Zealand 1920s - 16-wheeler forest loco

History

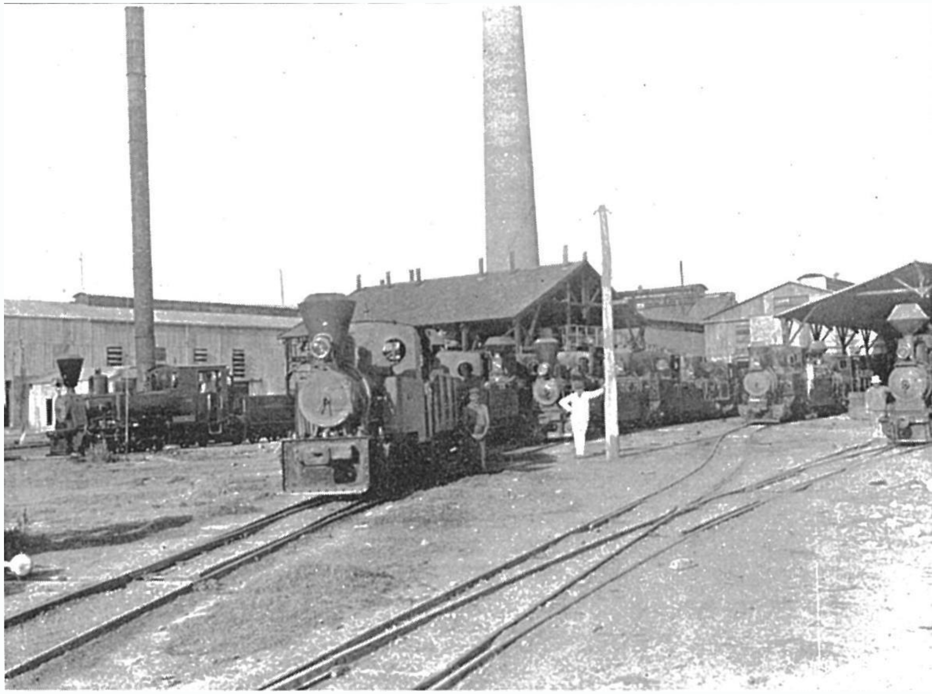
1. Era 150 years *1850-2000*
2. Global adoption
3. Distinctive features

Data:

Global impact

- 10,000 existed
- 150,000 + km
- 56 countries

first estimate



Chaco, Paraguay 1920s

Data:

Forest railways today

2012 research data

- Only 51 survive in 9 countries
- Only 14 carry logs
- Closure of 30 is imminent

End of an era

End of an Era: China’s last forestry railways 2002

Attributes:

❷ Value	Universal
Site	Outstanding

Task ❷ in the Framework

- What makes forest railways distinctive?
- Express values as attributes

Attributes:

- Attributes: a science & mathematics tool
- Attributes: express distinctive character ◀
- The 'strength of expression' of attributes gets used for site comparison in task ❹

Attributes:

Work done:

- Researched forest railways in 56 counties
- Universal themes emerged
- Distinctive character identified

Attributes:

1. **Construction attributes**: character related to construction features and the terrain through which it passes

2. **Operation attributes**: character related to locomotives, rolling stock and operational features

Attributes:

expressions of distinctive character

Construction

1. Mountain forest setting
2. Lightweight track
3. Curves + grades
4. Wooden trestles

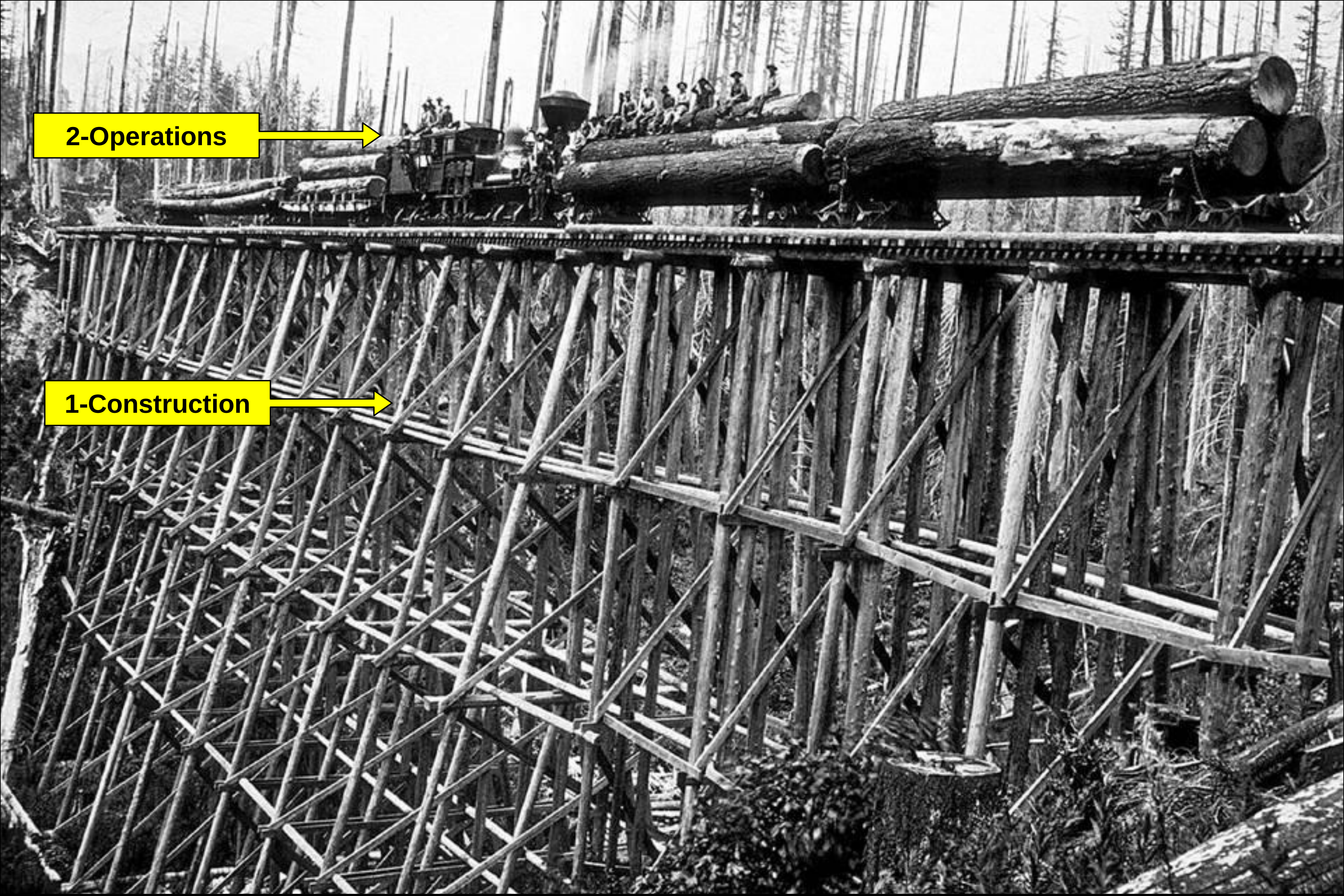
Attributes:

expressions of distinctive character

Operation:

- Special locomotives
- Special log wagons
- Operating practices

… *more*?



Forest railway value attributes

BIG Idea:

Value	❸ Universal
Site	Outstanding

Task ❸ in the Framework

- Why are forest railways a BIG Idea?
- Link to UNESCO criteria

BIG Idea:

Wood is:

- Premium material
- Global industry
- Process: grow→harvest→process→use

BIG Ideas ☑

BIG Idea: *Forest railways …*

A harvesting technology revolution

- Low cost
- High volume
- Versatile

Enabled industrialisation

BIG Idea ☑

BIG Idea:

Scale:

- 10,000 existed
- 150,000 km *add up all*
- 150 year era
- 56+ countries

BIG Idea ☑

BIG Idea: *summary*

Forest railways:

- Enabled industrialisation
- Adopted globally
- Distinctive technology
- Link to UNESCO criteria 4

BIG Ideas ☑

Transformed harvesting

- Low-cost
- High-volume
- Versatile

Forest railways are a BIG Idea

Compare:

Value	Universal
Site	4 Outstanding

Task 4 in in the Framework

- Which forest railway is outstanding?
- Global comparative analysis

Compare:

Pick the world's 10 strongest contenders from 52 left

- Russia .. 2 ☺
- Romania
- Hungary
- USA
- Canada ☹

- Taiwan
- Japan ☹
- Pakistan
- Indonesia

add more ....

X

Compare:

Compare 10 best railways:

- Scientific method: MCDA
  multi-criteria decision analysis
- Value attributes used for comparison
- Score the ‘strength of expression’ of each attribute

X

Compare:

"Three legged
stool image

Reflect UNESCO model, add:

- Authenticity & integrity *scored as attributes*
- Management & protection
- = World Heritage **potential**

Russian Forestry Railways

... YouTube

A freight train powered by a 1940s Soviet (Votkinsk) built PT-4 locomotive on Kresttsy forestry railway in 1951. Photo Sergei Dorozhkov Collection.

Compare:

Methodology

- RiVAS method (NZ university)
- Score range 1 to 5
- Reason for each score

X

Compare:

Scoring criteria for:	*Top score*
Heritage Value	20
Authenticity & Integrity	10
Protection & Management	10

- = **40**

Compare:

50%

Sites

Scores

	Heritage Value			Heritage Quality		
Forest Railway Country-9: Location-10	Construction	Operation	Heritage SCORE	Authenticity & Integrity	Protection & Management	Heritage SCORE
Taiwan: Alishan	10	7	17	9	10	36
Romania: Viseu de Sus	8	9	17	10	8	35
USA: Cass	8	8	16	8	9	33
Japan: Yakushima	9	7	16	9	6	31
Canada: Engelwood	9	8	17	9	3	29
Russia: Kudemskaya	7	9	15	7	4	27
Russia: Kobrinskaya	3	8	11	10	3	24
Hungary: Csömödér	3	7	10	10	5	25
Indonesia: Cepu	3	5	8	6	4	18
Pakistan: Changa Manga	2	4	6	7	4	17

40

Alishan Forest Railway 1st

Compare:

Alishan outstanding features:

- Dulishan Spiral
- Shay locomotive fleet
- Global technology blend
- National pride

Scored 2nd Romania: Viseu de Sus

Scored 3rd USA: Cass Scenic Railroad


Scored 4th Japan:
Yakushima island
forestry railway
足元注意

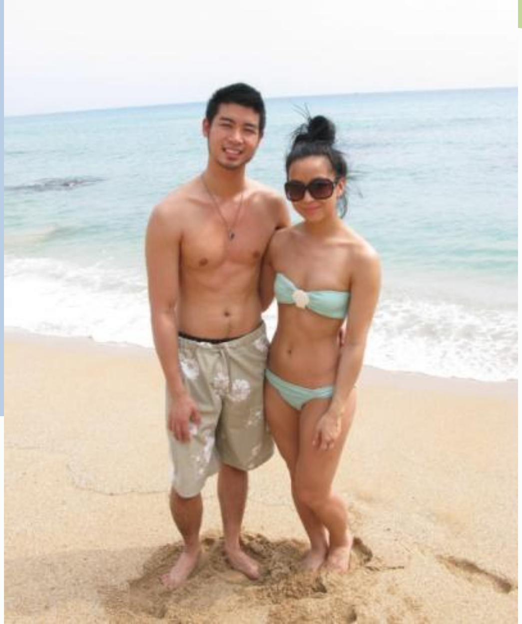
Plan My Holiday

❷

What beaches might rate most strongly?

- Kenting
- Phuket
- Waikiki
- Ipanema
- more …

.



❶

Beach:
My Holiday
BIG Idea!

❸

Attributes:
What highlights do I most want in my beach holiday?

❹

Pick the beach that offers the best holiday value

.

Science: Competition Theory

Disagree with result?

Framework is a scientific process

- Logical
- Comparable
- Repeatable

Romania

Re-run process with your data

Alishan as World Heritage

1. Method

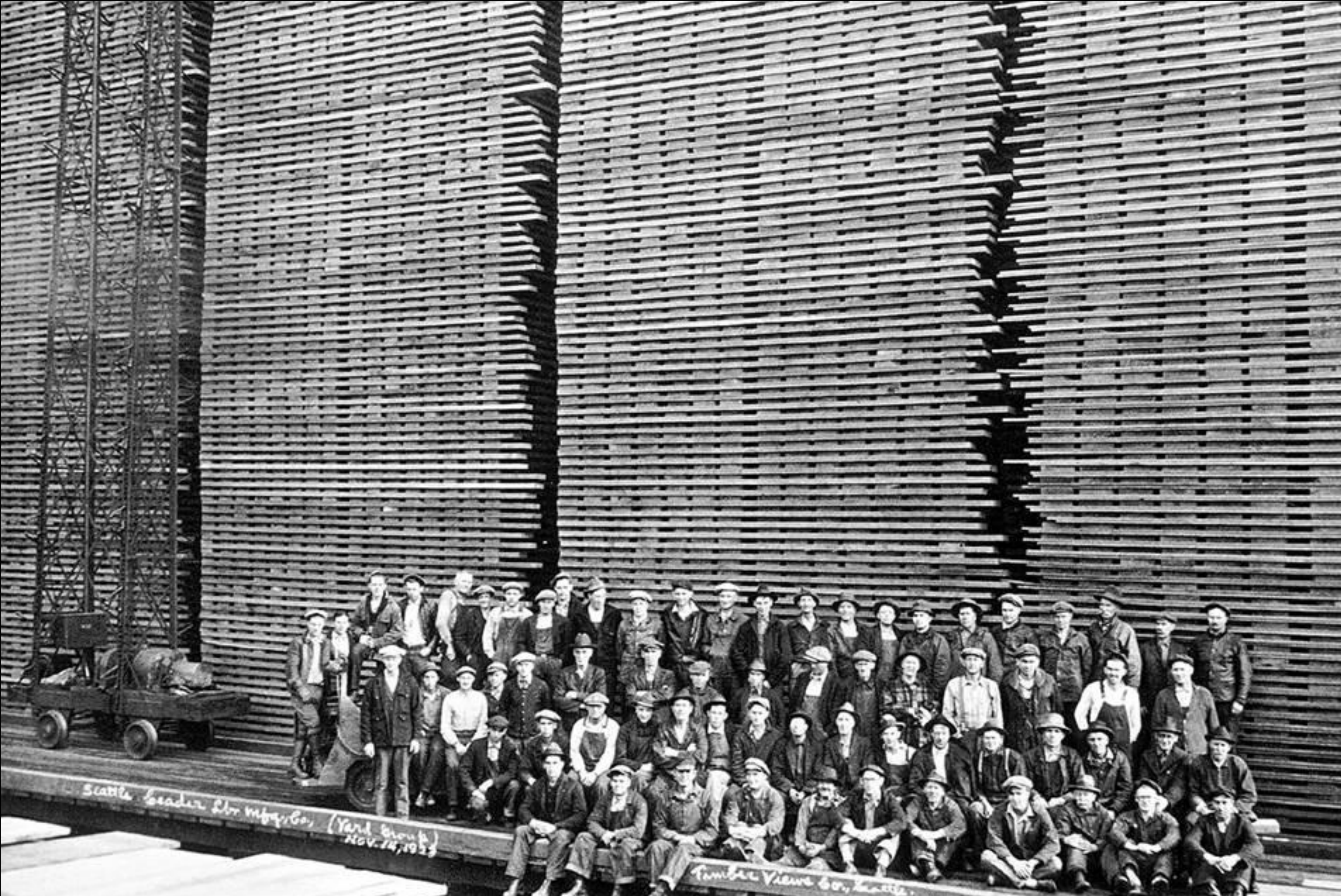
2. Application

3. Wider Vision ◄

Forest Industry World Heritage

Industrialisation era: ***wood harvesting***

BIG Idea



Industrialisation era: *wood processing*

BIG Idea

Heritage framework:

Global Wood

all **uses** of wood

… in all **places**

… in all **times**

… touches many people



Pick the Best:

The World Heritage of the Timber Industry

TICCIH Congress, Industrial Heritage in the 21st Century

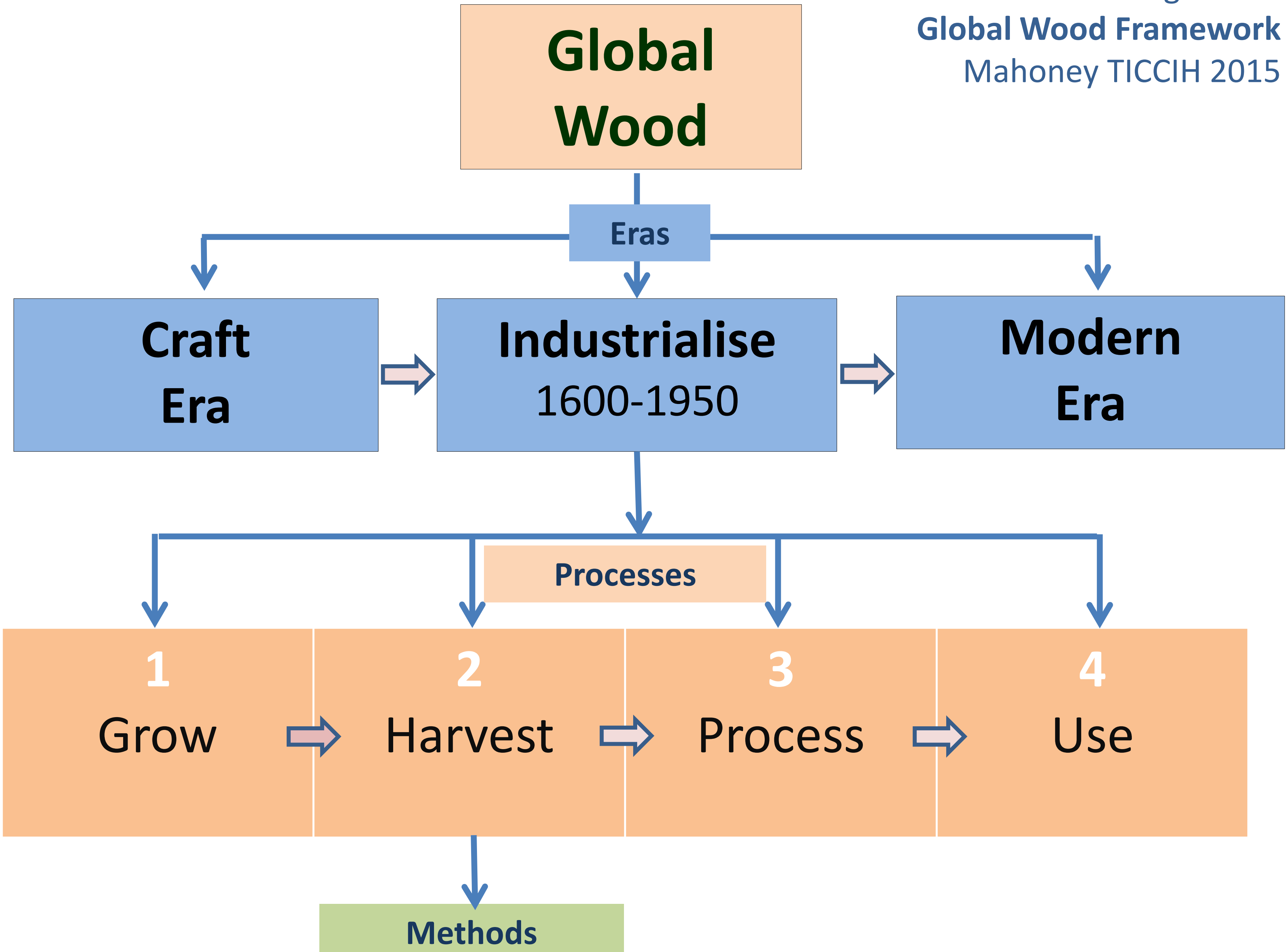
Lille, France; 6-11 September **2015**

Session: 2.4 UNESCO, ICOMOS & TICCIH

Paul Mahoney, Heritage Technical Advisor,

Department of Conservation, Wellington, New Zealand

Figure 2.2
Global Wood Framework
Mahoney TICCIH 2015



Grow wood:

Example: **Fire lookout tower**

protects forest growth

Grow

Step 1: Forests grow trees

Other examples:

- Forest office
- House of forest ranger
- Tree nursery
- Fire lookout tower ☑

Harvest wood:

Example: **Lidgerwood skidder.**

Alishan

1912 model 82 tonnes

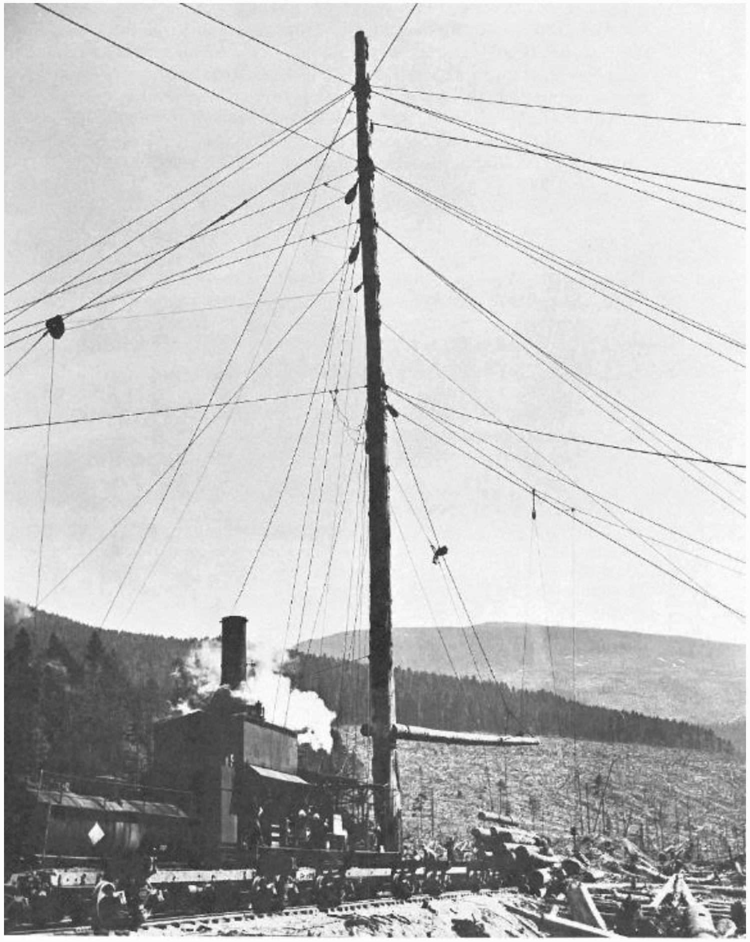
Harvest

***Step 2: Trees are harvested*.**

Other examples:

- Small log winch
- Logging branch railway
- Branch railway rolling stock
- Lidgerwood steam skidder ☑
- Skyline system
- Logging camp

more …



Process wood:

Example: **Band saw mill**

latest USA technology

Employee houses Cass USA

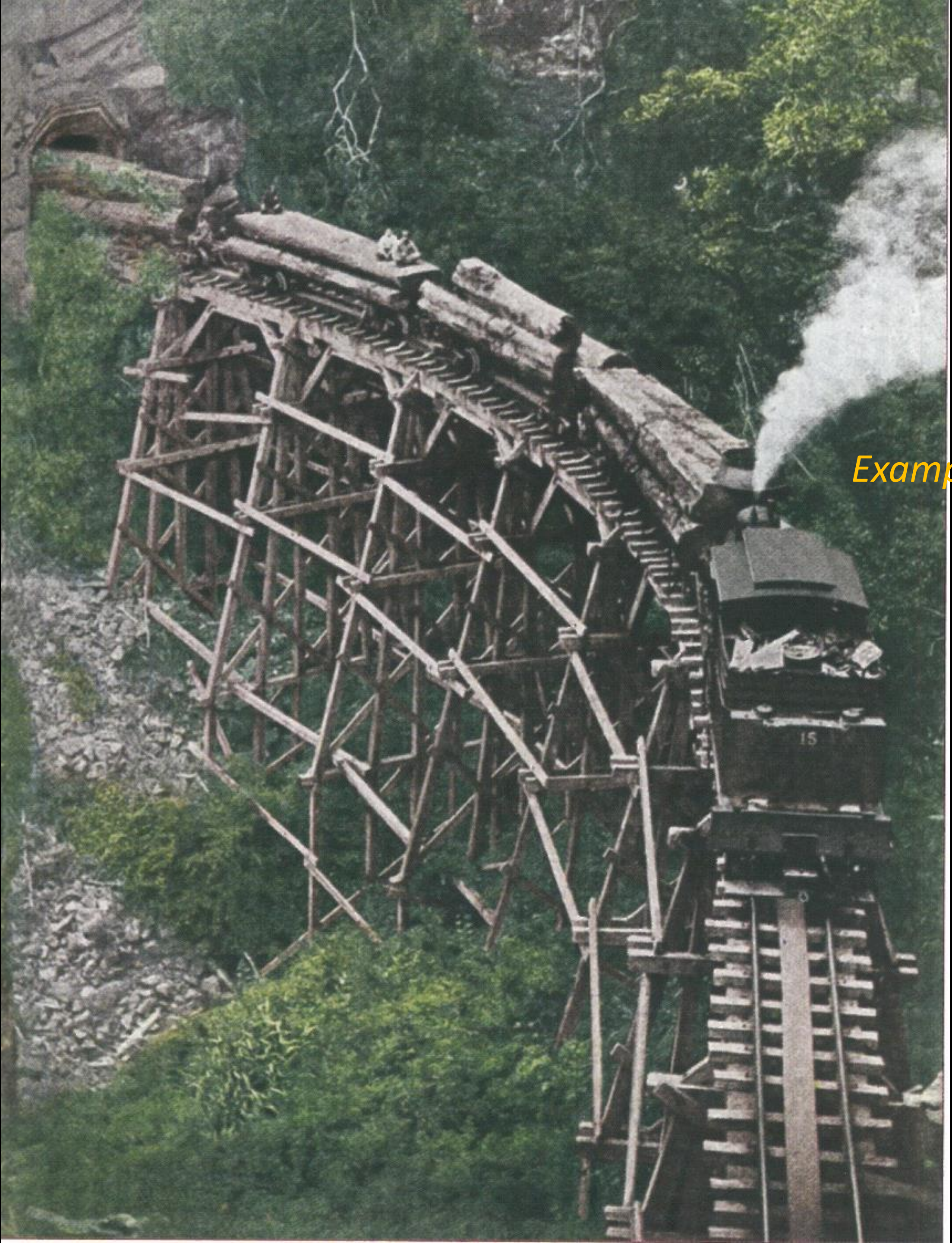
Process

Step 3: Logs are processed

Other examples:

- Log yard
- Sawmill ☑
- Extra processing
- Employee houses

more …



Use wood:

Example **wooden viaduct**

Alishan
Dadajia branch

Use

***Step 4: Wood products are used*.**

Other examples of use of wood:

- Trestle viaducts: *large*
- Buildings: *outstanding & typical*

  more …. hard to achieve here

Alishan Wider Vision

- Alishan shows the entire wood process

  grow→harvest→process→use

- Global contextual research is required to support this vision – *similar to the task I did for world forest railways*

- Guidance available from my recent papers …

Recent papers

Alishan Railway & Timber Industry

1. 1998: Book: Forest Railways of New Zealand
2. 2013: Alishan Heritage Assessment, BoCH, Taipei
3. 2014: **Sawmill** technology evolution, IPENZ, New Zealand
4. 2014: The World's Forestry Railways, BoCH, Chiayi
5. 2015: World Heritage of **Timber Industry**, TICCIH, France
6. 2016: The World's **Wooden Wonders**, DOC, New Zealand
7. 2018: Global Wood, TICCIH, Chile

Recent papers

Mountain Railways World Heritage

1. 2017: **Best mountain railways** of South America, ICRH, Argentina
2. 2018: Mountain Railways World Heritage, TICCIH, Chile
3. 2018: Darjeeling Railway World Heritage Framework, K Weise, India
4. 2018: Braden Copper Co World Heritage, CRHS, **Chile** ▸ *compares to Alishan*
5. 2019: Best **mountain railways** of East Asia, UNESCO, **Iran**
6. 2019: Best mountain railways of the World, UNESCO, Iran

Modern day messages

- Wood is good
- Wood is our future
- It is renewable
- It stores carbon
- It is biodegradable
- The story of Alishan today inspires better modern use of forests and wood

Alishan is outstanding

Thank you

END

A scientific argument for **Alishan** as Industrial World Heritage

Paul Mahoney - New Zealand
World Heritage consultant
railways- forest railways-wood
kiwiheritage@gmail.com

Appendix 5 - *Railway Heritage of Indonesia*

Hasti Tarekat Dipowijoyo

RAILWAYS HERITAGE OF INDONESIA

Celebrating Mobility in the Archipelago

Hasti Tarekat Dipowijoyo

Heritage *hands on*

Indonesia-the Netherlands

DUTCH INDIES PERIOD
The railway networks in Java Island from 1867-1949

Governor General Johannes den Bosch in 1830 applied **Forced Cultivation** (het cultuurstelsel) means that the natives had to use 20% of their land to produce commodities European markt such coffee, tea and sugar.

Otherwise, farmers had to work 66 days per year as forced labors in infrastructure projects.

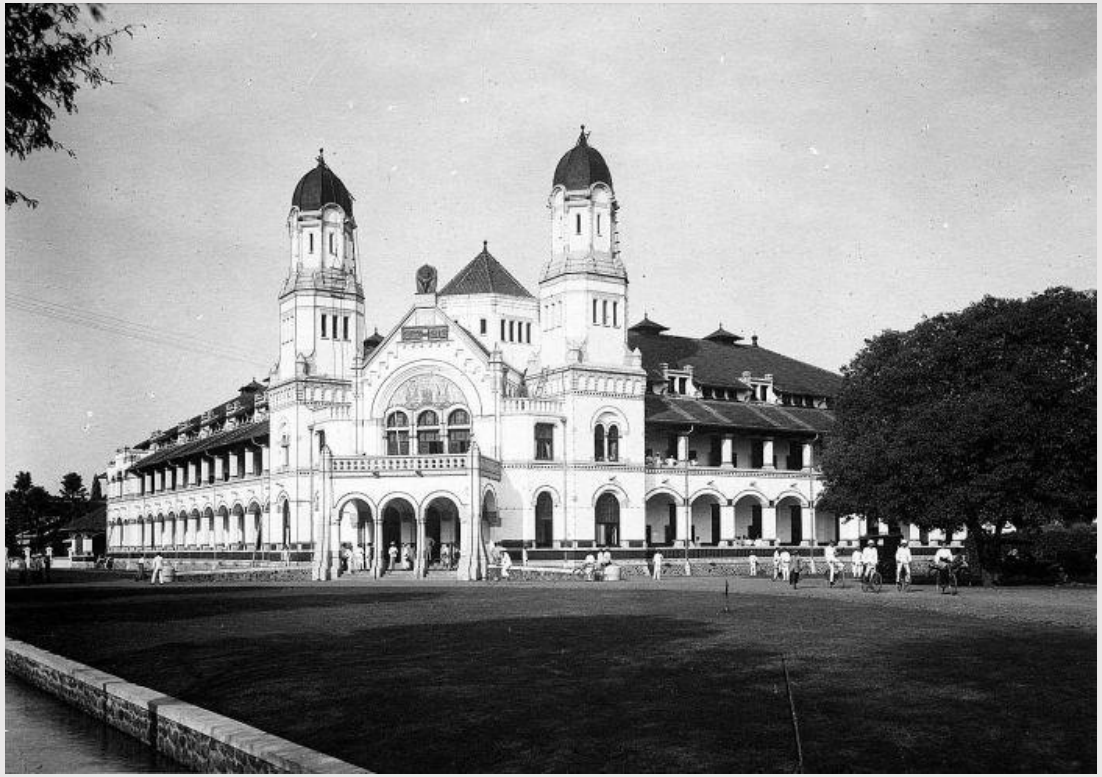
The forced cultivation means huge investment in the Dutch Indies railways network to transport harvests to Batavia (Jakarta), Semarang and Surabaya.

(Foto: Spaarnestad)

DUTCH INDIES PERIOD
The railway networks in Java Island from 1867-1949

De Nederlandsch-Indische Spoorwegmaatschapij –NIS (**the Dutch Indies Railways Company**) was established on 27 August 1863 because they received concession from the Governor General of Dutch Indies, Sloet van de Beele, on 28 August 1862 for traject **Semarang-Yogyakarta.**

The traject was challenging. Areas were difficult, many problems happened such as flood, lack of appropriate labors and problematic with material supplies. Despite these challenges, the main engineer Jan Philip de Bordes and his team stayed and made progresses.



Headquarter of de Nederlandsch-Indische Spoorweg Maatschappij (NIS) in Semarang, 1902, designed C. Citroen, Jacob Frederik Klinkhamer en B.J.Ouëndag
(Foto: Tropen Museum)

DUTCH INDIES PERIOD
The railway networks in Java Island from 1867-1949

The first line was in **1867** between Semarang to Tanggung.

In 1888 railways network existed between Central Java to East Java (Semarang, Solo, Yogyakarta, Surabaya).

From Jakarta to Bogor, Sukabumi, Bandung, Bekasi en Tanjung Priuk (the port in north of Jakarta).

In 1930 total railroad in Java was 7400 km.

(Foto: In de Archipel | Indonesië)

(Foto: Tropen Museum)

(Foto: Sporen van Smaragd)

DUTCH INDIES PERIOD
The railway networks in Java Island from 1867-1949

The documentation of first railroad in the Dutch Indies in 1864 was done by Germany photographer Carl Lang and photo studio Woodbury & Page.

The results were two albums and **the oldest picture was taken on 15 August 1864.**

(Foto: Tropen Museum)

DUTCH INDIES PERIOD
The railway networks in Java Island from 1867-1949

Jakarta to Surabaya (1936)

Station Goendih, Semarang-Soerakarta
(Foto: Tropen Museum)

At station Purwosari in Java on 13 november 1921
(Foto: Spoorwegmuseum)

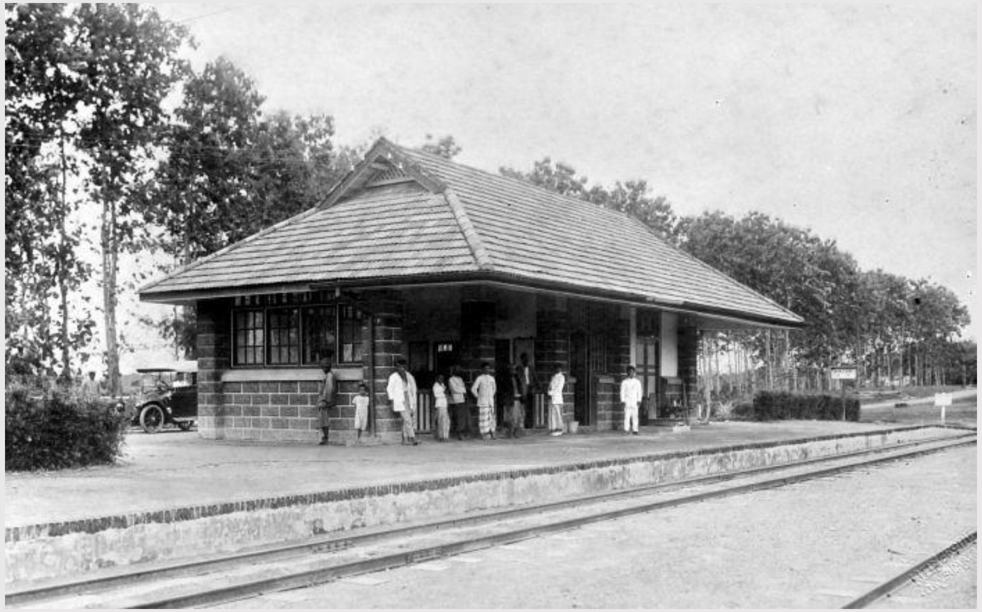
DUTCH INDIES PERIOD
The railway networks in Java Island from 1867-1949

Rail bridge Tjilame in West-Java
(Foto: Tropen Museum)

DUTCH INDIES PERIOD
The railway networks in Java Island from 1867-1949

Station Purwosari, Central Java
(Foto: Tropen Museum)

Station Tawang Semarang
(Foto: Tropen Museum)



Station Batu, East Java
(Foto: Tropen Museum)

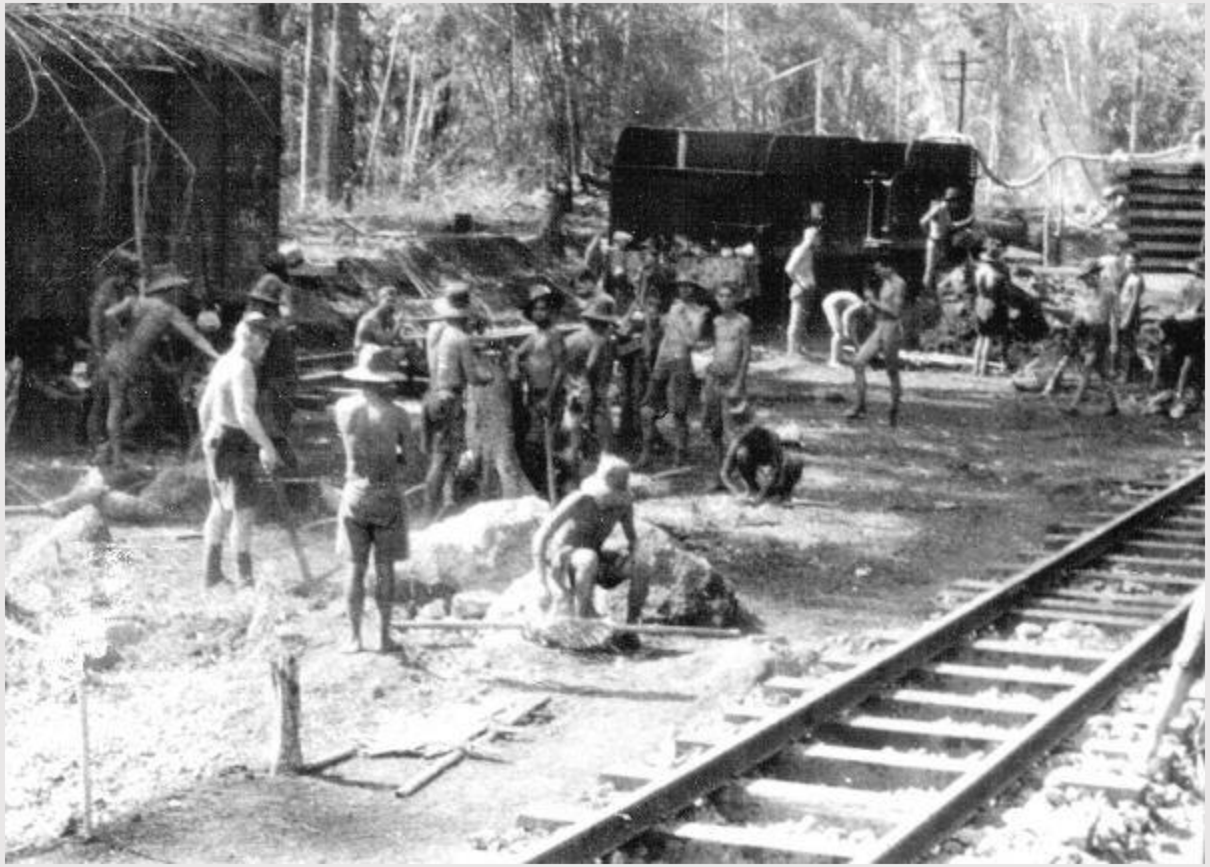
DUTCH INDIES PERIOD
The railway networks in Java Island from 1867-1949

Station Batavia (Jakarta)
(Foto's: Tropen Museum)

JAPANESE OCCUPATION PERIOD (1942-1945)

Railroad tracks were dismantle by the Japanese administration to be brought to Burma for railways construction by forced labors.

In 1950 the length was reduced from 6,811 kilometers into 5,910 kilometers. It means about **901 kilometers railroad tracks disappeared.**



Souce: http://www2.gvsu.edu

AFTER INDEPENDENCE (1945-ONWARDS)

Nationalization
since 1971

Source: www.URB.im

Source: www.abc.net.au

AFTER INDEPENDENCE (1945-ONWARDS)

Unit Architecture & Preservation of Indonesian Railways Company was established 1 April 2009 for identification, inventory, protection, maintenance and adaptive reuse of heritage assets:

1. Historical objects (locomotive, coach, wagon, signaling, equipment);
2. Non-station buildings (office, workshop, depot, water tower, official residence, signal cabin & crossing signal cabin, bridge and tunnel);
3. Station buildings;
4. Railways.

Unit Architecture & Preservation of Indonesian Railways Company (Locomotive)

(Courtesy of PT KAI)

In 1893 - 1902 from the Hartmann factory (Germany). Locomotives are assigned as locomotives to the officer's office or locomotive of passenger / freight trainers on short and flat routes on the island of Java.

In 1908, NIS brought 1 C18 steam locomotive and one C23 locomotive from Hartmann (Germany) factory.

Unit Architecture & Preservation of Indonesian Railways Company (Coach)

(Courtesy of PT KAI)

This wooden wagon was used to mobilize soldiers from one city to another during the struggle for Independence. "Merdeka ataoe Mati!!“ means “Independence or Die!!”

Wagon of Deli Sultanate in Medan, North Sumatra, from 1930

Unit Architecture & Preservation of Indonesian Railways Company (Wagon)

(Courtesy of PT KAI)

Probolinggo Station, East Java. This station connects between Banyuwangi Station and Surabaya Gubeng Station.

GTCM carriage is a railway mechanical railway carriage, based from the interior modified GW carriage, the carriage serves to transport additional railway mechanical equipment and also serves for the rest of the railroad maintenance officers.

Unit Architecture & Preservation of Indonesian Railways Company (Signaling)

(Courtesy of PT KAI)

Manual Siemens & Halske signaling is a signaling system that is driven mechanically / manually with human power.

Alkmaar signaling is driven by a mechanical / manual drive / handle lever with human power.

Unit Architecture & Preservation of Indonesian Railways Company (Non Station Buildings - Warehouse)

(Courtesy of PT KAI)

Cikudapateuh Warehouse

Unit Architecture & Preservation of Indonesian Railways Company (Non Station Buildings - Workshop)

(Courtesy of PT KAI)

Yasa Pengok Hall, Yogyakarta was built in 1914 by Nederland Indische Spoorweg Maatschapij (NIS), whose name was then Centraal Werkplaats and its main task was to carry out overhaul of locomotives, carriages and trains.

Balai Yasa Tegal is a workshop for maintenance and repair of trains, especially freight cars and passenger trains.

Unit Architecture & Preservation of Indonesian Railways Company (Non Station Buildings – Water Tower)

(Courtesy of PT KAI)

Built in 1915 in Ketanggungan Station, Cirebon.

Built in 1912 in Station Cirebon

Unit Architecture & Preservation of Indonesian Railways Company (Non Station Buildings – Official Residence)

(Courtesy of PT KAI)

Station Maseng, Bogor

Station Sidoardjo

Unit Architecture & Preservation of Indonesian Railways Company (Non Station Buildings – Signal Post)

(Courtesy of PT KAI)

Unit Architecture & Preservation of Indonesian Railways Company (Non Station Buildings – Bridge and Tunnel)

(Courtesy of PT KAI)

Cirangrang Bridge between Sasaksaat and Cilame Stations.

Ciherang Bridge between Bumiwaluya and Cipendeuy Stations.

Unit Architecture & Preservation of Indonesian Railways Company (Station Buildings)

(Courtesy of PT KAI)

Jakarta Kota Station

Yogyakarta Station

Unit Architecture & Preservation of Indonesian Railways Company (Station Buildings)

(Courtesy of PT KAI)

Delanggu Station, Central Java

Catang Station, Serang

Unit Architecture & Preservation of Indonesian Railways Company (Railway Route)

(Courtesy of PT KAI)

Ambarawa-Bedono, a very important historical old-rack-railway left in the world.

It is a triple line railway; two in each side and one 'toothed track' in the middle.

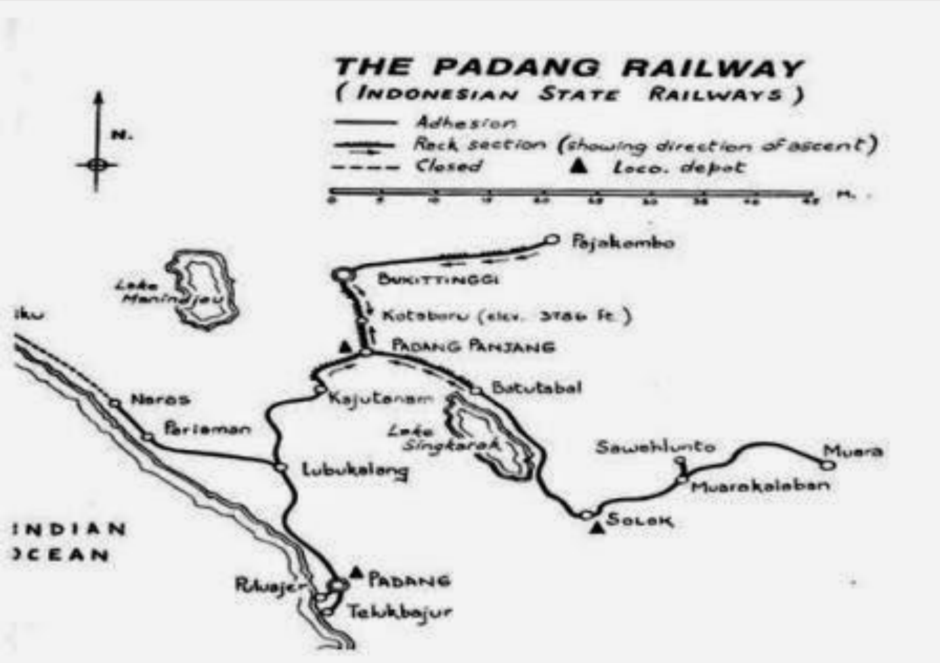
The special 'toothed track' is to prevent slipping on steeply inclined tracks (65%) that is climb from 478 m to 711 m above sea surface, just in a 4,2 km distance.

Touristic route between Bogor-Sukabumi since 1884

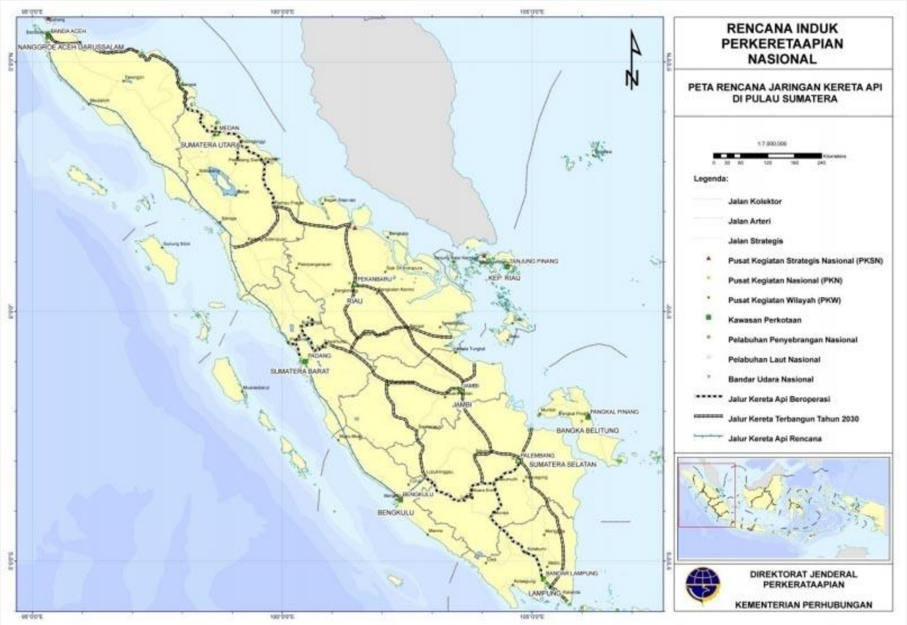
Historic Urban Landscape (HUL) and Railways Sawahlunto

Sawahlunto is the oldest coal mining town in South East Asia.

In 1883, Dutch Indies Govt. build the Teluk Bayur Harbor and in 1887-1892, they began to construct railways from Pulau Air Padang to Muaro Kalaban and from this station the road goes up to the Sawahlunto area.

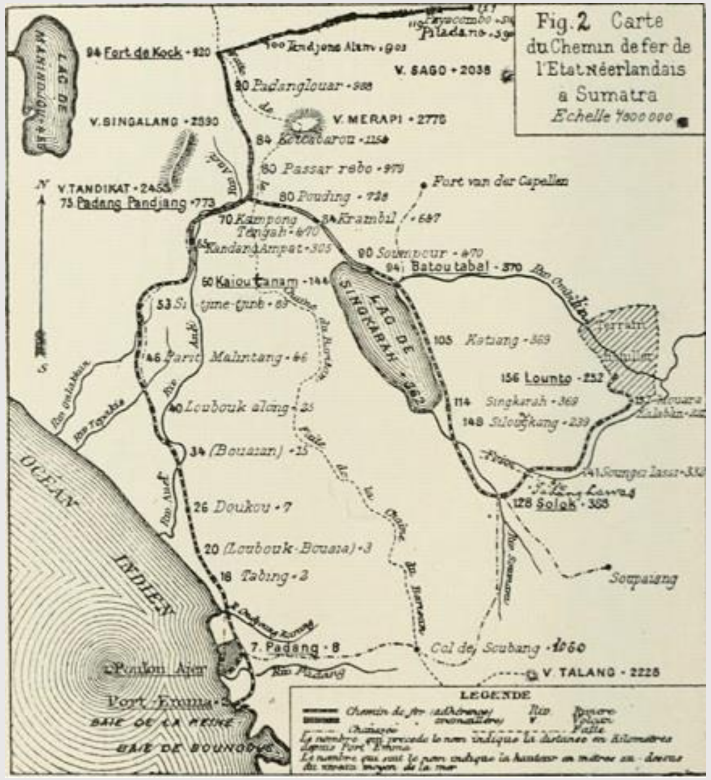


Picture: Expeditions / Adventure



Historic Urban Landscape (HUL) and Railways Sawahlunto

Pictures: KITLV



Historic Urban Landscape (HUL) and Railways Sawahlunto

Historic Urban Landscape (HUL) and Railways Ambarawa

Ambarawa was a military city during the Dutch Colonial Government. On May 21, 1873 the Ambarawa railway station was built.

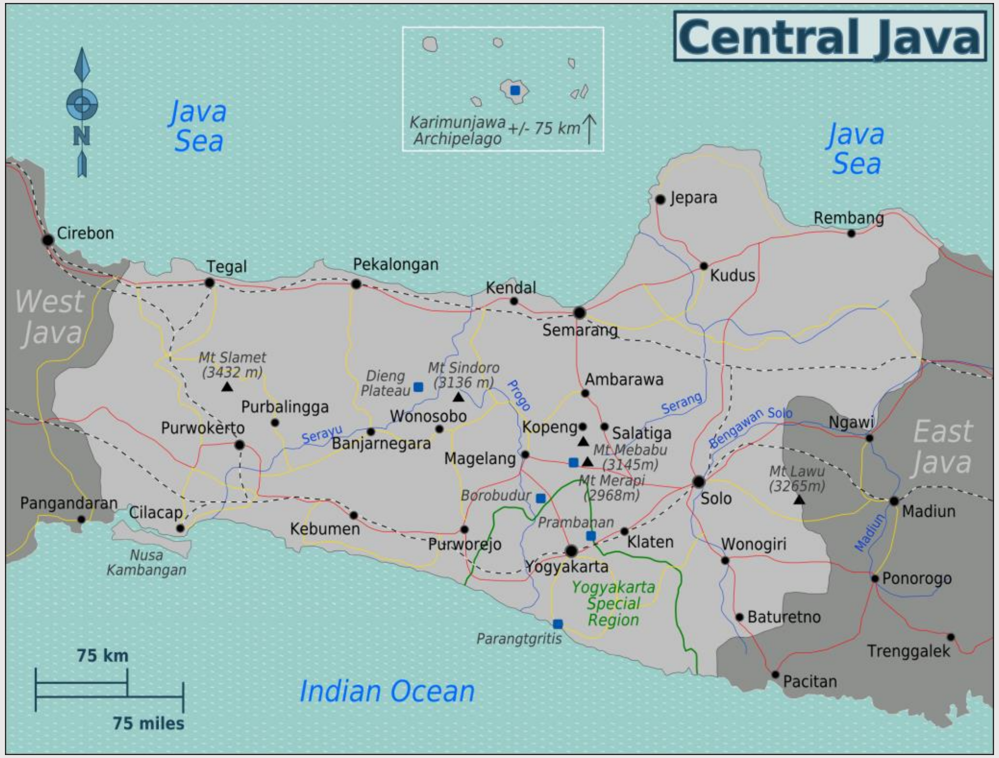
Ambarawa was the site of Japanese internment camps where up to 15,000 Europeans had been held during the Japanese occupation during World War II.

On April 8, 1976, the Ambarawa Railway Station was officially converted into a museum.

The museum preserves the steam locomotives which were then coming to the end of their useful lives when the 3 ft 6 in (1,067 mm) gauge railways of the Indonesian State Railway (the Perusahaan Negara Kereta Api, PNKA) was closed.

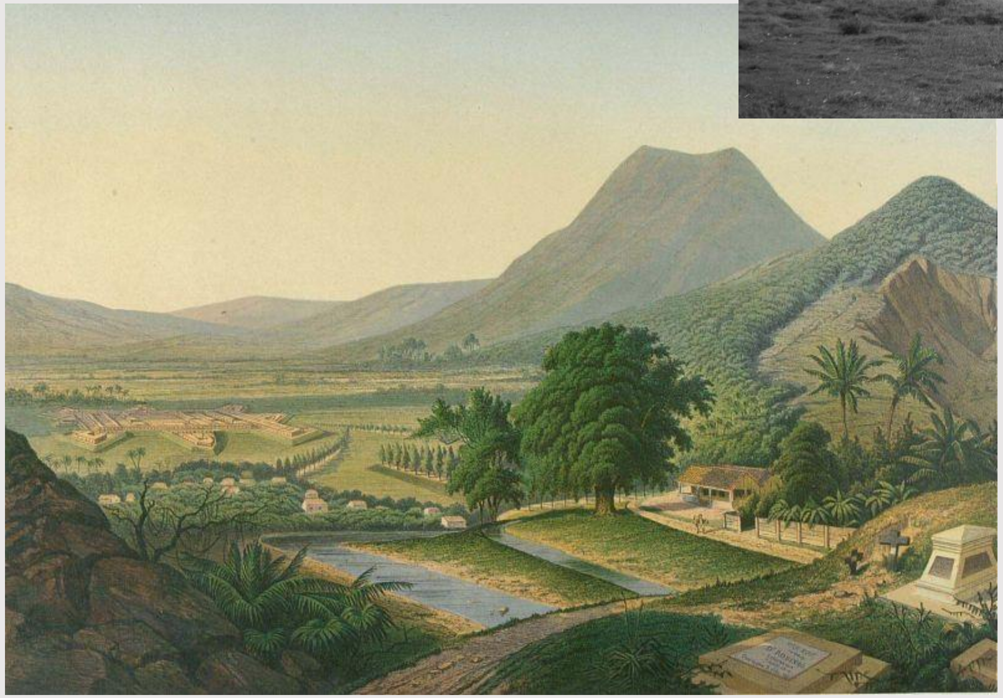
In 2010, the building of Ambarawa Railway Museum was made heritage building.

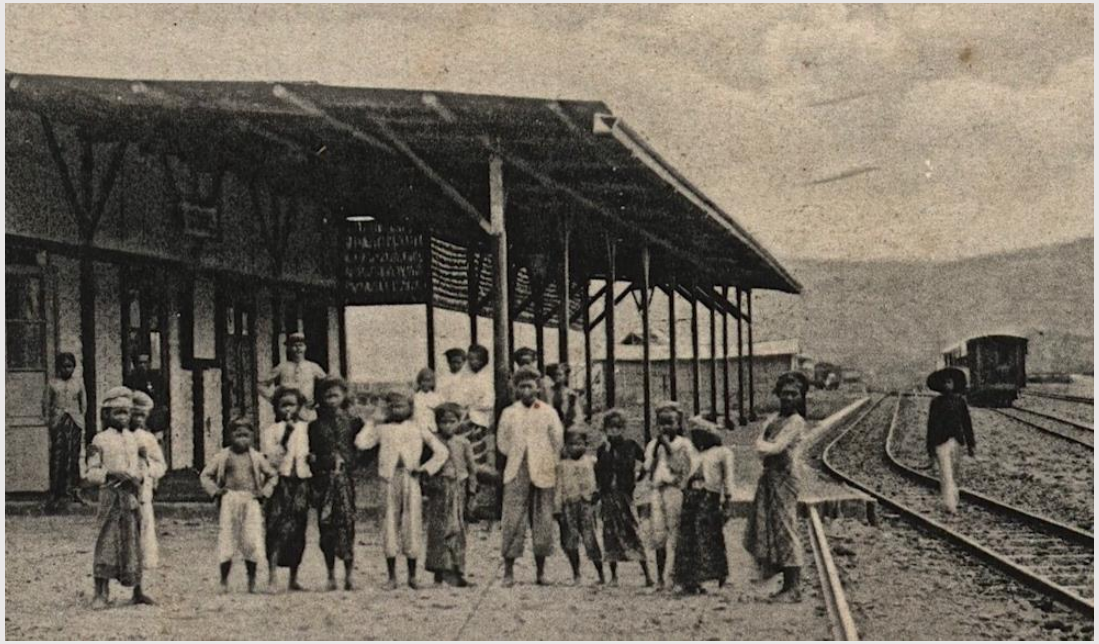
Source: KITLV



en.wikipedia.org

Historic Urban Landscape (HUL) and Railways Ambarawa





Fort Willem I

Pictures: Tropen Museum

Historic Urban Landscape (HUL) and Railways Ambarawa

Source: Phinemo

Historic Urban Landscape (HUL) and Railways Ambarawa

Stakeholders

Government

State-owned company PT Kereta Api Indonesia (407k)

Non-government

Indonesia Railway Preservation Society (IPRS)

Communities

Indonesianrailways (113k)

Indorailwaypicture (11,9 k)

DUTCH INDIES PERIOD
The railway networks in Java Island from 1867-1949

REFERENCES

1. Geschiedenis van de Indonesische spoorwegen, https://indearchipel.wordpress.com/2012/10/14/geschiedenis-spoorwegen
2. https://www.treinennieuws.nl/spoorwegen-in-nederlands-indie-150-jaar
3. Lizanne Gille, 2017, Herinneringen aan het Indische spoor een historisch onderzoek naar mondelinge overleveringen van spoormedewerkers in Nederlands-Indië werkzaam gedurende het koloniale bewind, de Japanse bezetting en de Indonesische onafhankelijkheid (afstudeerproject voor de master Cultuurgeschiedenis aan de Universiteit Utrecht);
4. Evelien Pieterse, 2017, Sporen van Smaragd, per trein door Nederlands-Indië (1867-1949)
5. https://heritage.kai.id/beranda

Appendix 5 - *Railway Heritage of Indonesia*

Hasti Tarekat Dipowijoyo

Darjeeling Himalayan Railway

UNESCO

A Unesco World Heritage Site

'B' Class built by Sharp Stuart & Co. 1903

DARJEELING HIMALAYAN RAILWAY

A UNESCO WORLD HERITAGE SITE

ESTD. 1881

Brief History of DHR

- After train services reached the plains of Siliguri in 1878, Franklin Prestige, Agent of the Eastern Bengal Railway, foresaw the utility of a rail link between the hills of Darjeeling and the plains. He submitted a scheme for the construction of a two feet gauge railway line from Siliguri to Darjeeling.
- In a detailed scheme submitted to the Government of Bengal and approved by the Lt. Governor Sir Ashley Eden, he pointed out how a railway could substantially reduce the cost of transport between Darjeeling and the plains.
- Prestage received final sanction for his project on April 8, 1879 and formed the Darjeeling Steam Tramway Co. However, the idea of operating the line as a steam tramway was soon abandoned and, on September 15, 1881, the company adopted the designation of Darjeeling Himalayan Railway Co. (DHR), which remained effective until it was taken over by the Government of free India on October 20, 1948.

World Heritage Status

UNESCO's World Heritage Committee inscribed DHR as a World Heritage Site on 5th December 1999 stating the following reasons:

“The DHR is the first, and still the most outstanding, example of a hill passenger railway. Opened in 1881, it applied bold and ingenious engineering solutions to the problem of establishing an effective rail link across a mountainous terrain of great beauty. It is still fully operational and retains most of its original features intact.”

UNESCO

UNITED NATIONS EDUCATIONAL
SCIENTIFIC AND
CULTURAL ORGANIZATION

CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE

The World Heritage Committee has inscribed

the Darjeeling Himalayan Railway

on the World Heritage List

Inscription on this list confirms the exceptional and universal value of a cultural or natural site which requires protection for the benefit of all humanity

DATE OF INSCRIPTION :
5 December 1999

DIRECTOR GENERAL OF UNESCO

Brief of Stations over DHR

- **NEW JALPAIGURI:** Altitude: 480 Ft. (MSL) Opened: 1964
- **SILIGURI TOWN:** Altitude: 500 Ft. (MSL) Opened: 1878
- **SILIGURI JN:** Altitude: 500 Ft. (MSL) Opened: 1878
- **SUKNA:** Altitude: 533 Ft. (MSL) Opened: 1879
- **RONGTONG:** Altitude: 1404 Ft. (MSL) Opened: 1880
- **TINDHARIA:** Altitude: 2822 Ft. (MSL Opened: 1880
- **GAYABARI:** Altitude: 3516 Ft. (MSL) Opened: 1880
- **MAHANADI:** Altitude: 4120 Ft. (MSL) Opened: 1880
- **KURSEONG:** Altitude: 4864 Ft. (MSL) Opened: 1880
- **TUNG:** Altitude: 5656 Ft. (MSL) Opened: 1881
- **SONADA:** Altitude: 6552 Ft. (MSL) Opened: 1881
- **GHUM:** Altitude: 7407 Ft. (MSL) Opened: 1881
- **DARJEELING:** Altitude: 6812 Ft. (MSL) Opened: 1881

Route Map of DHR

Present Status

At present NG –DJ section covers a distance of 87.48 Kms. from New Jalpaiguri. This length of track has 860 curves ,3 loops, 6 reverses (Zs), 557 Bridges/Culverts and 177 'C' Class U/Manned L/X-ings, Maximum curves is 114 degrees and total length of all 860 curves comes to 61 Kms . At present three are thirteen stations in this section taking off from New Jalpaiguri.

The ingenuity of DHR can be experienced in the following three ways

- The ingenuity of DHR can be experienced in the following three ways

- Criss-Crossing along the Hill Cart Road entailing over 154 crossings;
- Running along loops where the train describes a full circle to finish some 20 feet higher;
- Reversing on a "Z" layout; Forward, Reverse and Forward again at a higher altitude.

* The DHR ascends 6812 feet from New Jalpaiguri, the climb begins at Sukna, continues uninterruptedly to Ghum (7407 ft) and descends the final 5 miles to Darjeeling (6812 ft)

- The tiny 4-wheeled steam engines of the 19^{th} century are living legends for sounds, fragrance & romance of a bygone era.
- DHR still runs the original B class steam locomotives, many of these more than century old.
- DHR still follows 100 years old train operating rule which is followed nowhere in Indian Railways

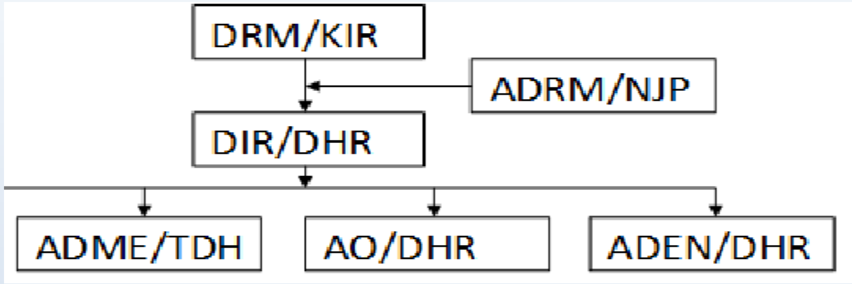
"Z" Reverse = 06 Nos.

Rev: No.	KM/TP	Btn. Stn.	Total length	Track Structure		
				Rail	Sleeper	Type of fittings
1	19/6-13	RTG-TDH	360 Mtrs.	50 Lbs	BG Converted ST	M S Clip (RT- 6078, 6079, 6081), T-Bolts (RT-6084), Coil Spring Washer (RT-1878)
1A	24/8-12	RTG-TDH	280 Mtrs.	50 Lbs	BG Converted ST	M S Clip (RT- 6078, 6079, 6081), T-Bolts (RT-6084), Coil Spring Washer (RT-1878)
2	25/13-26/3	RTG-TDH	360 Mtrs.	50 Lbs	BG Converted ST	M S Clip (RT- 6078, 6079, 6081), T-Bolts (RT-6084), Coil Spring Washer (RT-1878)
3	31/1-5	TDH-GBE	270 Mtrs.	50 Lbs	BG Converted ST	M S Clip (RT- 6078, 6079, 6081), T-Bolts (RT-6084), Coil Spring Washer (RT-1878)
4	34/14-35/3	TDH-GBE	280 Mtrs.	50 Lbs	PSC Line NG sleeper	ERC (RT-3722), Metal Liner (RT-3741, 3739), G R Pad (RT-3724)
5	36/8-36/12	GBE-MHN	280 Mtrs.	50 Lbs	PSC Line NG sleeper	ERC (RT-3722), Metal Liner (RT-3741, 3739), G R Pad (RT-3724)

Total No. of Loop - 3 Nos.

Loop No.	Name of Loop	KM/TP	Btn Stn.	Length of Loop	Degree of curvature of Loop	Track Structure of Loop
1	Chunbhatti Loop	23/5-10	RTG-TDH	294 Mtrs.	100 Degree	50 Lbs rails with BG converted ST sleeper with its fittings (M S Clips & T-Bolts)
2	Agony Point	31/10-32/0	TDH-GBE	246 Mtrs.	100 Degree	50 Lbs rails with BG converted ST sleeper with its fittings (M S Clips & T-Bolts)
3	Batasia	75/0-3	GVM-DJ	240 Mtrs.	85 Degree	50 Lbs rails with BG converted ST sleeper with its fittings (M S Clips & T-Bolts)

Organization structure & manpower



DEPT.		BOS	OR	VAC
ENGINEERING	P-Way	95	72	84
	Non-Safety	24	15	09
TRAFFIC		66	37	29
	Supervisor	31	22	*09*
	Running	114	69	*45*
	C&W	28	27	*1*
MECHANICAL	Steam Loco	48	40	*8*
	WS	85	70	*20*
	Office staff	21	09	*12*
	Running Room	9	5	*4*
ELECTRICAL		43	23	20
MEDICAL		*56*	*29*	*27*
TOTAL		**626**	**418**	**268**

Train Services on DHR

- Joy Ride Special Trains
- Daily Passenger Trains
- Jungle Safari Special Train on demand
- Evening Safari Special Train
- Red Panda
- Chartered Trains
- Special Coach Booking

Joy Ride Special Trains

- This train runs on round trip basis from Darjeeling to Ghum and back to Darjeeling. **Joy Ride Special Trains** passes a number of well-known Darjeeling sights and attraction as it climbs fearsome 1 in 20 gradients and loops over itself to gain height. The train will stop at Batasia Loop for 10 minutes for passenger to admire the view and then at Ghum for 30 minutes for the DHR Railway Museum. Entry to the museum is included in the fare.
- Joy Ride trains are namely divided into two categories – Joy Ride Special Trains (Diesel Loco) and Joy Ride Special Trains (Steam Loco)

Joy Ride Special Trains

Train No.	Joy Ride	Dept.	Arrv.	From & To	Class	Fare in Rs.
52593	Steam	09:40	11:40	Darjeeling –Ghum - Darjeeling	FC-V	1400/-
52594	Steam	10:00	12:00	Darjeeling –Ghum - Darjeeling	FC	1310/-
52591	Diesel	10:10	12:05	Darjeeling –Ghum - Darjeeling	FC	805/-
52595	Steam	12:10	14:10	Darjeeling –Ghum - Darjeeling	FC-V	1400/-
52596	Steam	12:20	14:20	Darjeeling –Ghum - Darjeeling	FC	1310-/
52597	Diesel	12:45	14:30	Darjeeling –Ghum - Darjeeling	FC	805/-
52598	Steam	16:05	18:05	Darjeeling –Ghum - Darjeeling	FC-V	1400/-
52592	Steam	16:10	18:25	Darjeeling –Ghum - Darjeeling	FC	1310/-
52599	Diesel	16:20	18:20	Darjeeling –Ghum - Darjeeling	FC	805/-

Passenger Trains run between New Jalpaiguri - Darjeeling and Kurseong - Darjeeling

Train No.	Departure	Arrival	Class	Fare in Rs.
52541	New Jalpaiguri at 08:30 hrs.	Darjeeling at 15:35 hrs.	FC	1295/-
			AC	1555/-
52540	Darjeeling at 08:15 hrs.	New Jalpaiguri at 15:10 hrs.	FC	1295/-
			AC	1555/-
52587	Kurseong at 06:30 hrs.	Darjeeling at 09.05 hrs.	FC	685/-
			SC	60/-
52588	Darjeeling at 16:00 hrs.	Kurseong at 18:30 hrs.	FC	685/-
			SC	60/-

Jungle Safari Special Train on demand

Departure time : Siliguri Jn, 10.30 hrs & back 15.20 hrs	Fare in Rs.
Diesel Hauled Jungle Safari Special train on demand with two FC coaches on round trip basis from Siliguri Junction to Tindharia via Rongtong and back to Siliguri Junction. This train passes through magnificent Mahananda Wild Life Sanctuary and section having Chunbhatti loop and three Z-reverses to attract tourists travelling in groups, schools, institution Special concession to students & schools - at Rs.14,885/-.	29,770/-

Evening Safari Special Train:

Train No.	Departure time : Siliguri Jn, 15:00 hrs – RTG,16:20 & back 17:55 hrs	Coach	Fare in Rs.
	Steam Loco Hauled Evening Safari Special train on round trip basis from Siliguri Junction to Rongtong and back to Siliguri Junction. This train passes through magnificent Mahananda Wild Life Sanctuary	Heritage CDR & FC	1,2000/- 1,0000/-

Chartered Trains

SN	Section	Traction/Loco	Fare in Rs.
1	Kurseong-Darjeeling	Diesel with two FS coaches	73,500/-
2	Kurseong-Darjeeling	Steam with two FS coaches	58,800/-
3	Tindharia - Kurseong	Steam with two FS coaches	58,800/-
4	New Jalpaiguri - Tindharia	Steam with two FS coaches	58,800/-

Special Coach Booking

SN	Type of Coaches	Fare in Rs.	Seat Capacity
1	Flat Wagon	9,500/-	-
2	Covered Wagon	9,500/-	-
3	2nd Class	9,500/-	25
4	1st Class	20,335/-	18
5	AC Chair Car	25,000/-	15
6	Heritage Coach- RA 124	20,335/-	10
7	Heritage Coach-FH 14	20,335/-	10
8	Heritage Coach-CDR 149	20,335/-	12

Operational Highlights

Cumulative figure showing passenger flow in DHR (In thousands)

Year	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Total
2013-14	7.9	8.9	9.9	3.8	.04	2.1	6.6	6.06	5.7	4.9	4.7	8.06	68.66
2014-15	10.6	12.01	11.7	6.1	5.8	5.6	11.6	9.2	10.1	7.4	4.2	7.07	101.38
2015-16	12.0	15.9	13.9	.84	3.89	5.83	9.96	9.12	7.32	5.49	5.84	10.7	100.79
2016-17	10.5	15.4	14.4	5.04	3.53	5.30	11.9	9.63	9.10	6.72	4.59	9.36	105.80
2017-18	11.1	19.0	5.62	--	--	--	.64	2.4	4.6	4.4	3.8	9.5	61.31
2018-19	12.0	20.2	18.4	4.81	2.59	4.46	12.86	11.52	8.4	6.4	5.4	11.02	118.68

Comparative earning chart- DHR (In Lakhs)

Year	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Total
2013-14	22.2	25.0	26.3	7.61	*0.6	4.28	19.0	16.2	16.2	16.2	11.8	23.2	188.59
2014-15	26.0	30.2	27.7	13.3	#12.5	15.3	37.0	25.5	27.5	22.7	27.6	58.9	324.2
2015-16	60.93	90.18	73.73	1.72	15.95	25.02	56.37	50.87	41.18	27.97	32.04	69.83	545.84
2016-17	68.03	107.60	92.32	27.76	16.83	41.68	89.90	70.82	63.11	46.41	45.62	94.64	765.34
2017-18	122.66	183.05	*59.49	* 0.0	* 0.0	* 0.0	#* 7.8	# 30.19	45.04	41.27	37.51	95.73	623.24
2018-19	117.86	207.74	194.77	45.45	#29.57	42.82	129.89	112.33	82.60	56.30	57.64	112.92	1193.83

Year wise earning

	2013- 14	2014-15	2015-16	2016-17	2017-18	2018-19
Expenditure	9,78,61,000	10,75,07,000	25,69,44,000	22,83,14,000	19,36,65,899	19,82,26,000
Earnings	1,88,58,034	3,24,68,890	5,78,10,419	7,65,34,032	6,23,24,365	11,93,83,510

* 2017-2018 Entire DHR train services were suspended in the months June, July, August, September & October- 2017 due to the Bandh in Darjeeling Hills & Landside

Train wise earning (In Lakhs)

Year	Red Panda	Jungle Safari & Evening Safari	Charter	Passenger Train	Joy Ride
2013-14	0	6.64	8.12	13.68	157.15
2014-15	0	15.1	14.3	31.94	258.99
2015-16	2.19	3.92	29.44	46.8	460.93
2016-17	0	3.29	37.49	49.57	672.42
2017-18	0.21	1.01	17.4	79.55	511.95
2018-19	0	2.86	14.46	210.71	962.3

COMPARATIVE OPERATIONAL STATISTICS OF DHR

	2017-18	2018-19	Percentage increase
Expenditure (in lakhs)	1936.65	1982.26	**2%**
Earnings (in lakhs)	623.24	1193.83	**92%**
Cumulative Passenger flow (in thousands)	61.31	118.68	**94%**

Earning details

SN	Parameters	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
1	Cumulative Passenger Earning, in Lakhs	185.3	320.4	543.49	764.79	623.24	1193.83
2	Sundry –Commercial In lakhs	3.24	4.26	2.35	1.89	12.99	1.45
3	Passenger Originating In lakhs	0.68	1.01	1.00	1.05	0.61	1.18
5	Joy ride Earning In Lakhs	151.52	258.99	460.93	672.42	511.95	962.30
6	Passenger train Earning In Lakhs	13.68	31.94	46.8	49.57	79.55	210.71
7	Earnings/Day in lakhs	0.51	0.88	1.49	2.01	2.795	3.89
8	Steam Charters, in Lakhs	8.12	14.03	29.44	37.49	17.40	14.46
9	Siliguri Excursions/ Jungle Safari in lakhs	3.24	15.10	3.92	3.29	1.01	2.86
10	No. of Days Service operated in spite of Strike/ incidence/ breaches /landslides/ others	280	351	278	304	223	365
11	Equipment failures per month-Steam locomotives.	2	-	-	0	0	0
12	No. of Accidents	Nil	-	-	2	0	0
13	Loco POH	03	03	02	01	2 + 2 SR	2
14	Carriage POH	39	33	16	9	12	24

Details expenditure demand wise: (in Thousands)

DEMAND	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
03(General Management)	626	831	621	9878	13701	13952
04 (Repairs & Maintenance of permanent way & work)	30060	25666	42478	82406	50776	55198
05 (Repairs & maintenance of motive power)	12549	11841	48770	21949	22907	22297
06(Repairs & maintenance of carriages & wagons)	14891	13127	47276	19053	17369	16001
07 (Repairs & maintenance Plant & Equipment)	557	1321	11743	12524	14772	13757
08 (Operating Exp, - Rolling stock & Equipment)	30386	29805	39213	43090	47927	46670
09 (Operating Exp-Traffic)	1674	17836	34751	4824	23382	19238
10 (Operating Exp-Fuel)	1472	594	23903	14688	1486	5939
11(Staff welfare & amenities)	2610	2968	6506	4584	1344	5174
12 (Misc. working expenses)	0	0	700	153	0	0
13 (PF, Pension & other retirement benefit)	3036	3518	983	15165	0	0
TOTAL	**97861**	**107507**	**256944**	**228314**	**193666**	**198226**

Tindharia Workshop

- Tindharia Workshop is set up in the year 1915 for maintenance of NG Carriage and Locomotives. It becomes fully operational in present site since 1925. The workshop undertakes POH and special repairs of NG steam locomotives and NG coaches.
- Total area : 6670 sqm
- Covered area : 3810 sqm
- Total track length : 802 m
- Total staff strength : Including supervisors'= On roll 92 nos

ACTIVITY OF TINDHARIA WORKSHOP

- POH and SPL repair of NG coaches and Locomotives.
- Manufacturing of Lube oil &fuel filter of EMD Locos.
- Machining of various components of loco and carriage.
- Manufacturing of various angles, beams , under gear components, etc.,
- Brake down activities over DHR

Out-turn target: - a) Loco POH = 0.33 locos per month.
b) Carriage POH = 3 coaches per month.
c) Lube Oil Filter mfg. = 150 nos.

DETAILS OF WEAK FORMATION IN DHR SECTION

SN	Section	KM	Length (Mtrs)	Action Taken	Remarks
1	**SN – KGN**	13/2-3	25	Temporary repaired	During every monsoon track affected due to sink age of formation
2		13/6-8	55		
3		14/7-8	20		
4		14/10-11	15		
5		15/4-5	15		
6		17/14-18/0	30		
7		23/3-4	25		
8		24/1-2	15		
9		24/5-6	20		
10		25/2-3	15		
11		25/10-11	13		
12		25/12-13	20		
13		26/7-9	100		
14		28/13-29/0	60		
15		37/6-39/11	2500		
16		43/3-7	240		
17		43/11-14	150		
18		51/1-4	20		
19	**KGN – DJ**	53/10-12	100		
20		65/1-2	40		
21		75/11-14	200		
22		76/2-3	50		
23		77/2-4	100		

B Class Steam Loco

Loco No.	Class	Year Built	Built By	Boiler No.	Status
779	B	1892	SS & C Glasgow, UK	38/L/NG (Copper)	Working at DJ
780	B	1892	SS & C Glasgow, UK	01/L/NG (Steel)	Working at DJ
782	B	1899	SS & C Glasgow, UK	27/L/NG (Copper)	Working at SGUJ
786	B	1903	NBLC Glasgow, UK	10/L/NG (Copper)	TDH for POH
788	B	1912	NBLC Glasgow, UK	06/L/NG (Copper)	Spl. repair at DJ
791	B	1913	NBLC Glasgow, UK	24/L/NG (Copper)	POH at TDH
792	B	1916	BLW Philadelphia	02/L/NG (Copper)	Working at DJ
795	B	1919	Tindharia	03/L/NG (Steel)	U/R at DJ
802	B	1927	NBLC Glasgow, UK	12/L/NG (Copper)	working at DJ
804	B	1925	NBLC Glasgow, UK	04/L/NG (Steel)	working at DJ
805	B	1925	NBLC Glasgow, UK	08/L/NG (Steel)	Working at SGUJ
806	B	1925	NBLC Glasgow, UK	09/L/NG (Steel)	Awaiting for POH at KGN
1001	B	2003	GOC/S.RLY	11/L/NG (Steel)	working at SGUJ

Diesel Loco – NDM6

Loco No.	Class	Commission date	Built By	Status
601	NDM6	2006	SAN Engineering & Locomotive Co. Ltd. Bangalore	Working
602	NDM6	2006	SAN Engineering & Locomotive Co. Ltd. Bangalore	Working
603	NDM6	2016	SAN Engineering & Locomotive Co. Ltd. Bangalore	Working
604	NDM6	1999	SAN Engineering & Locomotive Co. Ltd. Bangalore	Working
605	NDM6	2000	SAN Engineering & Locomotive Co. Ltd. Bangalore	Working
600	NDM6	-	SAN Engineering & Locomotive Co. Ltd. Bangalore	SGUJ-Loco shed Under Commission

Position of DHR Coaches

SL No.	Type of Coaches	Nos.	
1	FCZ	40	
2	AC	4	
3	S	09	
4	FR/FLR	06	
5	SR/SLR	09	
6	LR	03	
7	FH	01	
8	RA	01	
9	CDR	01	
	Total :-	**73**	

Over aged coach position:

(i) Over Aged (Y/B)-1967, 1968 = 12 nos
(ii) Over aged - YB-1989-1991 =14 nos

Challenges for DHR

The DHR is operating, from 1880, without modernization/significant inputs, notwithstanding landslides & losses and it is severely affected by encroachments, urban degradation, rehabilitation and spoiled buffer zones.

- **Historic locomotives**: When these locomotives were introduced the SKILL & FACILITIES required for their operation were common and widespread. Replacement parts were easily available & cheap. This is not the case today. The skills of operation & maintenance of steam locomotives needs to be passed on through formal & informal training.
- **Track:** Many sections of gradient have been steepened from 1 in 22 to 1 in 18 or even 1 in 16 & curves sharpened following reconstruction after landslips. The metal sleepers being used are too short (1.24 m as against 1.44 m) to give stability to the formation, especially on the curves.
- **Operating cost**, in relation to earnings is high. Annual cost of running the DHR is as high as Rs 20 Crores whereas the income is about Rs12 Crores only.
- **Landslides** have been a problem throughout the history of the DHR and the stabilization of the slopes is a major task for the continued running of the Railway.
- **Very old machinery** at Tindharia Workshop, needing spares for maintenance. Also, workshop is presently damaged due to recent earthquake & repeated landslides.
- **Encroachments-** Existing Inappropriate Construction/buildings in surrounding areas that have a negative impact on DHR.

Comprehensive Conservation Management Plan

(**C**CMP)

Comprehensive Conservation Management Plan

- Indian Railways in its efforts to conserve the heritage value of DHR and restore the glory of the DHR has undertaken special initiatives for improvement of DHR World Heritage Area (WHA) and its buffer zone.
- Ministry of Railways has requested UNESCO for extending technical support towards the 'Safeguarding of the Mountain Railways of India World Heritage property: Development of Comprehensive Conservation Management Plan (CCMP) for the DHR World Heritage Site through effective stakeholder empowerment'.
- "Agreement between UNESCO and NFR" at Cost: 533,332 USD for development of CCMP lasting two years had been signed on 20th Jan, 2017.
- The two your project has the ultimate goal of establishing a management system that ensures that OUV is safeguarded. It is fulfilling the requirements to ICOMOS concern a) the creation of a heritage conservation unit, b) the establishment of a buffer zone along the length of the railway line and the station, c) the establishment of an adapted management plan

Comprehensive Conservation Management Plan

CCMP will not be a report but a sort of 'operational manual' to be followed by the Railway on how to manage DHR as a World Heritage Site.

- CCMP will specifically provide:
  (1) graded inventory of heritage attributes (or exact elements) that constitute the DHR world heritage sites (including station buildings, tracks, coaches, sheds, workshops etc)
  (2) core and buffer zone
  (3) Institutional mechanism for managing

World Heritage Convention is a UNESCO Convention. It is part of UNESCO's mandate to monitor the status of conservation of world heritage sites across the world and provide technical advice to the members states, where necessary, on the modality of conserving the heritage sites. This is why the Ministry of Railway approached UNESCO and UNESCO took the job

The timeline for the final submission of the CCMP report had been 20.01.2019 but due to some reasons UNESCO had requested to extend the validity of the project to 30th September 2019 and Ministry of Railways agreed for the extension vide L.No. 2010/Heritage/DHR/FiT dated: 08.11.2018 to 30.09.2019 in accordance with Article VI 2 and 3 of the FIT, to finalize the CCMP and organize the 20th anniversary of DHR World Heritage Site Celebration.

AGREEMENT

The United Nations
Educational Scientific
and Cultural Organization
(hereinafter called
'UNESCO')

and

The Ministry of Railways
Government of India
(hereinafter called
'Ministry of Railways')

AGREEMENT

Article II

Obligations of the Ministry of Railways

SN	Activities	Remarks
1	Provide physical space and necessary infrastructure for establishing the Project Office at Kurseong for the UNESCO project team; and provide necessary logistical support for running and upkeep of the Project Office during the project duration;	Provided in July 2016
2	Designate a focal point at DHR to liaise with UNESCO for the duration of the project;	Designated - KGN office of DHR
3	The DHR focal point to assist UNESCO project team in all matter related to obtaining permissions for gaining access to properties within the World Heritage area, and providing logistical help for review meetings, workshops, etc.	DHR had provided all possible help
4	The DHR focal point to also facilitate the organization of consultative meetings with all concerned stakeholders;	DHR had provided all possible help

SN	Activities	Remarks
5	Ministry of Railways to initiate necessary administrative procedures for the transition of Project Office to become the World Heritage Site Management Office within the first year of the project and to complete the full establishment of World Heritage Site Management Office by the end of the second year of the project;	Railway had initiated in this direction
6	Support institutional and technical cooperation between Mountain Railways of India and other international railway heritage sites by organizing international workshops and study tours for the site managers, administrators and/or coordinators of Mountain Railways of India with budgetary provisions within this project fund.	International workshops and study tours to be organized.
7	The Ministry of Railways shall nominate and ensure participation of its officials in the periodic review meetings to discuss the progress of works and give their inputs during the project duration;	Railway officials are regularly participating review meetings.

SN	Activities	Remarks
8	During the project, if any difficulty arises that might affect the overall objectives of the project; then the same shall be referred to the Ministry of Railways, Government of India for its mediation and final decision;	It is followed whenever required
9	Assist UNESCO in inviting the focal points and technical staff of the Kalka Shimla Railways and Nilgiri Mountain Railways and ensure their participation in meetings, capacity building activities and any other programmes resulting-out of this project with budgetary provisions outside this project fund;	Assistance will be provided whenever asked.
10	The Ministry of Railways will share with UNESCO all suitable archival material and documentation material for the project	DHR had shared with UNESCO, the materials requested by the project team
11	The DHR shall be represented by the Director of DHR; while the Ministry of Railways shall be represented by its Executive Director, Heritage	It is followed as in Agreement

Article III
Obligations of UNESCO

During the period of the project, and within the framework of the budget estimated as outlined in the project document attached to this agreement, UNESCO shall:

SN	Activities	Remarks
1	Provide technical assistance and advice to Ministry of Railways for the protection, conservation and management of railway's heritage particularly it's Mountain Railways of India World Heritage property through the DHR project implementation;	UNESCO is providing assistance
2	Design, plan and coordinate the project;	Enclosed in project document
3	Establish the Project Office and to help support Ministry of Railways in its transition to become the World Heritage Site Management Office;	Established at KGN station
4	Prepare the terms of reference and recruit a Project Officer and technical staff for the Project Office to coordinate its activities and assist the UNESCO project team for the duration of the project;	Recruited project officer at Project office, KGN Sunil Krateli was the in-charge of the project team.

SN	Activities	Remarks
5	Prepare the terms of reference and contract experts and thematic consultants for the duration of the project;	The responsibility lies with UNESCO
6	Liaise with the DHR focal point on all matters related to the project such as obtaining permissions for enabling the UNESCO project team to gain access to properties within the DHR World Heritage property, logistical support for the organization of review meetings, workshops, etc.	Project team in-charge had communicated with DHR for any support required
7	Plan and organize thematic workshops and meetings between experts, consultants, railway officials, stakeholders to train and disseminate information at different stages of the project;	Conducted in Feb-2019
8	Undertake periodic review meeting and seek inputs from experts, and railway officials on project outputs;	Three review meetings held
9	Facilitate international collaboration by organizing international workshop and study tour for the site managers, administrators and/or coordinators of the Ministry of Railway, Government of India	It is planned in May 2019

Project title

As per Article I, General conditions of the Agreement

UNESCO shall provide the Ministry of Railways with progress report of the project every six month. Upon completion of the project, UNESCO shall prepare a final report, including an assessment of the project and its results.

The provisions for evaluation are described in the enclosed project document and budget. UNESCO is responsible for initiating, organizing and following up project evaluations in accordance with the approved project document and corresponding budget, and UNESCO's evaluation policy and guidelines. The Ministry of Railways shall be invited to participate in review meeting to be carried out with regard to the project at Ministry of Railways' cost unless explicitly foreseen in the project budget.

United Nations
Educational, Scientific and
Cultural Organization

Project Title

Project title
Work plan of CCMP project

SN	Activities	Remarks
1.0	Establish the project office for coordinating CCMP related activities within DHR	Project office established at KGN in June 2016
1.1	Desktop research on cultural heritage resources, issues and present management system	Discussed in Review meetings
1.2	Mapping: Total station survey of the DHR World Heritage boundaries	Completed and draft softcopy given to DHR
1.3	Documentation and identification of cultural heritage resources, such as tangible and intangible heritage	Draft copy published
1.4	Disaster vulnerability and risk assessment	Draft copy published
1.5	Review of existing management framework, such as institutional framework and legal framework	Discussion between UNESCO & IR in progress
1.6	Preparatory research and development of execution plan for a demonstration project	Completed

Work plan

Activities:

SN	Activities	Remarks
1.7	Training workshop for site managers and technical staff members on documentation and preparation on inventories for railway heritage	Conducted in November’18
1.8	1st Review Meeting of the project team with IR	On 25.11.2016 at RB
1.9	Training workshop on demonstrative GIS based interpretation and processes for the utilization of GIS	Discussed in last Meeting at KGN. It will be after finalization of Boundary
1.10	Develop a graded inventory for cultural heritage resources	Submitted with Draft manuals
1.11	Assess all findings and defining the world heritage property	It will be Final CCMP report
1.12	Second Review Meeting of the project team with IR	Done at MLG 27.03.2017 and at NDLS on 02.05.2017,
2.1	Preparatory research and development of execution plan for a demonstration project	Completed

SN	Activities	Remarks
2.2	Develop management framework and plan of action for the DHR boundaries	Draft copy was submitted in Oct' 2018 (as per Review Meeting dt.08.08.18)
2.3	Develop a disaster risk management plan and tourism management plan	To be submitted in Oct,18
2.4	Develop a draft CCMP for the DHR World Heritage property	Draft copy for conservation manuals & disaster preparedness submitted
2.5	Execution of a demonstration project	Yet to be done
2.6	**Third Review Meeting of the project team with IR**	23-24 May 2018 at KGN & 08.08.2018 at NDLS
2.7	Develop a draft Comprehensive Conservation Management Hand book	Draft copy for conservation manuals & disaster preparedness submitted
2.8	Final Review Meeting of the project team with IR	To be finalized
2.9	Preparation of Final Report by UNESCO	In May-2019

Project outputs:

- Complete graded inventory and GIS map within the World Heritage boundaries.
- Defined World Heritage property.
- Comprehensive Conservation Management Handbook : draft of the following manuals had been handed to NFR

  (a) Architectural conservation manual

  (b) Disaster preparedness manual

  (c) Operating & Maintenance manuals of Carriage, Wagon & 'B' class steam locomotives
- Workshop on draft Architectural conservation and Disaster preparedness manual held in Jan'19
- Workshop on Buffer Zone along with Stakeholders of DHR
- Work on Institutional structure of DHR
- Management objectives, plan of action and conservation approach.
- Concept note for demonstration project (Sonada and Ghum) developed.

Steps Taken for Promotion/Improvement of DHR

Measures taken to increase attract tourist in DHR

DHR has initiated several measures in recent past to improve availability and quality of its services. All these initiatives are planned within existing resources.

- Providing additional capacities in Joy Rides that has increased per capita earning
- Commercial use of Old heritage Dining Car, Inspection carriage, RA-124, freight & open flat bedded wagons
- Renovation of GHUM museum
- Increase in the frequency of Joy Ride trains from four(4) to nine(9).
- Meeting with Tour Operators & Hoteliers and Campaigning through posters & leaflets
- Prominent world class signage and display boards are installed along the section & station of DHR presenting DHR's cultural and natural heritage
- Reservation of seats in all DHR trains made feasible through online i.e. www.irctc.co.in
- Single window system for booking of Steam/Diesel Charters trains.
- Introduction of NG AC Chair car with good quality interior furnishing and Vista-dome coaches in service to attract more tourists.
- Website for latest update of DHR – www.dhr.in.net

Measures taken to attract tourist and Improve DHR

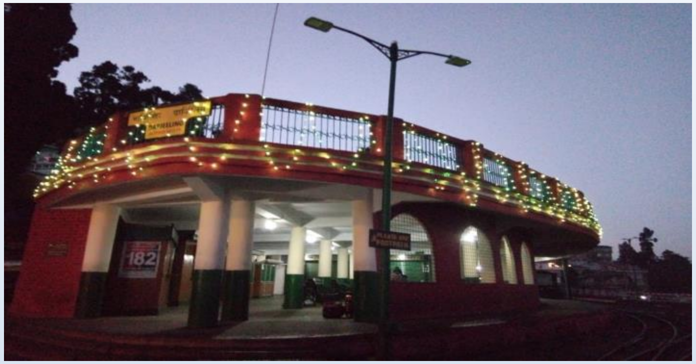
- AC Chair Car is introduced in daily Passenger Train between NJP-DJ from 10.04.18
- Vista-dome Type coach is introduced in Joyride from 10.06.18
- Heritage Belt driven system of Old machines of TDH WS reinstalled on 09.08.2018
- Restoration work of discontinued track due to major land slide at PaglaJhora and other places of DHR has been completed in short time
- Taiwanese Delegation Visited DHR from 22.09.18 to 24.09.18 as part of Letter of Intent (LOI) on 24.12.2016 to explore possibilities of mutual cooperation for development of Rail Heritage in India and Taiwan
- Paryatan Parv celebrated from 16th to 27th Sept,2018

NG AC coach

NG Vista dome coach

Workshop on Buffer Zone with all the Stakeholders of DHR

- Regular service of Vista dome coaches started from 03.10.2018 in three Joyride trains.
- Workshop on Conservation of Heritage assets & Disaster Management of DHR and Workshop with Stockholders from 19.11.2018 to 22.11.2018, organized by UNESCO.
- Evening Safari with Heritage Steam engine & Dining Car has been introduced between Siliguri & Rongtong (round trip) from 16.12.2018
- Stakeholders meeting for buffer zone of World Heritage property, Darjeeling Himalayan Railways on 25th and 26th February 2019 organized by UNESCO.
- Restoration of water pipeline from Paglajhora to Tindharia along the original alignment of DHR (Feb/2019).
- Provision of curve stone along the track to prevent road vehicle coming over the track in between Darjeeling More to Sukna(10 Kms).



Month long Heritage Event in DHR

Evening Safari with Heritage CDR

Actions Planed for 2019-20

Future Plan

- Commercial utilization of heritage coaches
- Luxury tourist train.
- 4 nos. AC coaches has been developed and put in service. Another 02 under refurbishing (June, 2019) and 04 more are in process for approval from HQ under RSP sanction 2018-19.
- 04 nos. of Vista Dome coaches has been developed and put in service at Joy ride special train.
- Leasing of specific trains to Corporate on payment.
- Renovation of Ghum museum after submission of CCMP by UNESCO.

- Implementation of Comprehensive Conservation Management Plan (CCMP) prepared by UNESCO
- To develop TDH workshop as locomotive and coach manufacturing unit besides overhauls.
- DHR running staff will be provided with uniform resembling original DHR dress code.
- One Vista Dome Dining Car is under refurbishing and it will be put in service shortly (May/2019).
- Restoration of Sonada and Gayabari Station as per guide lines of CCMP (DPR of the stations has been prepared and detail estimate is under process).
- Detailed repairing work of Tindharia Work Shop sanctioned under Umbrella Project at a cost of Rs. 4.3 crores approx.
- Restoration of Darjeeling Loco Shed, Pit line along with office building at a estimated cost of Rs. 34 lakhs.

Burnt station of DHR Section during agitation

GAYABARI STATION

SONADA STATION

Work under progress in Vista Dome CDR

VISION

“ To make Darjeeling Himalayan Railway an efficient Hill Railway in the World keeping intact its Outstanding Universal Value as World Heritage Site for future generations.”

Thanks

Appendix 6 - *The Heritage of the Darjeeling Himalayan Railway - When a Train Climbs a Mountain*

Vinita Srivastava

黒部峡谷鉄道の運営と維持管理

2019年7月1日～2日

黒部峡谷鉄道㈱

黒部川

流域面積：682.0km^2

流路延長：85km

黒部川水系　衛星写真
Google　Earth　より

黒部峡谷鉄道の歴史

◆黒部峡谷鉄道の歴史は、黒部川電源開発と共に始まりました。
◆大正12年に軌道敷設工事に着工し、部分開通を経て昭和12年に終点の欅平迄開通しました。
◆当時は工事専用鉄道として運用していましたが、秘境黒部峡谷の探勝を希望する観光客が絶えない為、「便乗の安全については一切保証致しません」と書かれた便乗証を発行しトロッコに便乗していただいていました。
◆その後、旅客鉄道を専業とする会社として、昭和46年に黒部峡谷鉄道株式会社が発足しました。

【黒部峡谷鉄道㈱の沿革】


- 明治42年：**福沢桃介**（電力王，福沢諭吉の娘婿）が黒部川を視察するも、**電源開発を断念**
- 大正８年（1919年）：**高峰譲吉**が東洋アルミナム㈱を設立し、黒部川の電源開発に着手！また、『日本電力㈱』を設立
- **大正10年（1921年）：東洋アルミナム㈱が鉄道敷設の為、『黒部鉄道㈱』を設立**
- 大正11年：日本電力㈱が東洋ｱﾙﾐﾅﾑ㈱の筆頭株主となり、黒部川の電源開発、鉄道事業、温泉事業等の利権取得
- **大正12年～昭和12年（14年間）（1923年～1937年）：宇奈月～終点の欅平迄の20.1kmの鉄道敷設を完了し、全線運転開始**
- 昭和２年：「柳河原発電所（当初出力36千kW）」が運転開始
- 昭和11年：「黒部川第二発電所（当初出力63千kW）」が運転開始
- 昭和15年：「黒部川第三発電所（当初出力80千kW）」が運転開始
- **昭和26年（1951年）：電力再編成令により黒部川水系の電源及び鉄道事業は『関西電力㈱』に引き継ぎ**
- 昭和28年：関西電力専用鉄道（宇奈月～欅平 間）が地方鉄道業法による旅客輸送許可を取得し、営業運転開始
- 昭和38年：黒部上部軌道の全線運行開始（欅平～黒四発電所前 間）
  ：「黒部川第四発電所」が運転開始
- **昭和46年（1971年）：『黒部峡谷鉄道株式会社』設立（S46年5月4日：会社設立、S46年7月1日：営業開始）**

No1.V-shaped Gorge in Japan
黒部峡谷トロッコ電車

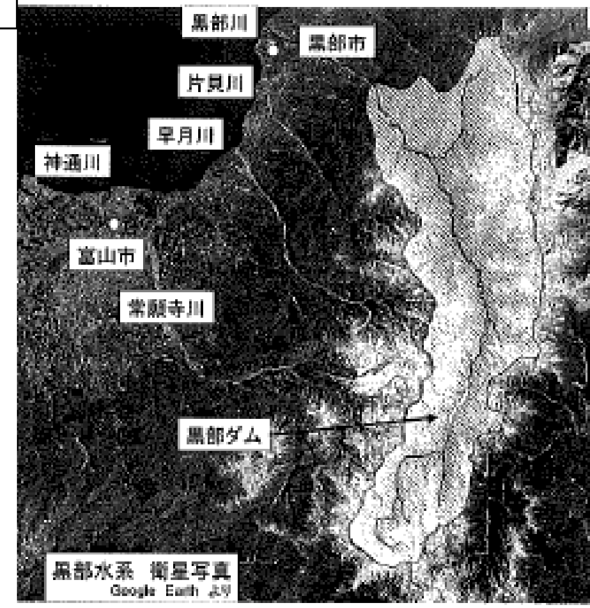
黒部川水系の特徴

◆**黒部川の水源**
北アルプスの鷲羽岳（標高：2,924m）

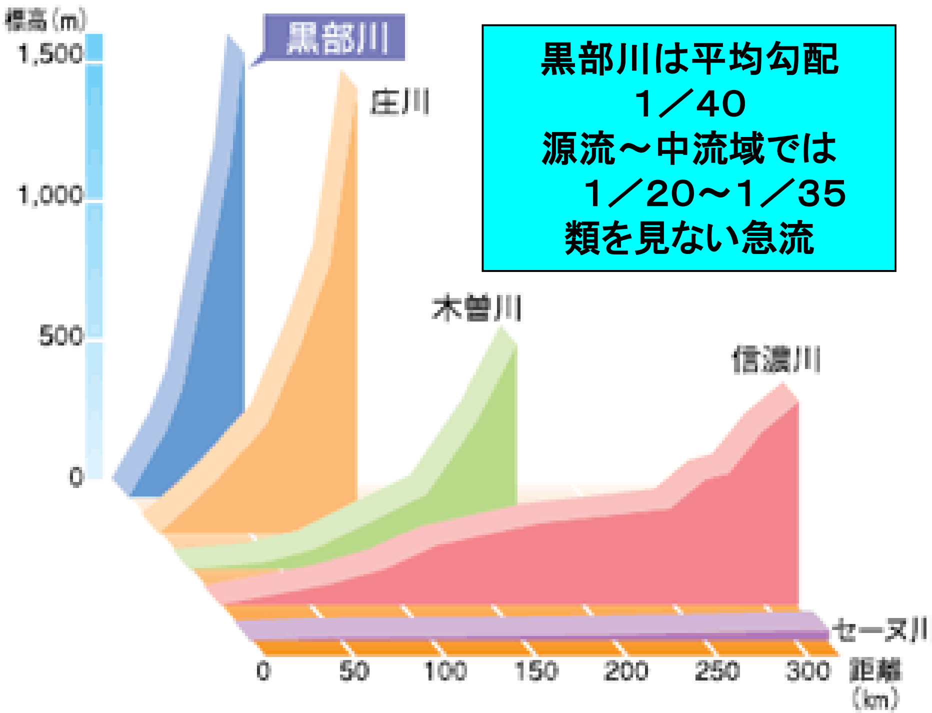
◆**黒部川の<u>流域</u>(※)**　(※)降った雨が川に流れ込む範囲
全長：85km
流域面積：682㎢

◆**黒部川の特徴**
・豊富な雪解け水と安定的な雨量あり⇒“水量”Q：大
・日本有数の急流⇒“有効落差”H：高い

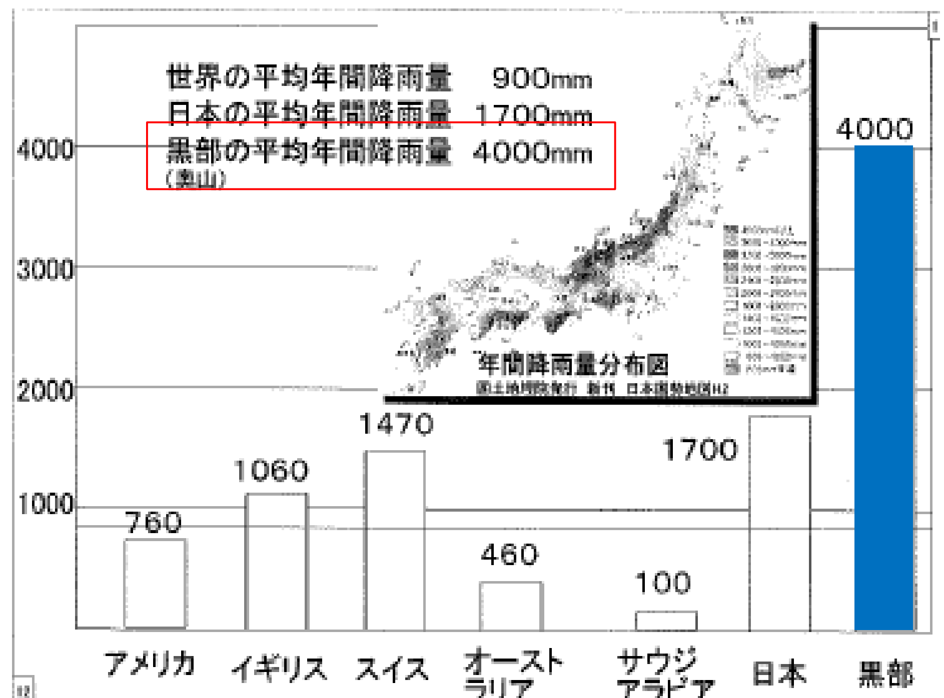
◆$P = 9.8 \times Q \times H \times \eta_{tg}$（kW）



主な河川の河床勾配比較図

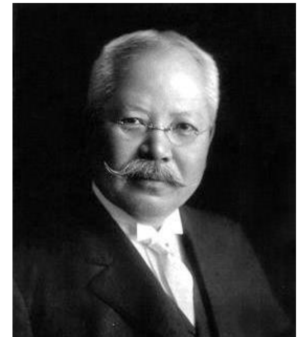


平均年間降雨量の比較表



黒部峡谷トロッコ電車
No1.V-shaped Gorge in Japan

昭和26年当時の乗車風景

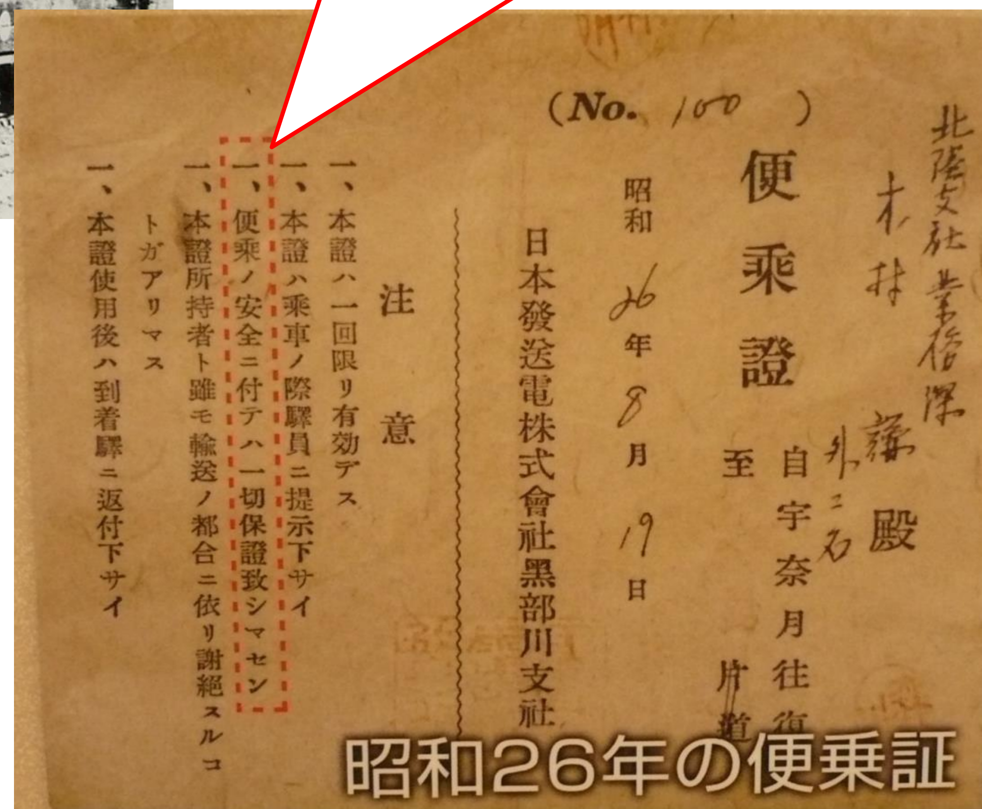


高峰 譲吉(1854-1922)

【プロフィール】
- 富山県高岡市生まれ
- タカジアスターゼ、アドレナリン を発明し、米国で巨万の財を成す
- 日産化学、三共(現:第一三共)創設

黒部専用鉄道時代の電気機関車(電気記念館前展示)
(製造者:米国ジェフリー社、製造年:大正15年3月)

便乗ノ安全ニ付テハ一切保證致シマセン



(No. 100)

便乗證

北陸支社業務課

昭和 26 年 8 月 19 日

自 宇奈月 往復
至

日本發送電株式會社黒部川支社

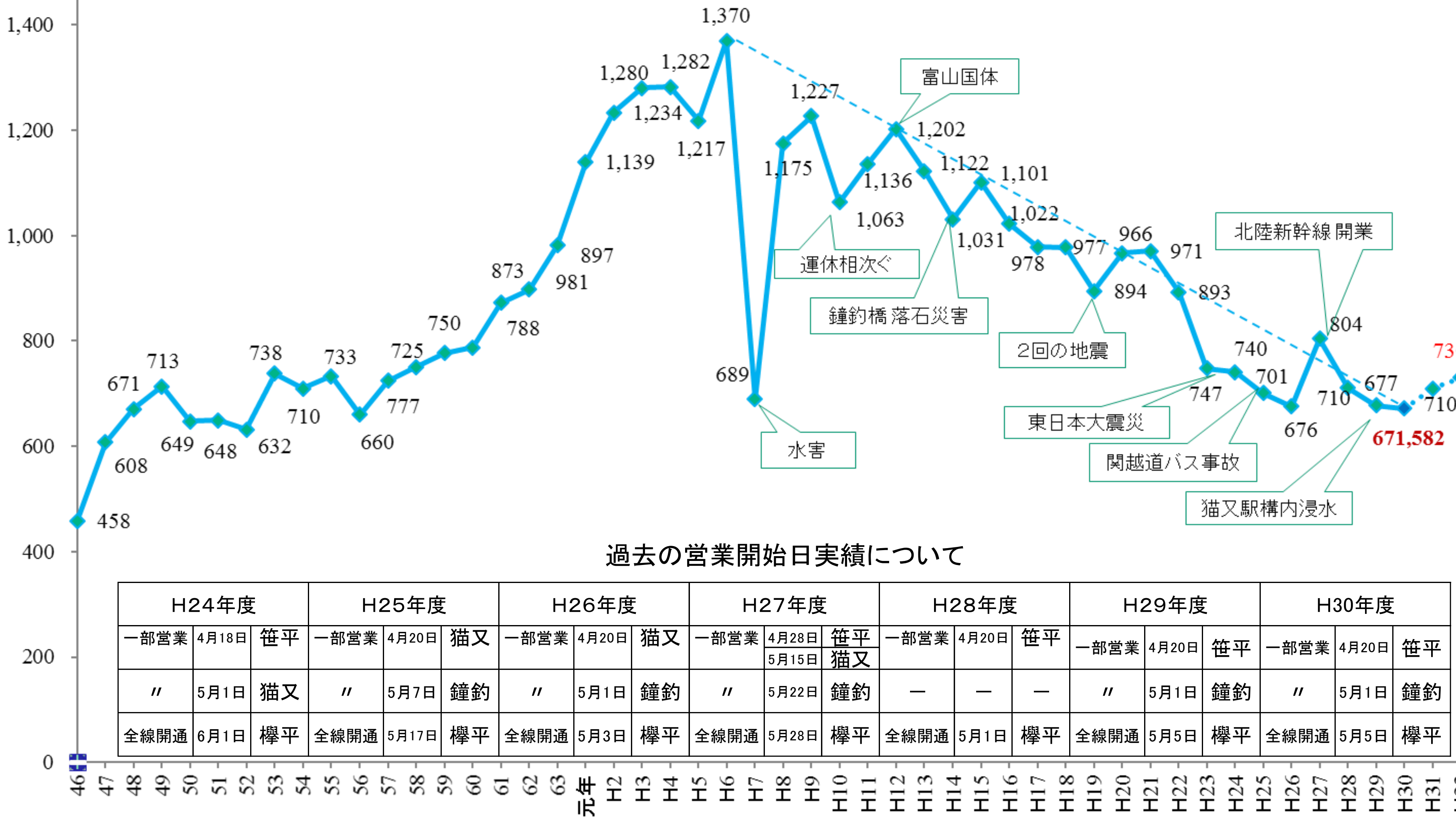
注意

一、本證ハ一回限リ有効デス
一、本證ハ乗車ノ際驛員ニ提示下サイ
一、便乗ノ安全ニ付テハ一切保證致シマセン
一、本證所持者ト雖モ輸送ノ都合ニ依リ謝絶スルコトガアリマス
一、本證使用後ハ到着驛ニ返付下サイ

昭和26年の便乗証

黒部峡谷トロッコ電車
No1.V-shaped Gorge in Japan

創業以来の乗降客数の推移



過去の営業開始日実績について

H24年度			H25年度			H26年度			H27年度			H28年度			H29年度			H30年度		
一部営業	4月18日	笹平	一部営業	4月20日	猫又	一部営業	4月20日	猫又	一部営業	4月28日 5月15日	笹平 猫又	一部営業	4月20日	笹平	一部営業	4月20日	笹平	一部営業	4月20日	笹平
〃	5月1日	猫又	〃	5月7日	鐘釣	〃	5月1日	鐘釣	〃	5月22日	鐘釣	―	―	―	〃	5月1日	鐘釣	〃	5月1日	鐘釣
全線開通	6月1日	欅平	全線開通	5月17日	欅平	全線開通	5月3日	欅平	全線開通	5月28日	欅平	全線開通	5月1日	欅平	全線開通	5月5日	欅平	全線開通	5月5日	欅平

黒部峡谷鉄道の設備概要

営業キロ程

20.1km （宇奈月～欅平間）

レール間

黒部峡谷鉄道	ＪＲ(新幹線)	私 鉄
特殊狭軌(ﾅﾛｰｹﾞｰｼﾞ) 762mm	1435mm	1067mm

ﾅﾛｰｹﾞｰｼﾞ：三岐鉄道、あすなろう鉄道（三重県）

トンネル

41箇所

最長1073m （33T）

橋梁

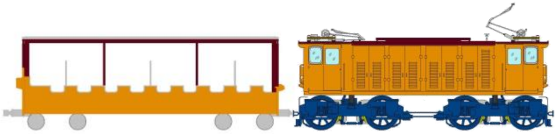
21カ所

最長166m （新山彦橋）

運転速度

最高25km／h

平均15km／h



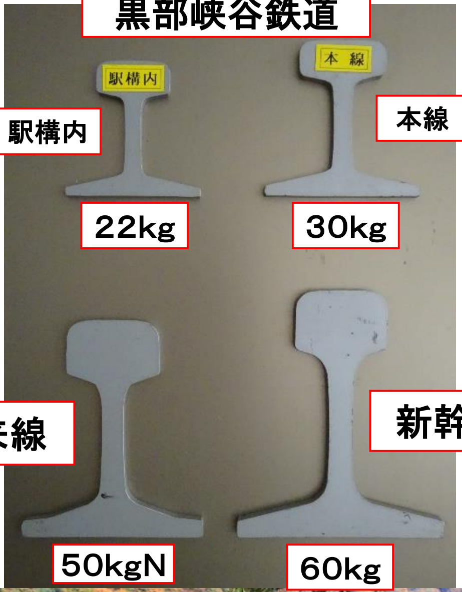
軌条設備

軌条重量 22～30kg(1m当り) 【JR在来線50～60kg】

曲線半径：21．5m 【箱根登山鉄道：30m】

最急勾配：50‰ 【箱根登山鉄道：80‰】

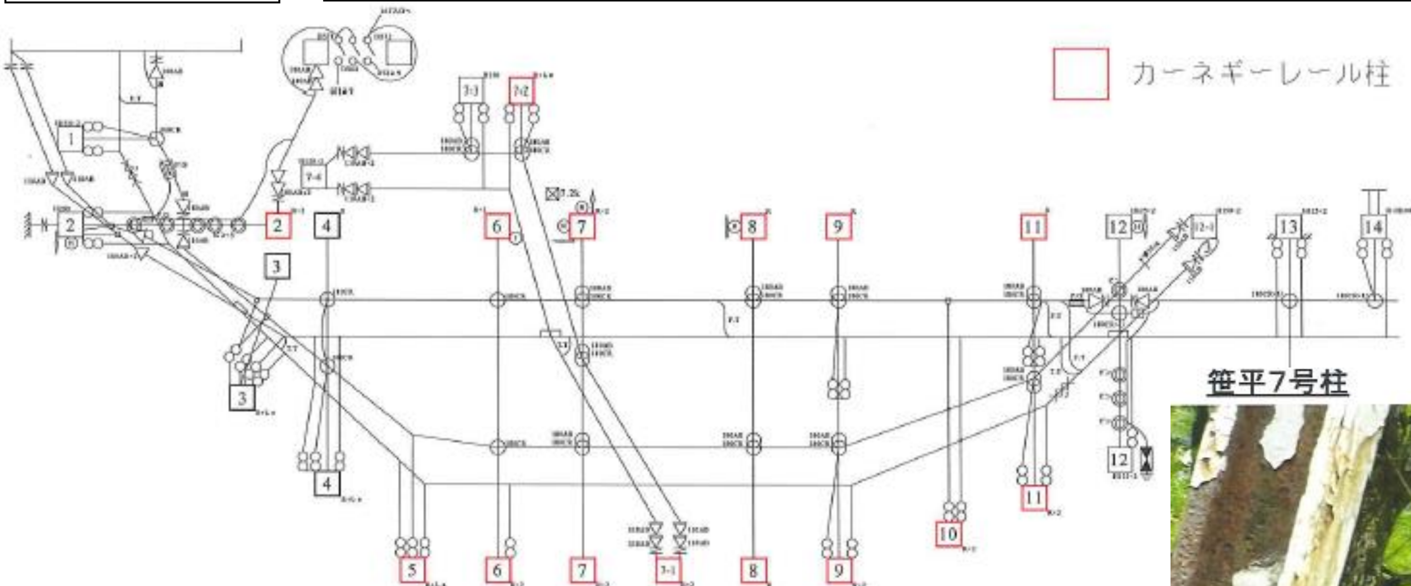
（参考：大きさ比較）



最長166m （新山彦橋）

黒部峡谷トロッコ電車

カーネギー社製レール柱（笹平駅）



笹平駅構内にはカーネギー社製レール柱が１５本現存

笹平7号柱

CARNEGIE　1907　E T　IIIIIIIIII－I R J

CARNEGIE：米国のカーネギー社（鉄鋼王カーネギーが創設した会社）
1901年、モルガンの組織した企業連合に売却され、後にUSスチールとなる。ニューヨークのカーネギーホールは、カーネギーの寄付金をもとに1891年にオープンした。

トロッコ電車の大きさ比較

トロッコ電車（EDV型）と九州新幹線

トロッコ電車（EDR型）と在来線

黒部峡谷鉄道の車両台数

機　関　車


EDR形
12両
EDM形
5両


ED形（凸形）
2両


EDS形（凸形）
1両


EDV形
4両
EHR形
2両


DD形
2両

客　車


1000形
56両


2000形
7両


2500形
15両
2550形
2両
2800形
6両


3100形
28両


ハ形
21両

貨　車


ト形
63両


オト形
33両


チ形
22両


オチ形
15両


ナチ形
4両


ムチ形
2両

ハト形
1両


シ形
1両


オシ形
2両


ワ形
3両

黒部峡谷鉄道は愛称トロッコ電車と言われ、軌間762mmの小さな鉄道です。
2019年6月1日現在
- 機関車：　28両
- 客　車：135両
- 貨　車：145両
- 特殊車：　 2両

車両総数:310両を保有しています。

電気機関車の変遷

EB形（単連形）

ED形（凸形）（単連形）

EDS形（凸形）（単連形）

EHR形（固定重連形）

EDM・EDR形（重連形）

EDV形（重連形）

冬の黒部峡谷

黒部峡谷が雪で閉ざされる冬期間は、過去の経験から雪崩による設備被害を最小限にする為、一部の電車線や橋梁（ウド谷橋）を取り外す作業を実施。（12/1～12/15）

冬期車両整備風景①

黒部峡谷鉄道の営業は4月20日～11月30日で終了します。
その後、冬期間は次年度の営業運転開始に向け、機関車・客車の整備作業を行ないます。

車両管理区員+乗務員+駅員を含め、総勢約80名もの作業員が機関車班客車班に分かれて、分解整備・清掃作業を行ないます。

冬期車両整備風景②

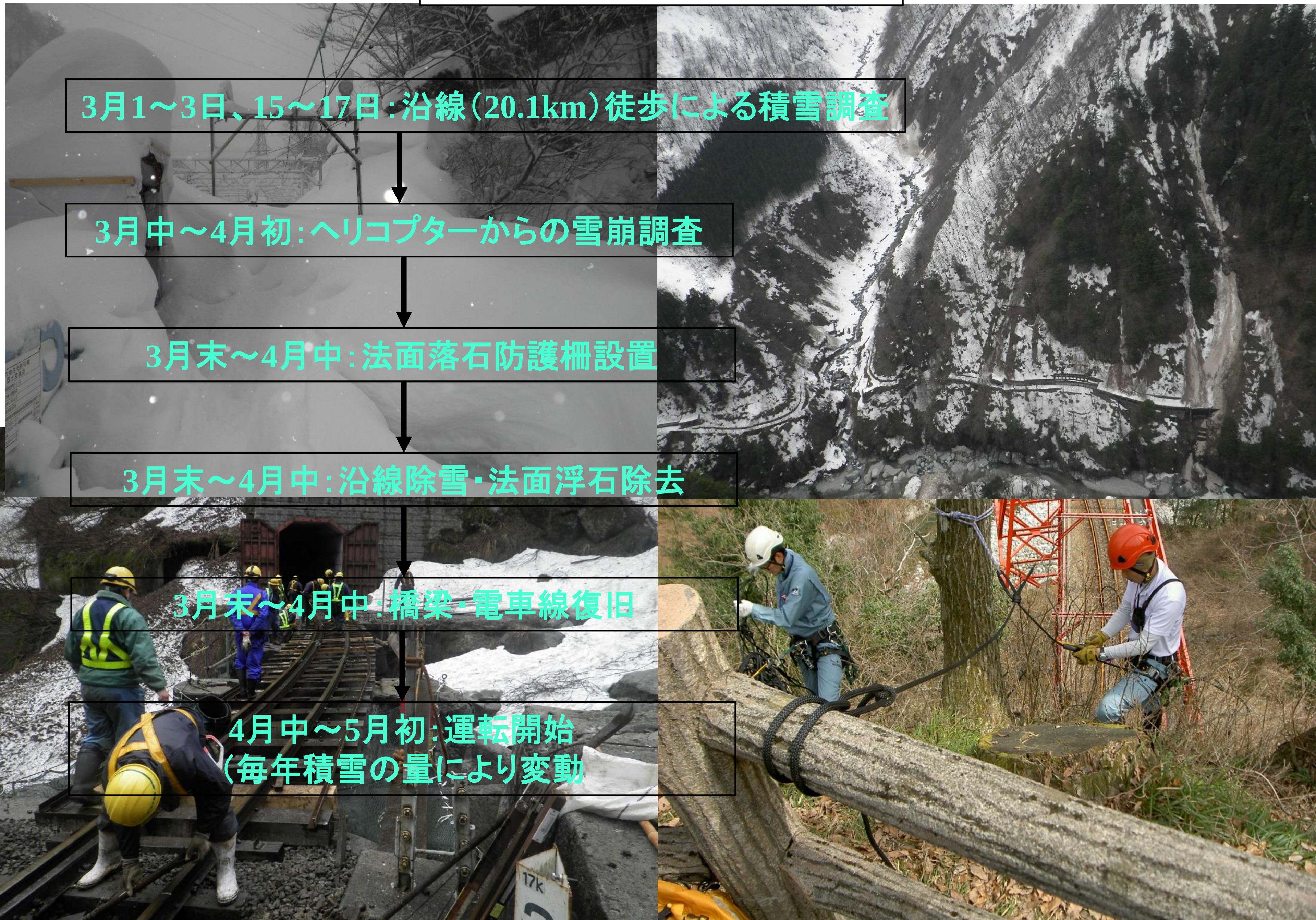
自走式除雪車：SP2

初代SP1（H8～H28）

2代目　SP1（H28～　）

・当社唯一の自走式除雪車両で、SP1は平成8年から20年間に渡り、黒鉄沿線や各駅構内の除雪作業で活躍しました。（360度旋回）
・現在は、2代目のSP2（1両）が平成28年から運転開始しています。
最大除雪量：900t/h　、除雪作業最大時速：5km/h　、168kW（230PS）

運転再開フロー



3月1～3日、15～17日：沿線（20.1km）徒歩による積雪調査

↓

3月中～4月初：ヘリコプターからの雪崩調査

↓

3月末～4月中：法面落石防護柵設置

↓

3月末～4月中：沿線除雪・法面浮石除去

↓

3月末～4月中：橋梁・電車線復旧

↓

4月中～5月初：運転開始
（毎年積雪の量により変動

電車線復旧概要

列車編成

◆内燃車（DD班）・・・・・・・建柱・張り上げ

DD機関車＋オト車（クレーン）＋オト車（空車）＋オト車（作業台）＋ハ車＋ハ車＋ハ車

◆保線車

保線車２＋作業車・・・・調整（粗）・張り上げ

保線車3・・・・・・・・・・・・・調整（細）

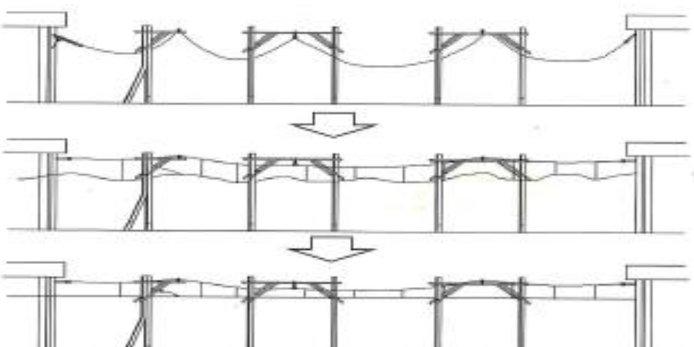
電車線復旧手順

1. 建柱・ビーム取付（DD班）

・支持柱及びビームを保管場所からクレーンにて空車に積み込み建柱箇所へ移動し、支持柱の建て込み及びビームを取り付ける。

2. 吊架線・トロリー線取付（DD班）

・吊架線及びトロリー線を保管場所より手延線後、列車を使用し上部へ張り上げる。



3. くせ直し・調整

・保線車の測定用パンタにてトロリー線の高さ及び偏位調整を行う。尚、調整の際トロリー線の屈曲等、くせ補正を行う。

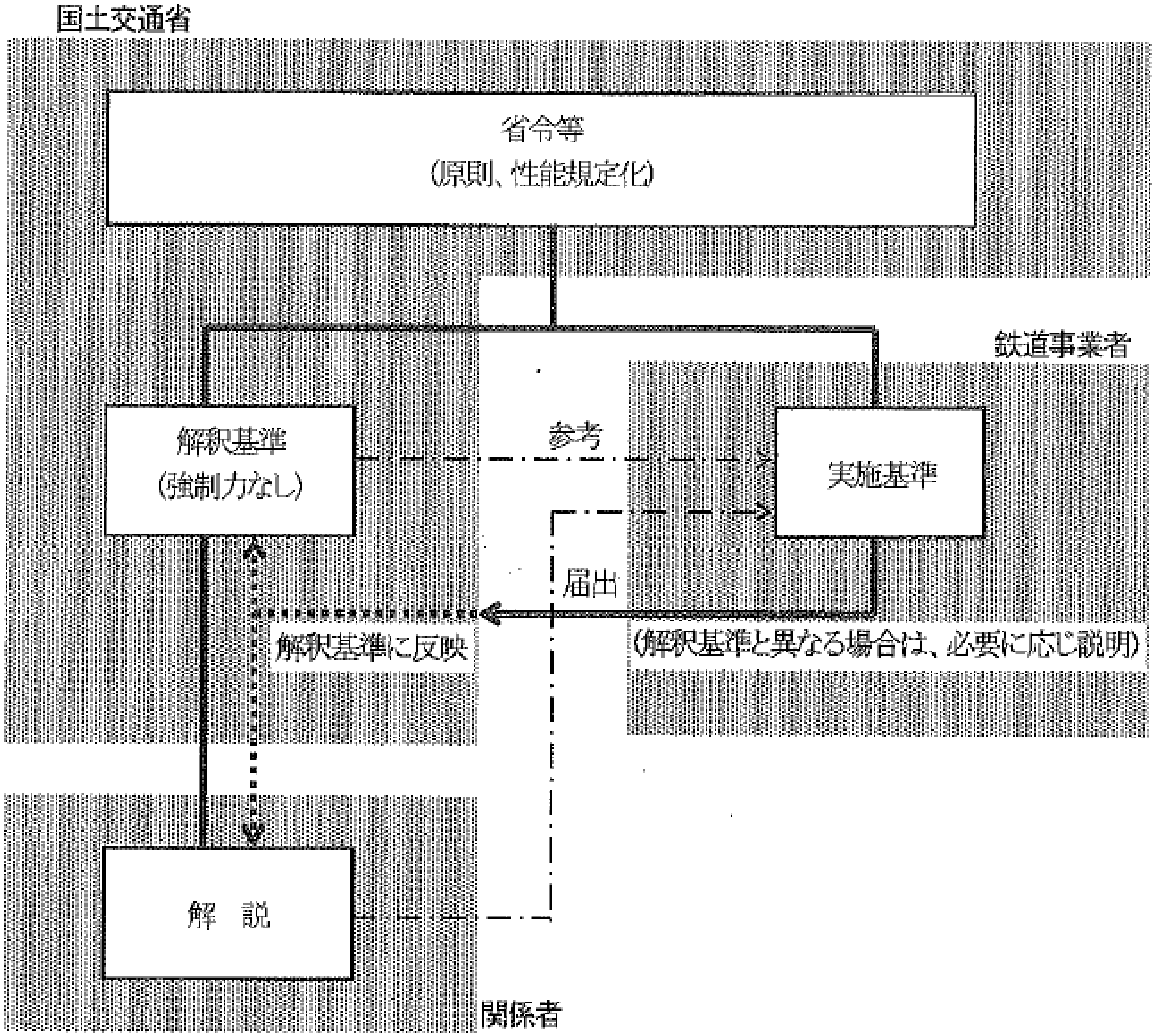
トロリー線高さ	トンネル外	3.0m 以上3.2m 以下
	トンネル内	2.9m 以上3.2m 以下
トロリー線偏位	軌道中心より左右250mm 以内	

4. 電車線試運転

・電車線の絶縁抵抗測定、漏洩電流測定を実施後、電車線に送電し電気機関車を走行させ異常のないことを確認する。

維持管理の方法

鉄道事業者は、国土交通省が定める「鉄道に関する技術上の基準を定める省令」に基づき実施基準を策定・届出し、これに基づき施設、車両の設計、運転取扱等を行う事とされている。



黒部峡谷鉄道の実施基準

1. 運転取扱心得
2. 車両構造実施基準
3. 車両整備実施基準
4. 土木施設実施基準
5. 電気設備実施基準
6. 運転保安設備実施基準

車両の検査周期と体制について

	全般検査（主要部品を取外し、全般に定期検査）	重要部検査（主要部品を外さない範囲の定期検査）	臨時検査（※）	月検査（車両状態及び機能について定期検査）	列車検査（消耗品、主要部の機能について検査）
電気機関車	8年以内（空気系統は直営）	4年以内（空気系統は直営）	使用を休止した車両を始めて使用する場合　等	3ヶ月以内	2日以内
蓄電池機関車（専鉄上部）	8年以内（空気系統は直営）	4年以内（空気系統は直営）		3ヶ月以内	運行時毎
内燃機関車	8年以内（空気系統は直営）	4年以内（空気系統は直営）	使用を休止した車両を始めて使用する場合　等	3ヶ月以内（空気系統は直営）	運行時毎
客車	8年以内（空気系統は直営）	4年以内（空気系統は直営）	使用を休止した車両を始めて使用する場合　等	3ヶ月以内（空気系統は直営）	毎日
貨車	5年以内（空気系統は直営）	2年6ヶ月以内（空気系統は直営）	使用を休止した車両を始めて使用する場合　等	3ヶ月以内	運行時毎
特殊車（保線車）	7年以内（空気系統は直営）	3年6ヶ月以内（空気系統は直営）	使用を休止した車両を始めて使用する場合　等	3ヶ月以内（空気系統は直営）	運行時毎

検査体制（凡例）

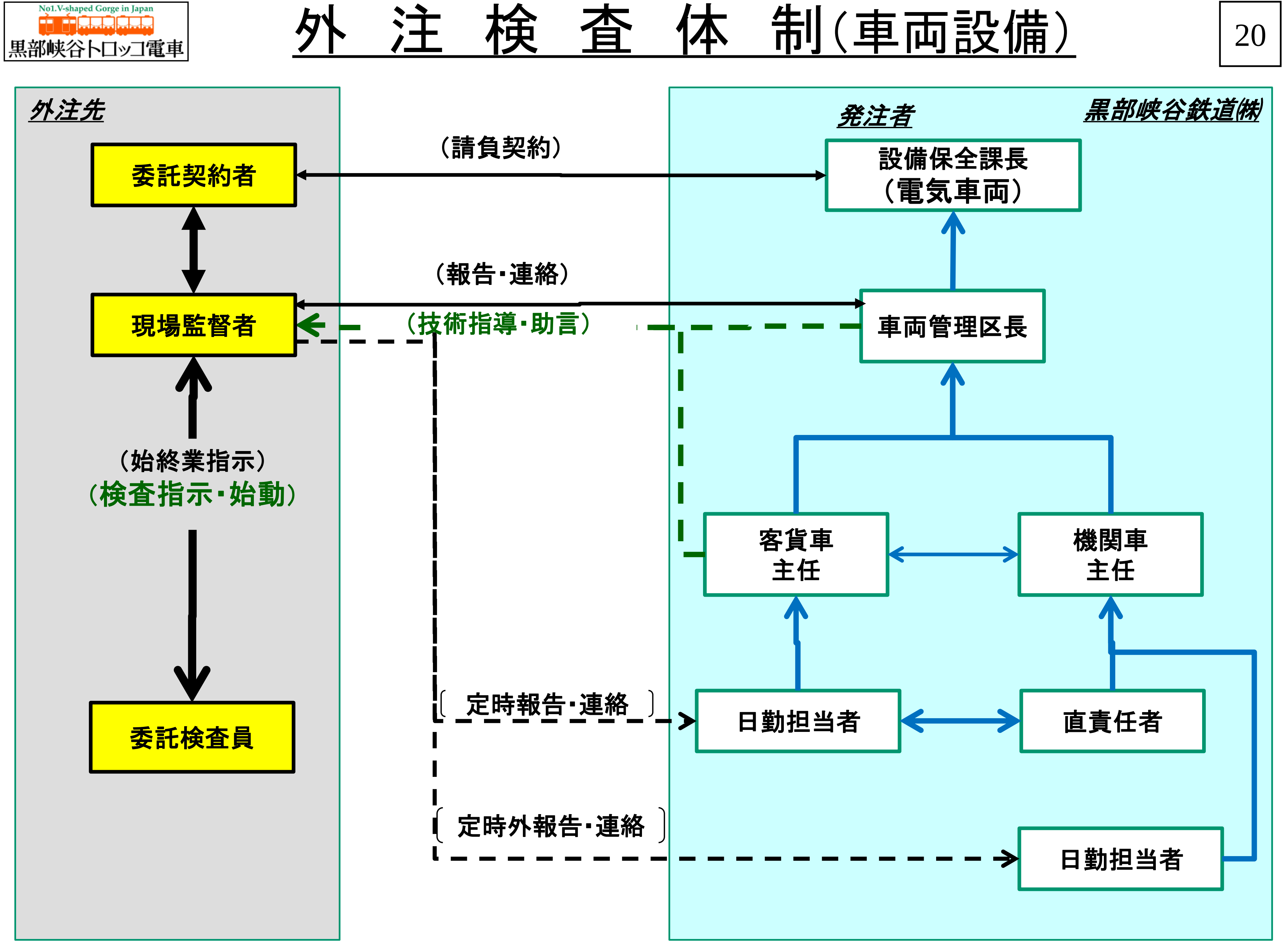
メーカーによる検査	:メーカー工場にて検査実施
請負による検査	:車両管理区検修庫にて検査実施
一部請負による検査	:車軸・台車枠探傷検査等の一部を請負実施
直営による検査	:黒鉄社員が直営で検査実施

全般検査	省令第90条（施設及び車両の定期検査）
重要部検査	同上
月検査	同上
列車検査	省令第89条　3．列車検査
臨時検査	同上

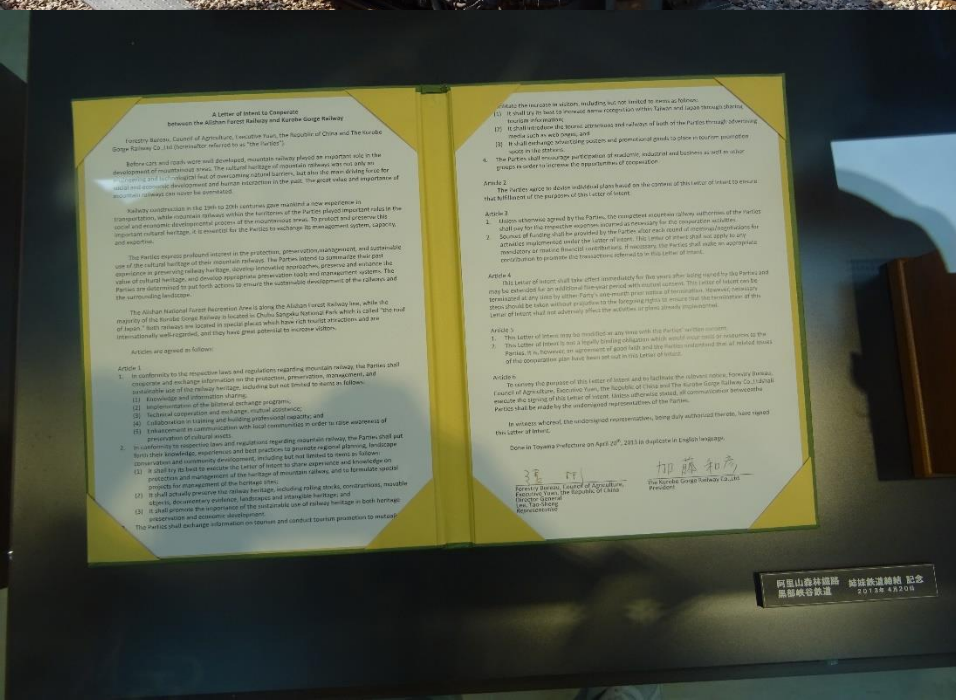
※：冬期間は休止としているため毎年冬期間に"臨時検査"を実施

省令・・・・・・・鉄道に関する技術上の基準を定める省令（H14.3.31施行）⇒黒鉄 車両整備実施基準（H14.3.31制定　H28.8.1　改正）

外 注 検 査 体 制（車両設備）

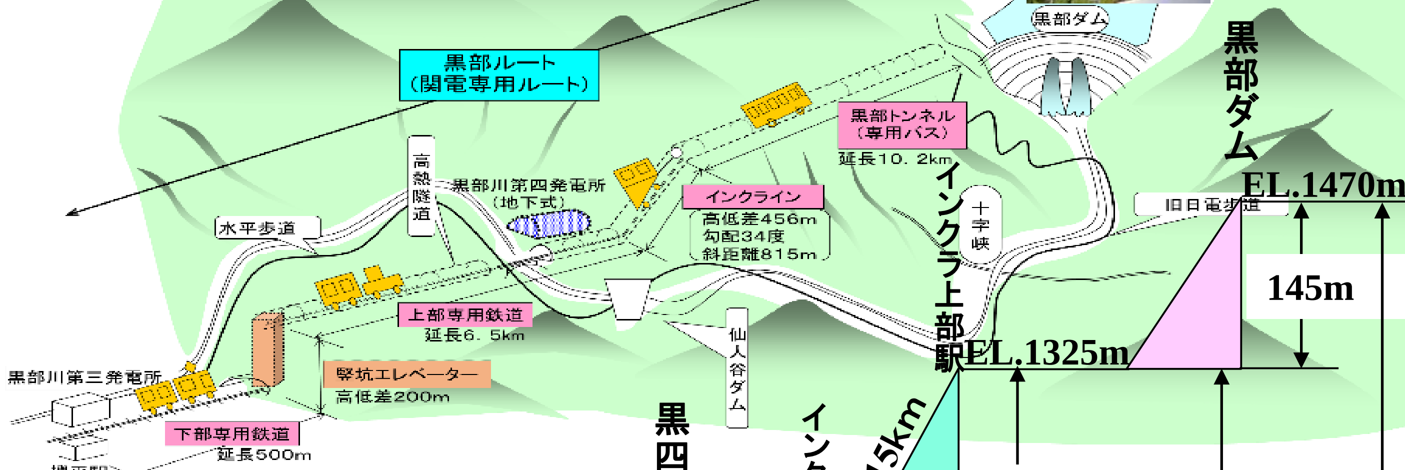

No1.V-shaped Gorge in Japan
黒部峡谷トロッコ電車
外注先
委託契約者
現場監督者
（始終業指示）
（検査指示・始動）
委託検査員
（請負契約）
（報告・連絡）
（技術指導・助言）
定時報告・連絡
定時外報告・連絡
発注者
黒部峡谷鉄道㈱
設備保全課長
（電気車両）
車両管理区長
客貨車
主任
機関車
主任
日勤担当者
直責任者
日勤担当者

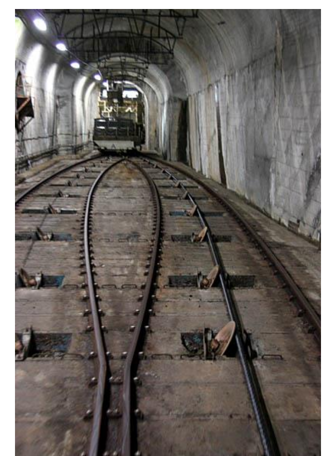
阿里山森林鐵路との姉妹提携記念



No1.V-shaped Gorge in Japan
黒部峡谷トロッコ電車

黒部ルート（2024年から一般開放・旅行商品化予定）

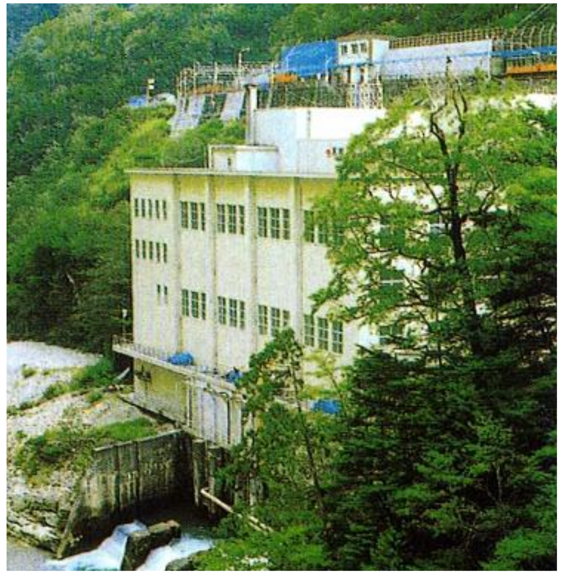




黒部川第三発電所

昭和11年　着手
昭和14年　竣工

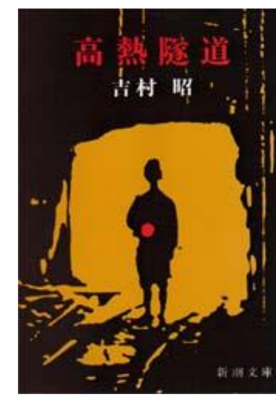
出力は81,000kW



高熱隋道

黒部川第三発電所のため、仙人谷ダムを建設するため、資材運搬用として
5.6kmの隋道を設けるため工事着手したが、阿曽原～仙人谷間で高熱地帯に遭遇
160℃を超える岩盤温度にダイナマイトが自然発火するに至り、6名もの命が奪われた

吉村昭　著
小説　高熱隋道



作業員は一日2時間×2回　4時間、15日間勤務すると、15日間の有給休暇を取った。
高熱環境での作業のため、作業員4名に水掛人夫2名も補助員2名をつけ、人夫の後方20m程度から
水掛人夫が水をかけ、その後方からは補助員が水をかける。
このように8人一組で6班が交代しながら作業を続けた。・・賃金は一日10円・・当時の人夫平均は月20円

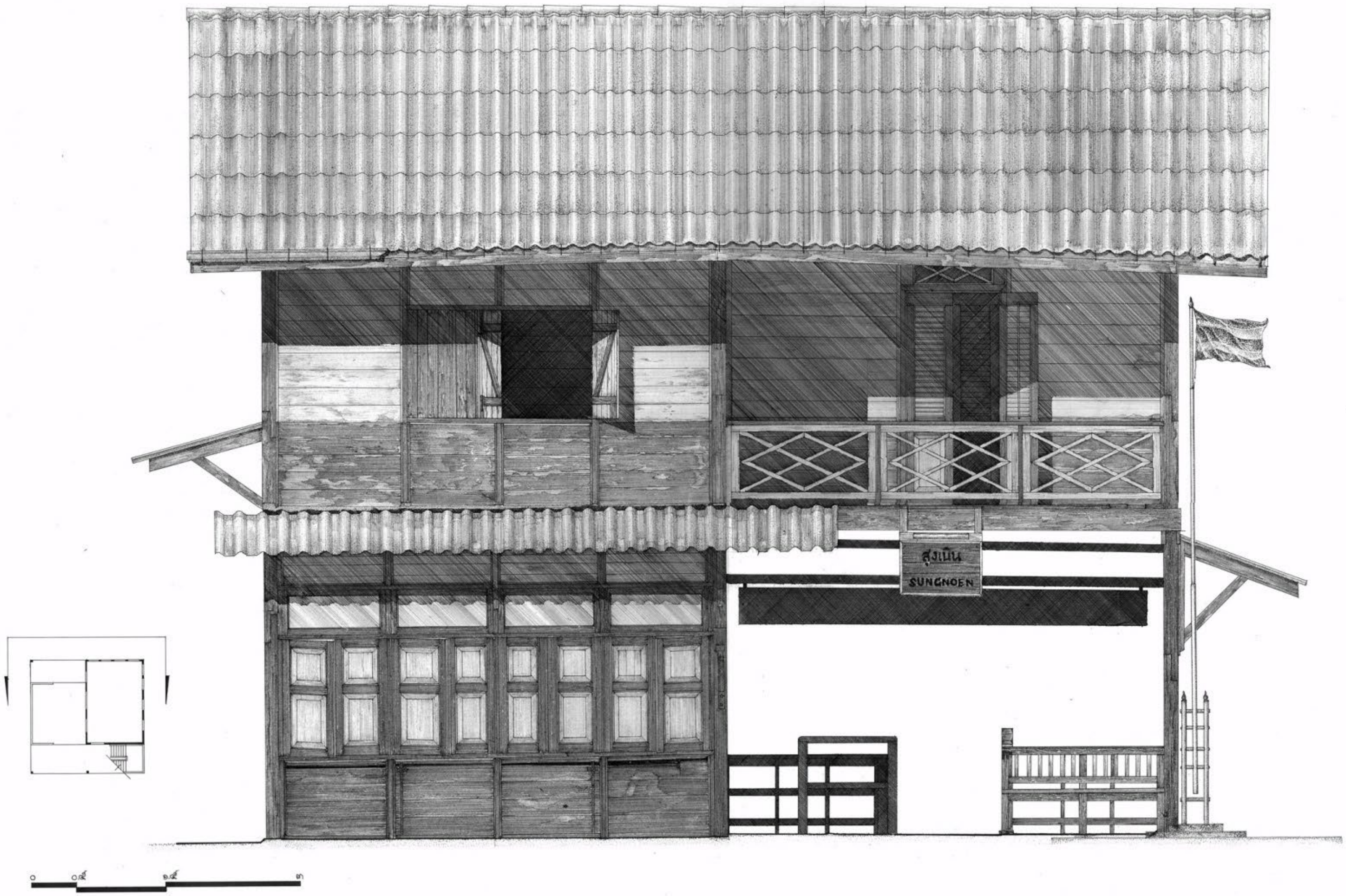

高熱隋道

トロッコのマスコット　「くろべえ」　と　「でんちゃ～」

Appendix 7 - *Operation Management & Safety Maintenance Mechanism of Kurobe Gorge Railway*

Maeyama Masami

The Identifying and Safeguarding of the State Railway of Thailand's Railway Station Buildings



อาคารสถานีรถไฟสูงเนิน อำเภอสูงเนิน จังหวัดนครราชสีมา รูปด้านทิศเหนือ มาตราส่วน ๑:๒๕ โดยนายจตุเทพ เสถียรจิตร คณะสถาปัตยกรรมศาสตร์ สถาบันเทคโนโลยีพระจอมเกล้าเจ้าคุณทหารลาดกระบัง วันที่ ๒๒ กรกฎาคม ๒๕๕๘
SUNG NOEN RAILWAY STATION BUILDING, SUNG NOEN DISTRICT, NAKHON RATCHASIMA PROVINCE, NORTH ELEVATION, SCALE 1:25, BY MR. CHATUTEP SATHIANCHIT, FACULTY OF ARCHITECTURE, KING MONGKUT'S INSTITUTE OF TECHNOLOGY LADKRABANG, JULY 22, 2015

Parinya Chukaew

Contents

Research Objectives

- To **establish** the collaborative working network
- To **survey and identify** the heritage resources of the SRT
- To **manage and record** the heritage resources of the SRT
- To **produce** a conservation guidelines for the heritage resources of the SRT

Historical Background

- **Since 1850 the protection of European colonization had existed**

- **1855 Queen Victoria of the Great Britain gave King Mongkut (Rama IV) the tiny model train**

- **1886 the first railway from Bangkok to Samut Prakan built by a Danish private company**

- **The development of railway was one of the strategies to tackle colonization pressure**

- **1890 King Rama V established the Royal Railway Department under the Ministry of Public Works**

Historical Background

- 1896 Bangkok – Ayutthaya built by a British Company and led by Mr. Cambell

- Railroad and associated facilities including stations, maintenance workshops, control tower, welfare housings, bridges, water tanks, warehouses, and rental shophouses were built

- 94 years later, railroads were completely built and operated throughout the Kingdom

- 1921 Bangkok – Sungai Kolok, South

- 1921 Bangkok – Chiang Mai, North

Historical Background

- **1926 Bangkok – Ubonratchathani, Northeast**
- **1926 Bangkok – Aranyaprathet, East**
- **1958 Bangkok – Nong Khai, Northeast**
- **1958 Bangkok – Nam Tok, West**
- **1990 Bngkok – Ban Phlu Ta Luang, East**
- **4,034 kilometers of railway tracks and 442 railway stations + 1 Chitlada Royal Station**

สถานีราชบุรี พระเจ้าลูกยาเธอ พระองค์เจ้าอุรุพงศ์รัชสมโภช ผู้ตามเสด็จ ทรงยืนอยู่ทางขวา
The Rajburi Railway Station during the reign of King Chulalongkorn.

Locomotive Depot

Welfare Housing

Control Tower

Maintenance Workshop

Bridge

Warehouse

Rental Shophouse

Traditional Communities Related to Railway Stations

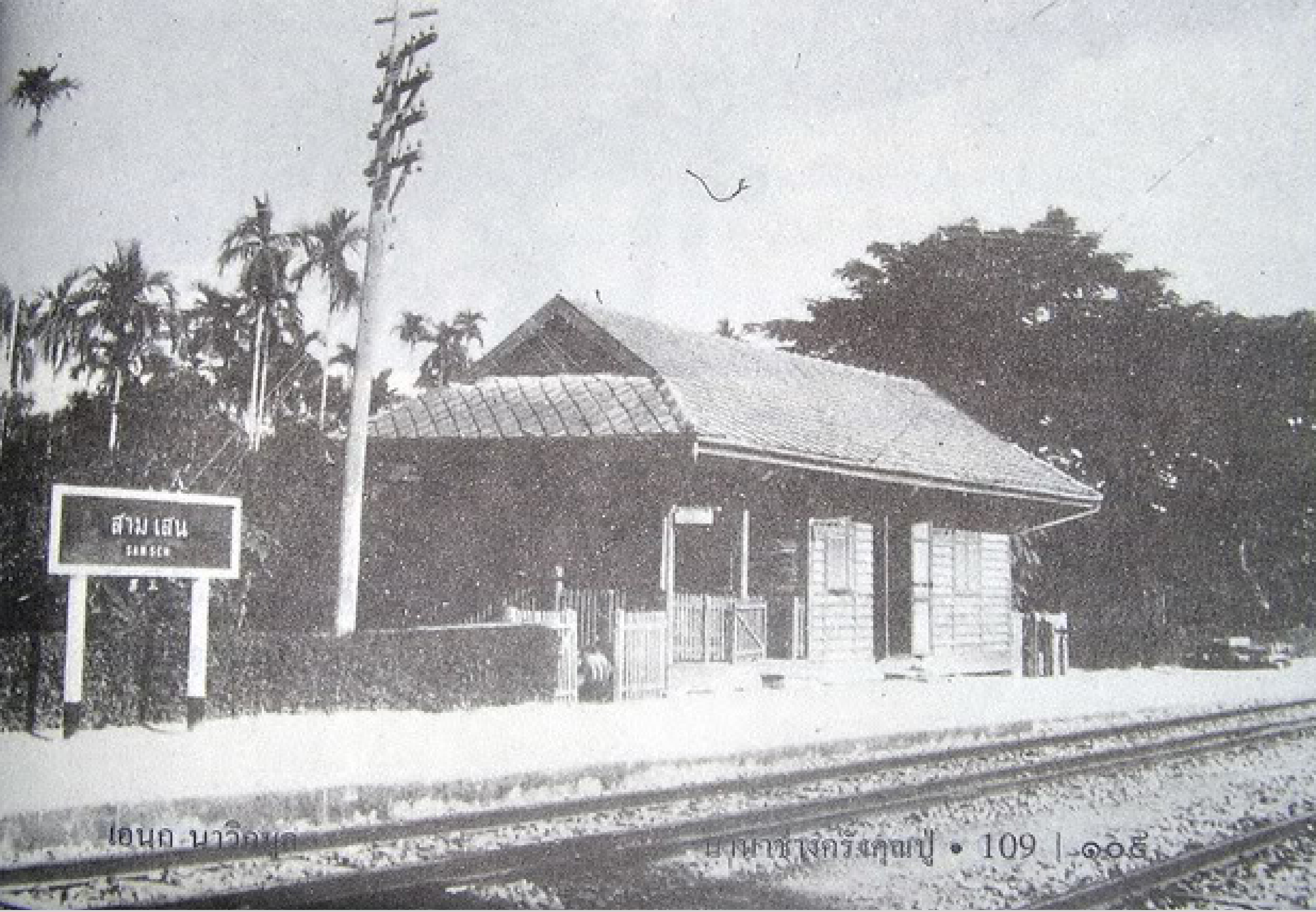
Architectural Characteristics

- **Railway station buildings demonstrate the development and use of various and unique architectural styles, materials, and construction techniques**

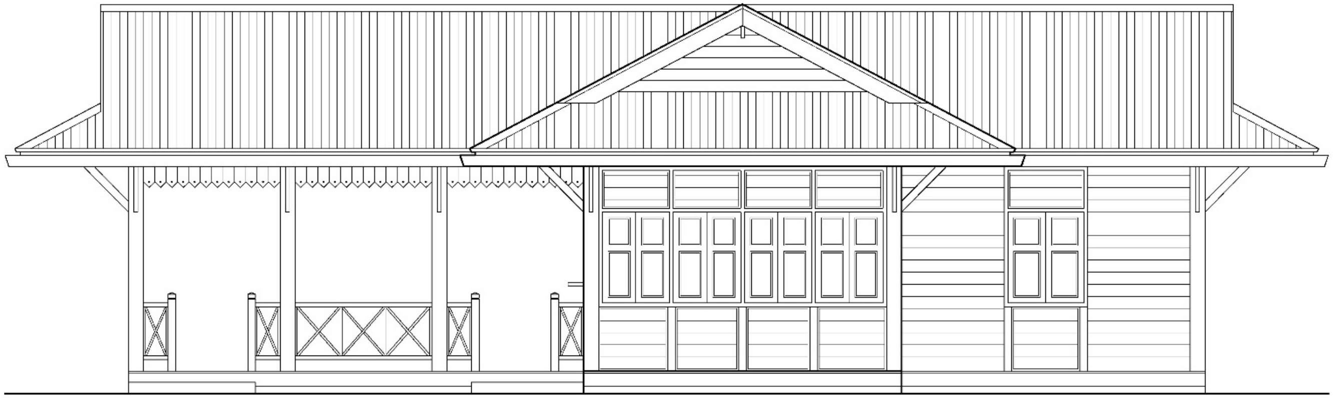
- **The earliest station buildings were beautifully built with teak or timber designed by Western engineers**

- **After World War II, Thai architects had been involved in designing new station buildings replaced the ones that were destroyed by war**

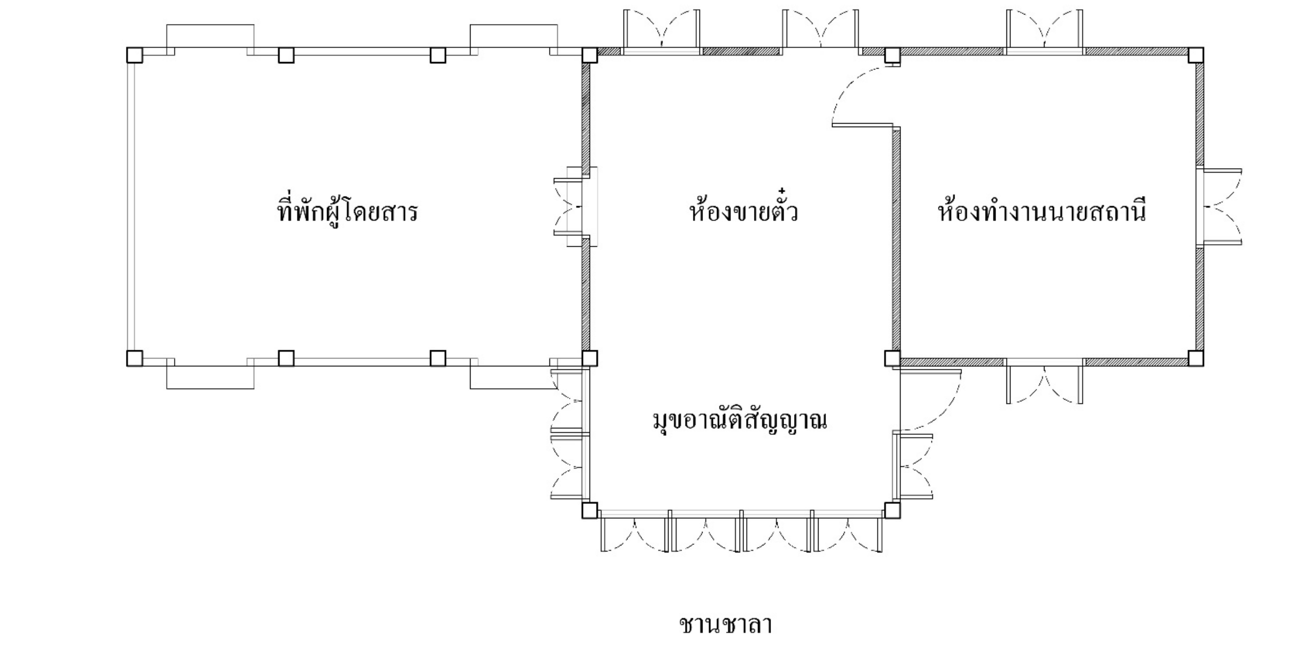
Chumphon Railway Station



Samsen Railway Station



รูปด้านหน้า

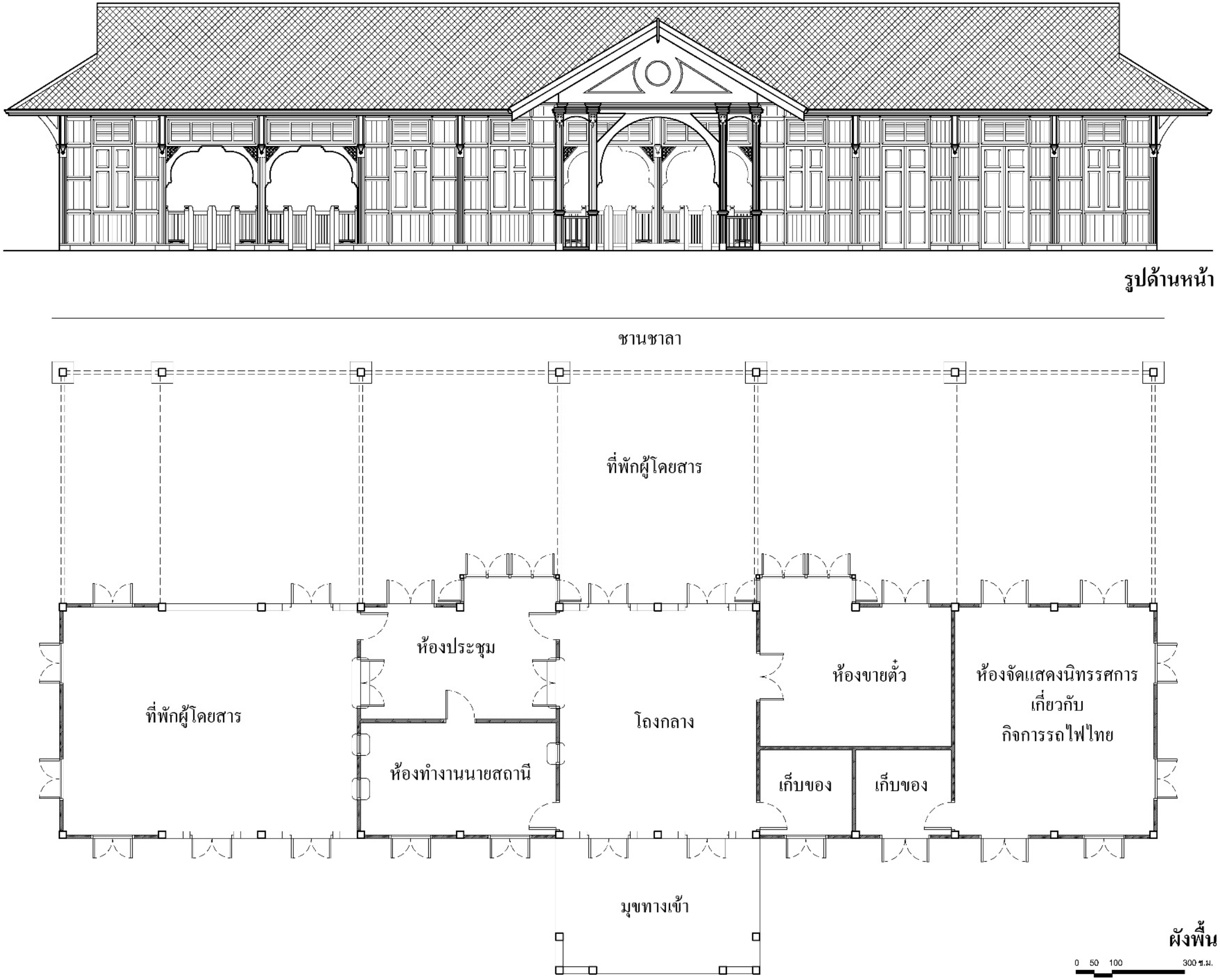


ผังพื้น

0 50 100 300 ซ.ม.

Floor Plan and Front Elevation of Small Railway Station Building

Western Architecture Style

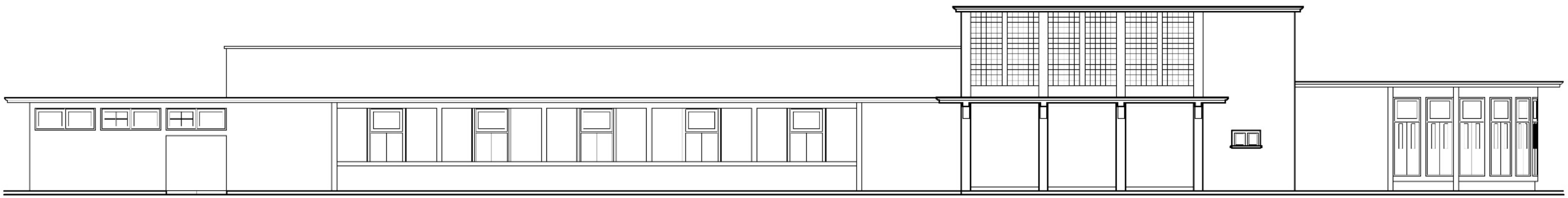


Floor Plan and Front Elevation of Kantang Railway Station Building

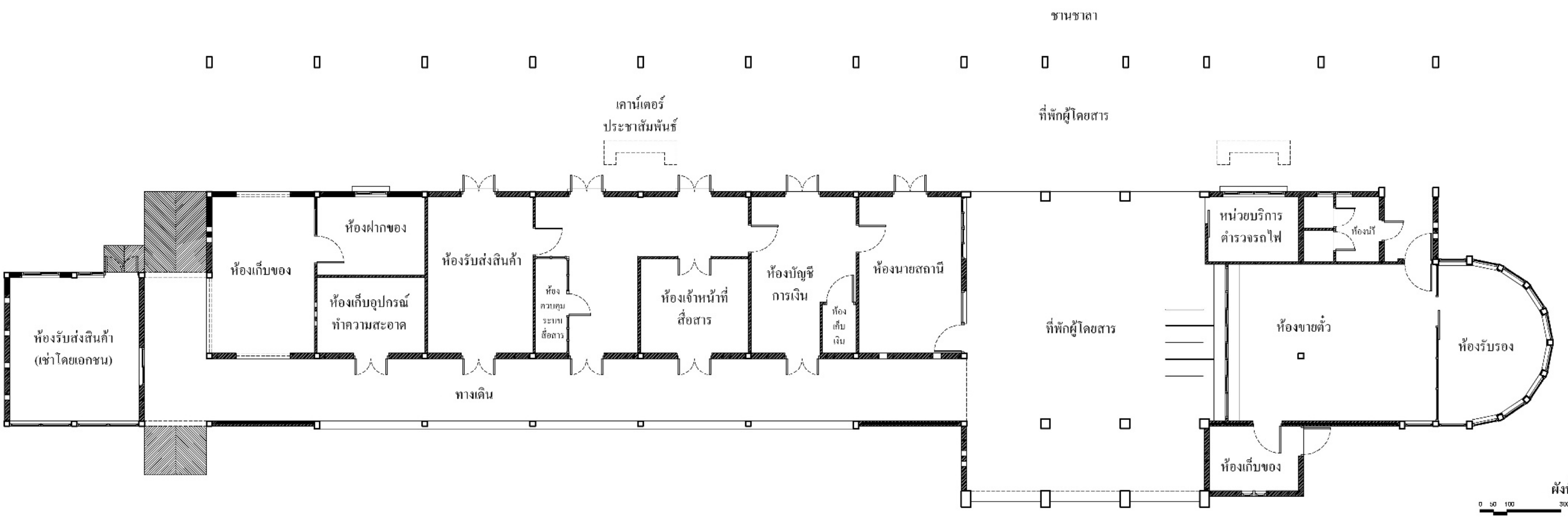



Contemporary Thai Architecture Style

Modern Architecture Style



รูปด้านหน้า



ผังพื้น

Suratthani Railway Station Building Floor Plan and Front Elevation

Issues Concerning Conservation

- **The trade-off between conservation and development: it is not possible to preserve the heritage resources unless they are proved to be of great significance**
- **Unclear policy: the SRT has no obviously written policy towards conservation**
- **Lack of proper maintenance the heritage resources**
- **Shortage of traditional construction materials and craft-persons**
- **An insufficient protection law**

State of Preservation

- Few railway station buildings were listed as Thailand's national heritage from the Fine Art Department and were given the conservation award from the Association of Siamese Under the Royal Patronage

- Some railway station buildings with high architectural and historical value have been demolished without being surveyed or identified for their significance

- Many railway station buildings have not been identified or surveyed for their significance

Kantang Railway Station Building 2010

Kantang Railway Station Building 2015

Songkhla Railway Station Building 2010

Songkhla Railway Station Building 2015

Songkhla Railway Station Building 2015

การปรับปรุงฟื้นฟูสถานีรถไฟหนองแมว

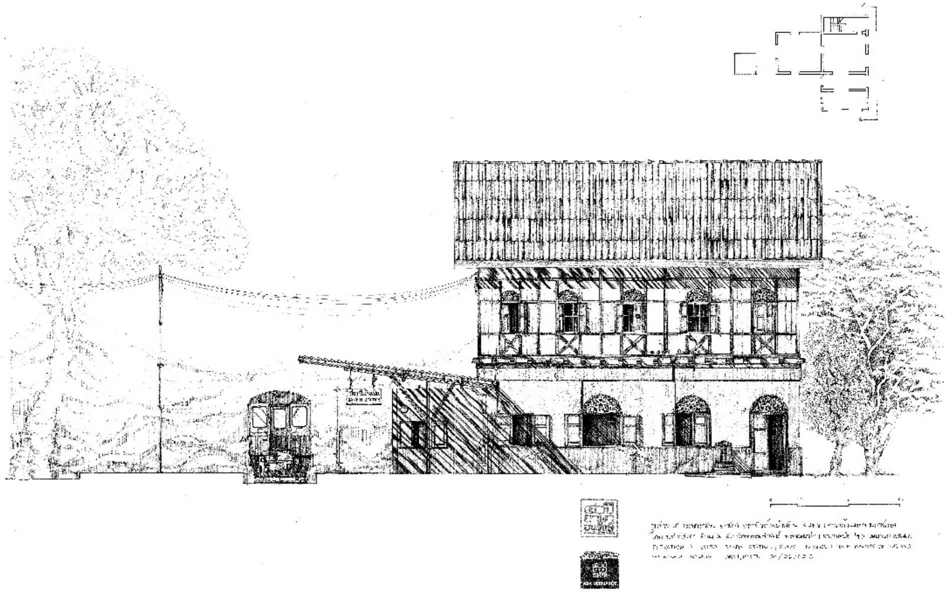
ตัวอย่างของการลงมือทำภายใต้ข้อจำกัดด้านงบประมาณและบุคลากร

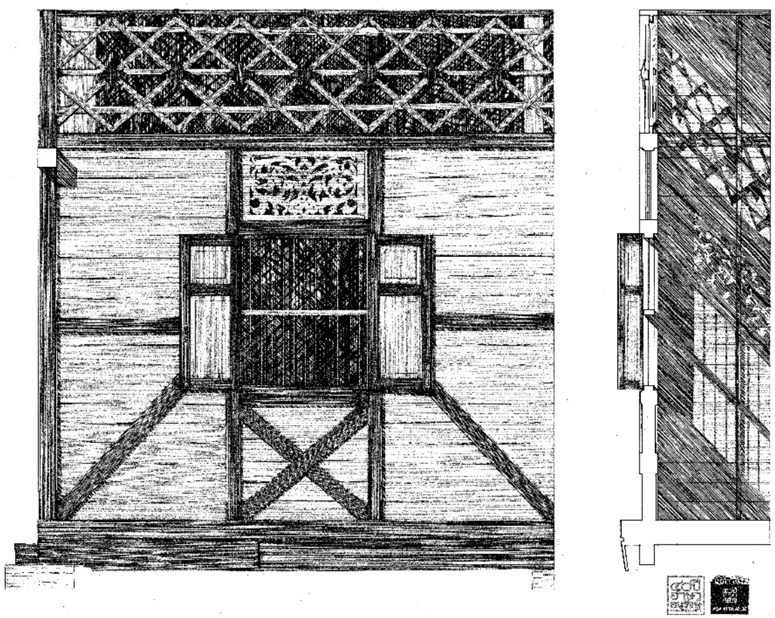
ก่อนการปรับปรุงฟื้นฟู (มีนาคม 2557)

ภายหลังการปรับปรุงฟื้นฟู (มกราคม 2558)

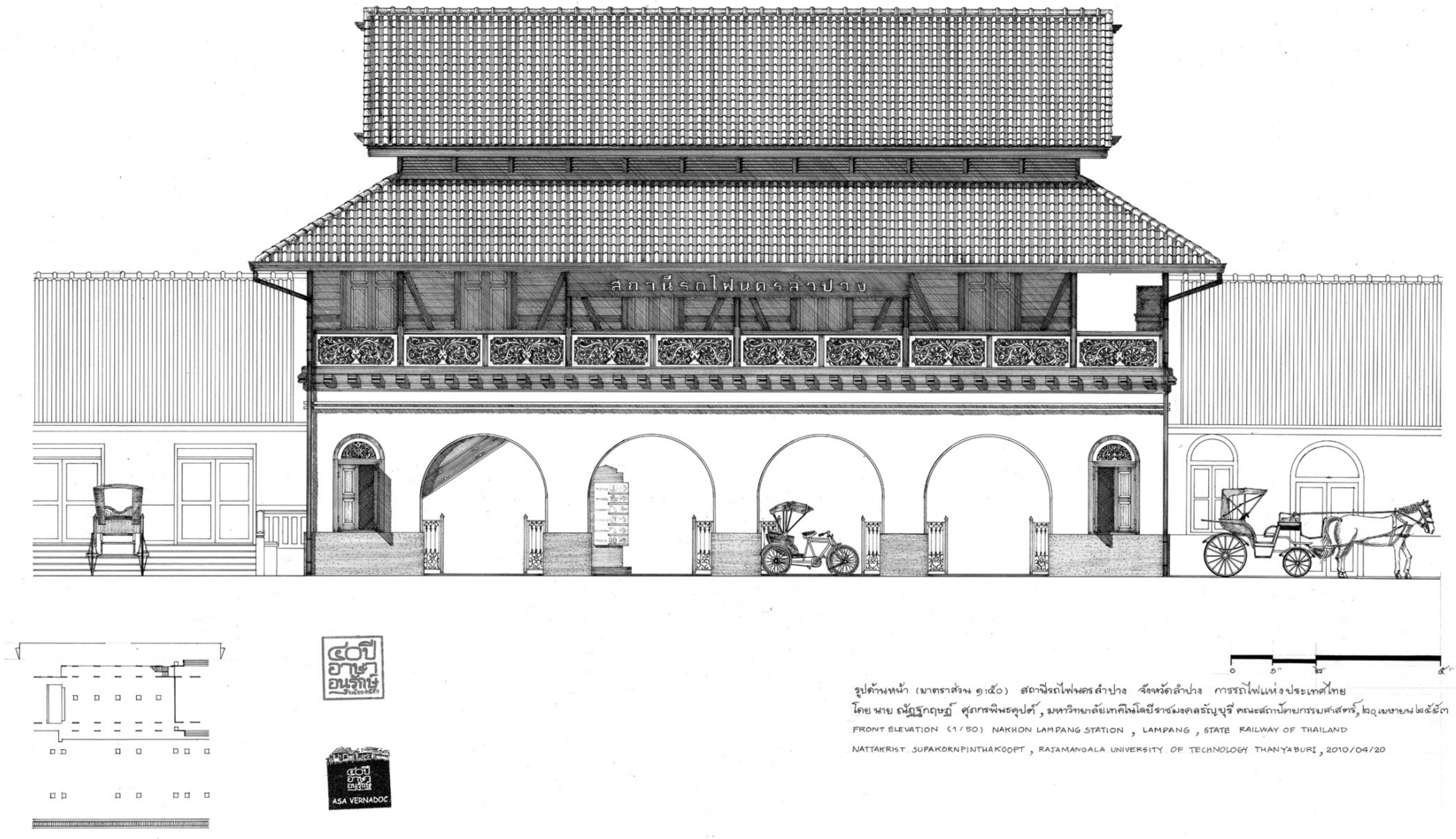
Nong Maew Railway Station Building Rehabilitation

Sikhiu Railway Station Building was demolished 6 years ago





Vernacular Documentation 2011

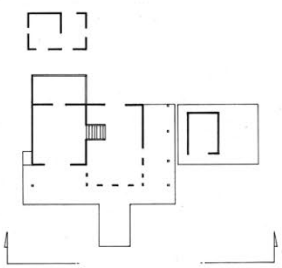


Front Elevation of Nakhom Lampang Railway Station Building

Front Elevation of Ban Pin Railway Station Building

รูปด้าน ๑ (มาตราส่วน ๑:๕๐) สถานีรถไฟแม่ทะ จ.ลำปาง : การรถไฟแห่งประเทศไทย
โดย นายธนิก หมื่นคำวัง, มหาวิทยาลัยนเรศวร, วันที่ ๒๐ เมษายน ๒๕๕๓

ELEVATION 1 (1/50) MAETHA STATION, LAMPANG PROVINCE : STATE RAILWAY OF THAILAND
20/04/2010 THANICK MUENKHAMWANG, NARESUAN UNIVERSITY



ASA VERNADOC

Front Elevation of Mae Tha Railway Station Building

VERNADOC Exhibition at Bangkok Railway Terminal 2014

VERNADOC Exhibition at Bangkok Railway Terminal 2014

Mae Tha Railway Station by Nakharin Pitak, KMITL, 2014

Khun Tan Railway Station by Thanapat Thanasothorn, KMITL, 2014

Railway Station Building Exhibition and Park Talk at the BACC 2015

Railway Station Building Exhibition and Park Talk at the BACC 2015

Community Participation

Community Participation

- **Important aspects of creating a conservation plan for railway station district – *identification, documentation, assessment, treatment, and implementation***

- **Local residents, local government and all stakeholders work closely with the research team in the planning process**

- **Public awareness about the conservation has been growing**

Mae Phuak Railway Stop in January 14, 2012

VERNADOC Camp at Mae Phuak Railway Stop in June 2014

VERNADOC Camp at Mae Phuak Railway Stop in June 2014

ในปี พ.ศ.2430 **พระบาทสมเด็จพระจุลจอมเกล้าเจ้าอยู่หัว รัชกาลที่ 5** มีพระบรมราชโองการโปรดเกล้าโปรดกระหม่อมให้ **เซอร์แอนดรู คล้าก** และบริษัทปันชาร์ด (MessrsPunchard, Lowther & Co.) ทำการสำรวจเพื่อสร้างทางรถไฟระหว่างกรุงเทพมหานครและเชียงใหม่หลังจากนั้นในวันที่ 1 มิถุนายน พ.ศ. 2454 กรมรถไฟหลวงได้เปิดการเดินรถไฟจากกรุงเทพมหานครผ่านสถานีรถไฟปางต้นผึ้งมายังสถานีรถไฟแม่พวก ซึ่งในเวลานั้นพื้นที่ของหมู่บ้านแม่พวกยังอยู่ในพื้นที่ป่าเขาโดยสาเหตุที่การก่อสร้างทางหยุดที่หมู่บ้านแม่พวกก็เพราะเงินกู้สำหรับสร้างทางรถไฟนั้นใกล้หมดลงและการก่อสร้างทางขึ้นเขาจากอุตรดิตถ์มายังหมู่บ้านแม่พวกนั้นมีค่าใช้จ่ายมากเนื่องจากต้องถมดินให้สูง ทำสะพานหอสูงและขุดอุโมงค์ปางตูบขอบและอุโมงค์เขาพลึง

หลังจากนั้นในวันที่ 12 กันยายน พ.ศ. 2454 **สมเด็จพระศรีพัชรินทราบรมราชินีนาถ พระบรมราชชนนีพันปีหลวง** เสด็จประพาสเส้นทางรถไฟสายเหนือตั้งแต่สถานีรถไฟหัวลำโพงจนถึงสถานีรถไฟแม่พวกโดยพระองค์ได้เสด็จจากจังหวัดอุตรดิตถ์ในเวลาเช้าถึงสถานีรถไฟแม่พวกประพาสชมทัศนียภาพโดยรอบแล้วเสด็จกลับในวันเดียวกัน เหตุการณ์ดังกล่าวได้มีการบันทึกเป็นกลอนพื้นเมือง (ภาษาท้องถิ่นเรียกว่าค่าว) โดย **พระสุริยะจางวาง (เจ้าสุริยะสารศิริวงศ์)** นายอำเภอเมืองแพร่ในขณะนั้น เนื้อความในค่าวถอดความโดยสังเขปได้ดังนี้ (ถอดความโดย **สุนันท์ธนา ชมภูมิ่ง แสนประเสริฐ** วันที่ 12 มีนาคม พ.ศ. 2555)

"สมเด็จพระพันปีหลวงจะเสด็จเมืองแพร่ ณ สถานีแม่พวกด้วยทางรถไฟในวันที่ 12 กันยายน จ.ศ.1273 ในการนี้เจ้าคุณนิกรข้าหลวงเมืองแพร่ได้เตรียมการต้อนรับโดยนำเจ้านายและข้าราชการในเมืองแพร่รวมทั้งตำรวจและทหารเดินทางไปแม่พวกตั้งแต่วันที่ 5 กันยายนเพื่อเตรียมเส้นทางที่จะเสด็จสัญจร (ถนน, สะพาน) เตรียมพลับพลาที่ประทับ (ในค่าวใช้คำว่าหอประพาส) เตรียมพิธีการถวายการต้อนรับและการถวายของที่ระลึกรายชื่อ เจ้านายที่ระบุในค่าว เช่น แม่เจ้าบัวไหล (ชายาในเจ้าหลวงเมืองแพร่องค์สุดท้าย) พระพิไชยราชา เจ้าบุรีรัตน์ แม่เจ้าจันคำเจ้าฟองคำ ขุนพงศ์พิบูลย์ เป็นต้น

ค่ายที่พักแรมของผู้เตรียมการตั้งอยู่ที่ตีนดอยซันแม่คักแม่พวก ซึ่งเป็นชุมชนใหญ่มีตลาดและผู้คนหลากหลายเผ่าพันธุ์หลั่งไหลมาอาศัยอยู่มีทั้งคนจีน มอญ ไทย (หมายถึงคนที่อยู่ใต้เมืองแพร่ลงมา) พม่า (ม่าน, เมง) เงี้ยว ยอง ต่องสู้ ขมุ แขก ลื้อ แม้ว เย้า ฮ่อ อีก้อ ยาง (กะเหรี่ยง) ในวันที่พระพันปีเสด็จมาพร้อมเหล่าบริวารมีประชาชนมาเฝ้ารับเสด็จจำนวนมาก มีการยืนเข้าแถวถวายการต้อนรับโดยเริ่มด้วยแถวทหาร ตำรวจทำการเคารพ แถวของข้าราชการต่อด้วยประชาชนมีแตรวงบรรเลง และการฟ้อนรำถวายประชาชนทำความเคารพด้วยธูปเทียนและโห่ร้อง จากนั้นพระองค์เสด็จโดยรถยนต์พระที่นั่งไปยังสวนป่าสักซึ่งเป็นที่ตั้งของหอประพาสที่ได้สร้างไว้ ณ ที่นั้นได้ทรงช้างเข้าเที่ยวชมสวนและมีพนักงานป่าไม้มาถวายการต้อนรับโดยนำช้างมาแสดงการชักลากไม้ให้ทอดพระเนตรหลายตัว จากนั้นทรงพักผ่อนพระอิริยาบถในหอประพาสแล้วเสด็จกลับแม่พวกเพื่อทรงรถไฟกลับไปยังจังหวัดอุตรดิตถ์ในวันเดียวกัน เจ้านายและข้าราชการในเมืองแพร่ที่มาถวายการต้อนรับเดินทางกลับแพร่ในวันรุ่งขึ้น 13 กันยายน 2454"

สถานีรถไฟแม่พวก.....

สถานีแห่งความหวังและการรอคอย

ป่าสักที่สมเด็จพระพันปีหลวงเสด็จทอดพระเนตรนั้นเป็นป่าสักทองที่ชาวบ้านแม่พวกได้ร่วมกันปลูกไว้ในปี พ.ศ. 2453 จำนวนทั้งสิ้น 1,779 ต้น บริเวณตรงข้ามกับสถานีรถไฟแม่พวกปัจจุบันป่าสักทองดังกล่าว (ที่ชาวบ้านแม่พวกปลูกไว้) อยู่ในความดูแลของกรมป่าไม้ในพื้นที่ 133 ไร่

ต่อมาในวันที่ 15 พฤศจิกายน พ.ศ. 2455 กรมรถไฟหลวงได้เปิดการเดินรถไฟจากกรุงเทพมหานครถึงสถานีปากปานโดยผ่านสถานีรถไฟเด่นไชยหรือเด่นชัยในปัจจุบัน ช่วงเวลาเดียวกันนี้มีการทำถนนดินลูกรังอัดแน่นจากเด่นไชยไปยังเมืองแพร่ซึ่งต่อมากลายเป็นส่วนหนึ่งของทางหลวงหมายเลข 101 หลังจากนั้นสถานีรถไฟเด่นชัยได้รับการพัฒนาจนกลายเป็นย่านสถานีสำคัญของจังหวัดแพร่ สำหรับการเดินรถไฟจากกรุงเทพมหานครถึงหมู่บ้านแม่พวกในสมัยนั้นต้องใช้เวลาเดินทาง 3 วันโดยวันแรกระหว่างกรุงเทพมหานคร-พิษณุโลก วันที่สองระหว่างพิษณุโลก-อุตรดิตถ์ และวันที่สามระหว่างอุตรดิตถ์-แม่พวก เนื่องจากกรมรถไฟหลวงยังไม่มีการเดินรถไฟในเวลากลางคืน

อาคารสถานีรถไฟแม่พวกเมื่อแรกสร้างเป็นอาคารไม้ชั่วคราวจนกระทั่งปี พ.ศ. 2460 กรมรถไฟหลวงได้รื้ออาคารสถานีรถไฟชั่วคราวลงและเริ่มสร้างอาคารสถานีรถไฟแม่พวกหลังปัจจุบันและมีการเปิดใช้อย่างเป็นทางการในปี พ.ศ.2462 สถานีรถไฟแม่พวกได้รองรับการเดินทางของประชาชนและการขนส่งสินค้าเรื่อยมาจนกระทั่งในปี พ.ศ. 2511 เมื่อมีการทำถนนเชื่อมระหว่างอำเภอเด่นชัยและอำเภอเมืองอุตรดิตถ์และชาวบ้านเริ่มมีการใช้รถไฟในการเดินทางลดน้อยลงทำให้รายได้ของสถานีรถไฟแม่พวกลดน้อยลงตามไปด้วย หลังจากนั้นในปี พ.ศ. 2524 รัฐบาลได้ดำเนินการขยายถนนเชื่อมระหว่างอำเภอเด่นชัยและจังหวัดอุตรดิตถ์ทำให้การเดินทางไปยังที่ต่าง ๆ มีความสะดวกรวดเร็วมากขึ้น ส่งผลให้ปริมาณผู้โดยสารที่สถานีรถไฟแม่พวกลดลงอย่างมาก ต่อมาในวันที่ 1 ตุลาคม พ.ศ. 2546 การรถไฟแห่งประเทศไทยได้ยุบสถานีรถไฟแม่พวกแล้วเปิดเป็นที่หยุดรถแทนเพื่อลดภาระค่าใช้จ่ายและต้นทุนลงทำให้ไม่มีนายสถานีและพนักงานการรถไฟประจำและไม่มีการใช้สอยพื้นที่ภายในอาคารสถานีรถไฟแม่พวกแต่อย่างใด นอกจากนี้ยังมีการรื้อถอนบ้านพัก โรงชั่งของ และยกเลิกประแจทั้งหมดเหลือแต่ทางประธาน

ต่อมาในวันที่ 6 มีนาคม พ.ศ.2549 การรถไฟแห่งประเทศไทยได้อนุญาตให้องค์การบริหารส่วนตำบลห้วยไร่ให้ใช้สิทธิเหนือพื้นดินเพื่อขออนุรักษ์และขอใช้อาคารสถานีแม่พวกจัดทำสำนักงานชมรมกีฬาดนตรี และที่ทำการสาธารณสุขพื้นฐาน โดยสิทธิเหนือพื้นดินตามสัญญานี้กำหนดไว้ 5 ปีนับตั้งแต่วันลงนามในสัญญาหลังจากนั้นในปี พ.ศ.2550 องค์การบริหารส่วนตำบลห้วยไร่ได้จัดสร้างห้องสุขาและสนามฟุตบอลเล็กจำนวน 2 สนาม บริเวณด้านหน้าอาคารสถานีรถไฟแม่พวก

ปัจจุบันพื้นที่ภายในอาคารสถานีรถไฟแม่พวกไม่ได้มีการใช้ประโยชน์แต่อย่างใดยกเว้นบริเวณส่วนโถงพักคอยที่ชาวบ้านยังคงใช้ในการรอรถไฟ ซึ่งมีขบวนรถหยุดรับส่ง 2 ขบวนต่อวันคือ ขบวนท้องถิ่น 408 เชียงใหม่-นครสวรรค์ จอดที่สถานีรถไฟแม่พวกเวลาประมาณ 14.00 น. และขบวนท้องถิ่น 407 นครสวรรค์-เชียงใหม่ จอดที่สถานีรถไฟแม่พวกเวลาประมาณ 10.00 น. หากชาวบ้านแม่พวกต้องการขึ้นรถไฟขบวนอื่นจะต้องไปที่สถานีรถไฟเด่นชัยซึ่งอยู่ห่างจากหมู่บ้านไป 10 กิโลเมตร

อาคารสถานีรถไฟแม่พวกวางขนานไปกับทางรถไฟในแนวเหนือใต้ผังพื้นอาคารเป็นรูปตัวเอช ลักษณะเป็นอาคารไม้ 2 ชั้นจำนวน 2 หลัง ระหว่างกลางของอาคาร 2 หลังนี้เชื่อมต่อกันด้วยโถงพักคอยชั้นเดียว โดยอาคารไม้ 2 ชั้น ทางทิศเหนือเคยเป็นที่ทำงาน ห้องนอน และห้องเก็บของนายสถานีส่วนอาคารไม้ 2 ชั้น ทางทิศใต้เคยเป็นที่ทำงาน ห้องนอน และห้องเก็บของ ผู้ช่วยนายสถานี โครงสร้างอาคารทั้งหมดเป็นไม้ตั้งอยู่บนฐานรากคอนกรีตเสริมเหล็ก พื้นชั้นล่างและชั้นบนเป็นไม้ ผนังอาคารแสดงโครงคร่าวไม้ที่ใช้รับไม้ฝาที่เรียงตามแนวนอนและต่อกันแบบเข้าลิ้นหลังคาปั้นหยามุงด้วยกระเบื้องลอนคู่ ประตูและหน้าต่างของอาคารเป็นบานลูกฟักไม้

สภาพอาคารสถานีรถไฟแม่พวกโดยทั่วไปอยู่ในสภาพปานกลาง โครงสร้างหลักของอาคารอยู่ในสภาพดี ประตูและหน้าต่างอยู่ในสภาพปานกลาง ห้องน้ำภายในอาคารอยู่ในสภาพทรุดโทรม รั้วไม้บริเวณโถงพักคอยมีองค์ประกอบไม่ครบถ้วน พื้นระเบียงชั้นสองมีสภาพทรุดโทรม บริเวณห้องโถงและห้องครัวที่ชั้นล่างอาคารทางทิศเหนือมีปัญหาเรื่องปลวก ผนังภายนอกของอาคารหลายแห่งมีช่องโหว่ทำให้ไม่สามารถป้องกันน้ำฝนและสัตว์เลื้อยคลานได้ รางระบายน้ำฝนสังกะสีและท่อน้ำฝนสังกะสีมีเฉพาะที่อาคารทางด้านเหนือแต่อยู่ในสภาพไม่พร้อมใช้งาน รอยต่อของหลังคาโถงพักคอยชั้นเดียวกับผนังภายนอกอาคารทิศเหนือและทิศใต้มีรูโหว่ทำให้ไม่สามารถป้องกันน้ำฝนได้อย่างมีประสิทธิภาพ ระบบประปาไม่สามารถใช้ได้แต่มีการเดินระบบไฟฟ้าใหม่สภาพพื้นที่โดยรอบอาคารอยู่ในสภาพปานกลางต้นไม้ส่วนใหญ่ได้รับการดูแลรักษาเป็นอย่างดี ลานกีฬาคอนกรีตด้านหน้าอาคารทั้ง 2 ลาน อยู่ในสภาพดีและมีการใช้สอยทำกิจกรรมอย่างต่อเนื่อง ห้องน้ำด้านหน้าอาคารมีสภาพทรุดโทรมและสกปรก ถังเก็บน้ำคอนกรีตทั้ง 3 ถังอยู่ในสภาพไม่พร้อมใช้งาน

อาคารสถานีรถไฟแม่พวกและพื้นที่โดยรอบมีคุณค่าทางประวัติศาสตร์และรูปแบบทางสถาปัตยกรรมเดิมที่มีคุณค่ายังปรากฏอยู่ซึ่งควรได้รับการดูแลรักษาด้วยเทคนิคและวิธีการที่เหมาะสม ดังนั้นแนวทางการอนุรักษ์และพัฒนาที่มีความเป็นไปได้คือ การเปลี่ยนประโยชน์ใช้สอยและการปรับปรุงฟื้นฟูโดยการผนวกกิจกรรมร่วมสมัยเข้ากับการใช้สอยอาคารในปัจจุบันซึ่งเป็นที่หยุดรถไฟ สำหรับกิจกรรมใหม่นั้นควรมาจากความเห็นร่วมกันของผู้ที่เกี่ยวข้องทุกฝ่ายและควรมีคุณค่าทางเศรษฐกิจมากพอที่จะรักษาอาคารนั้นไว้ได้โดยไม่ต้องพึ่งงบประมาณในการดูแลรักษาจากการรถไฟแห่งประเทศไทยมากนัก

อย่างไรก็ตามแนวทางการอนุรักษ์และพัฒนาอาคารสถานีรถไฟแม่พวกและพื้นที่โดยรอบจะสามารถดำเนินการได้ก็ต่อเมื่อผู้จัดทำแผนการอนุรักษ์และพัฒนาได้ตระหนักถึงความสำคัญและคุณค่าในด้านต่าง ๆ รวมทั้งควรมีนโยบายการพัฒนาอาคารและพื้นที่โดยรอบ มีมาตรการควบคุมการเปลี่ยนแปลงที่ชัดเจนและเป็นรูปธรรม โดยการจัดทำแนวทางการต่อเติมอาคารและการใช้ประโยชน์ภายในและภายนอกอาคารรวมทั้งสนับสนุนเงินทุนและวัสดุในการดูแลและซ่อมแซมอาคารด้วย.

เรื่องและภาพโดยนายปริญญา ชูแก้ว
คณะสถาปัตยกรรมศาสตร์ สถาบันเทคโนโลยีพระจอมเกล้าเจ้าคุณทหารลาดกระบัง

กฐินสามัคคี...ไม่พึ่งรัฐเราก็ทำได้

เพื่อปรับปรุงฟื้นฟูอาคารสถานีรถไฟแม่พวก อ.เด่นชัย จ.แพร่

วันอังคารที่ 14 ตุลาคม พ.ศ. 2557

Donation for Mae Phuak Railway Stop Rehabilitation in October 14, 2014

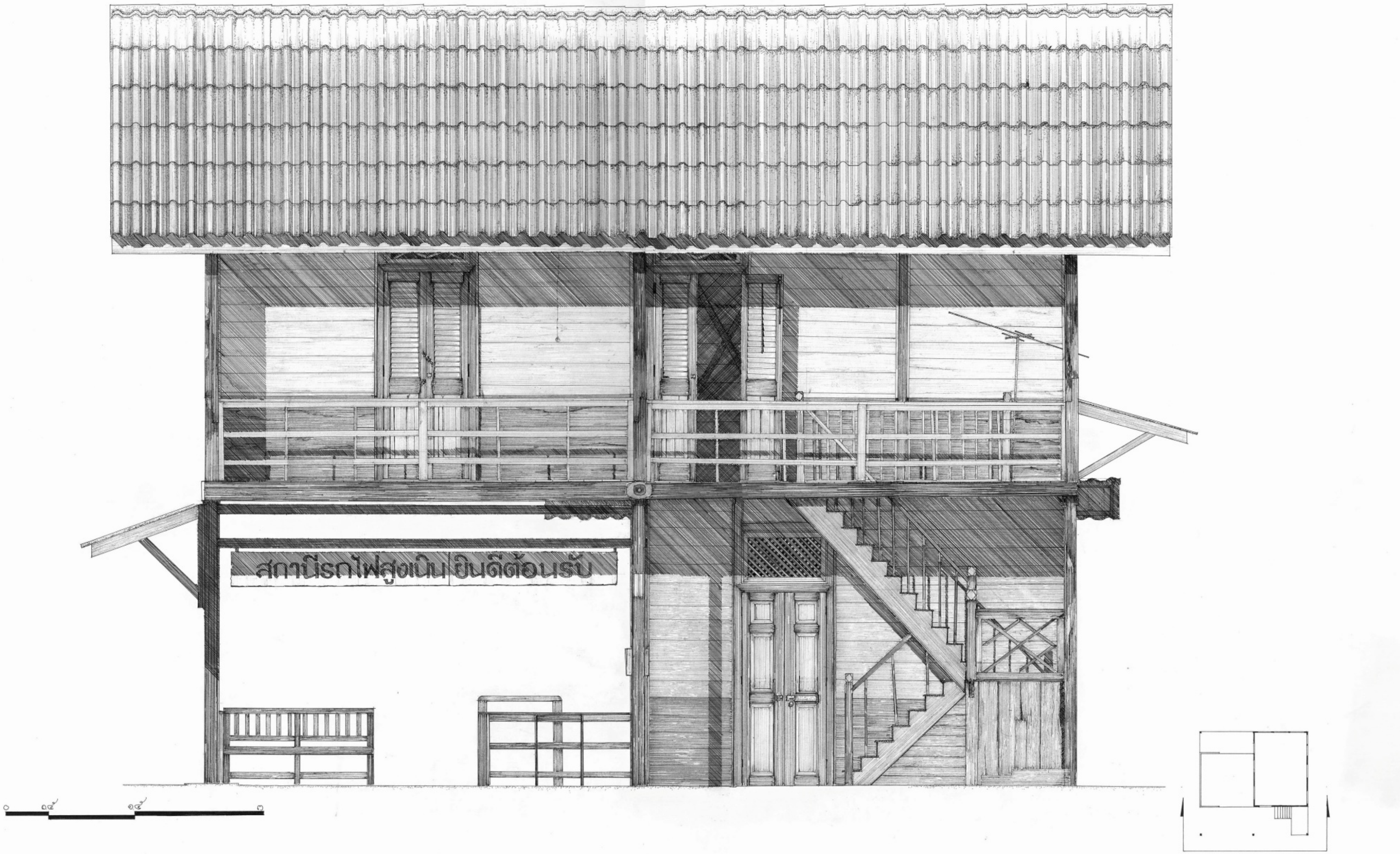
Mae Phuak Railway Stop in April 2, 2015

Thai Public Broadcasting Service in March 16, 2016

Mae Phuak Railway Stop in January 20, 2019

Mae Phuak Railway Stop in January 20, 2019

VERNADOC Camp at Sung Noen Railway Station in July 2015



อาคารสถานีรถไฟสูงเนิน อำเภอสูงเนิน จังหวัดนครราชสีมา ประเทศไทย รูปด้านทิศใต้ มาตราส่วน ๑:๒๕ โดย นางสาว มธุรส นาคมานนท์ สาขาครุศาสตร์สถาปัตยกรรม สถาบันเทคโนโลยีพระจอมเกล้าเจ้าคุณทหารลาดกระบัง วันที่ ๒๒ กรกฎาคม พ.ศ. ๒๕๕๘

SUNG NOEN RAILWAY STATION BUILDING, SUNG NOEN DISTRICT, NAKHON RATCHASIMA PROVINCE THAILAND, SOUTH ELEVATION SCALE 1:25, BY MISS MATHUROS NAKMANON ID.ED.ARCH KING MONGKUTS INSTITUTE OF TECHNOLOGY LADKRABANG, 22 JULY 2015

VERNADOC Camp at Sung Noen Railway Station in July 2015

VERNADOC Camp at Sung Noen Railway Station in July 2015

Sung Noen Railway Station in February 2019

Sung Noen Railway Station in February 2019

Donation for Roof Repairing in February 2019

เมื่อรถไฟทางคู่กำลังจะมา.....แล้วอนาคตของ

อาคารสถานีรถไฟที่มีคุณค่าจะเป็นอย่างไรครับ.....

Saving Railway Station Buildings form SRT Double Tract Railway Project

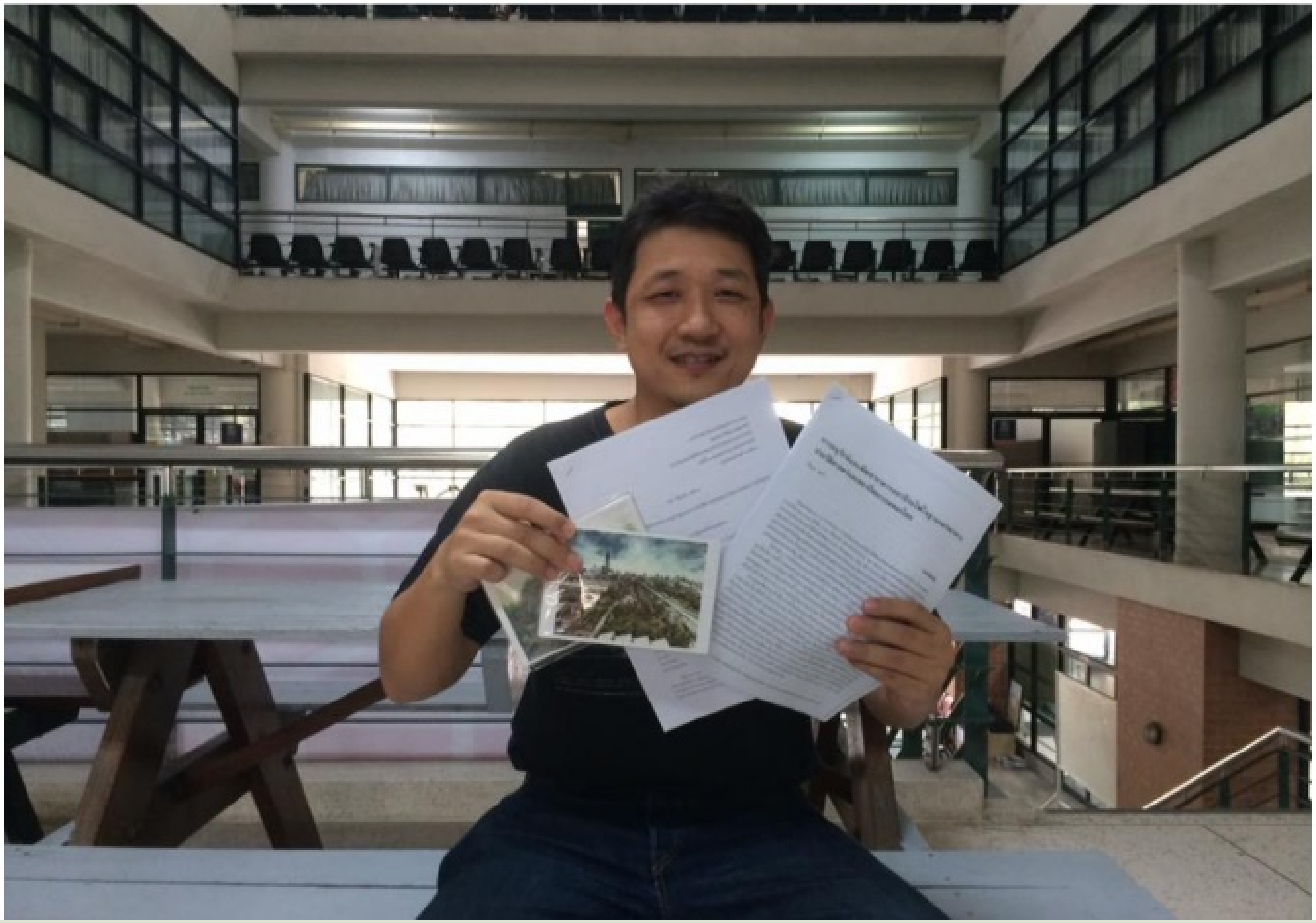
Saving Railway Station Buildings form SRT Double Tract Railway Project

- 187 kilometers from Tanon Jira Junction Station to Khon Kaen Station
- 19 Railway Station Buildings, 2 will be saved and 17 will be demolished

อ.สถาปัตย์ลาดกระบังส่งจม. "วิงวอน" บิ๊กตู่ เบรกรื้อ อาคารสถานีรถไฟเก่า ชี้เป็นโบราณสถานของชาติ

วันที่ 23 มีนาคม 2560 - 20:27 น.

Facebook Twitter Google+ LINE



Sending a letter to Prime Minister of Thailand

Saving Railway Station Buildings form SRT Double Tract Railway Project
- 15 station buildings are saved

Saving Railway Station Buildings form SRT Double Tract Railway Project
- 15 station buildings are saved

Conservation Guidelines and Recommendations

- **Proper plan, sufficient budget, a transparent consideration system, clear roles set up for responsible personnel, and appropriate rules and regulations should be established**

- **Education and awareness – raising opportunities on the importance of the railway stations should be continued**

Conservation Guidelines and Recommendations

- **Various treatments suitable for preserving the historic structures and sites should be introduced**
- **The implementation of treatments with sufficient budget and support should be practiced**
- **Control changes to conserved areas and help avoid inappropriate development**

Benchmarking

- Making the railway stations as a local cultural heritage site
- Integration of conservation plan & local comprehensive town plan & local tourism plan
- Establishment of community conservation group registered to the local government to safeguard their heritage resources

Historic Preservation Planning

Stage 1

IDENTIFICATION

- Identify
- Record
- Preliminary Assessment

Criteria

- History
- Archaeology
- Architecture
- Age

Stage 2

TREATMENTS

- Protection
- Preservation
- Restoration
- Rehabilitation
- Reconstruction
- Relocation
- Interpretation

Criteria

- Test of authenticity
- Assessment of integrity

Stage 3

IMPLEMENTATION

- Development Guideline
- Law
- Actual Repair
- Review Board
- Incentive

Criteria

- Budget
- Government Policy
- People organization

Who Values the Heritage of the SRT?

Appendix 8 - *The Conservation & Development of Railway Station Buildings as Historical & Architectural Heritage of Thailand*

Parinya Chukaew

Appendix 9 - *Dynamic Preservation and application of Alishan Forest Railway – full 360 degree view record*

Shih-Chuan Huang

科技於文化資產保存應用：
阿里山林業鐵路動態保存與運用全線360度環景紀錄
Dynamic preservation and application of Alishan Forest Railway - full 360-degree view record

國立臺北藝術大學 建築與文化資產研究所
Graduate Institute of Architecture and Cultural Heritage, Taipei National University of the Arts
黃士娟 副教授 Shih-Chuan Huang
陳柏良 研究員 Bo-Liang Chen

前言Foreword

- 「文化資產保存」以**建築**、**文物**等為開端，採取**凍結式**、**靜態**的保存方法，並日益發展為有技術、法規支持的系統。
- "Cultural Assets Preservation" begins with architecture, cultural relics, etc, which take a frozen and static method on preservation, and gradually develops support systems with technique and legislation.
- 隨著時代推移，各種不同的種類、背景與核心精神的文化資產出現，保存的觀念與範疇也日益擴張，而難以用原有的技術應對。
- To accompany with times change, cultural assets of various kinds, backgrounds and core spirits appear, and the concept and scope of preservation are also expanding which is difficult to deal with the initial technology.
- 與阿里山林業鐵路相關的「**文化景觀**」、「**產業文化資產**」、「**動態保存**」、「**文化路徑**」等，都是因此而生的新觀念，所牽涉的技術、法規、視野、專業益加廣泛，難以單由「**文資保存**」獨立支撐。
- "Cultural landscape", "industrial cultural assets", "dynamic preservation", "cultural path", etc. are new ideas related to the Alishan Forest Railway, and the technology, regulations, vision, and profession involved are wide, so that there are difficult to support independently by “cultural assets preservation”.
- 如何與不同專業溝通？如何獲取各種領域的技術支持？成為此類型文化資產保存操作實務上的重大課題。
- How to communicate with different professional people? How to get technical support in various fields? That will become significant issues in the practice of preservation of this type of cultural assets.

1.文化景觀下的阿里山林業鐵道
Alishan Forest Railway under the cultural landscape

- 2011年成為縣市級之文化景觀ー阿里山林業暨鐵道文化景觀（縣）、北門驛與阿里山森林鐵道（市）。
- In 2011, it became a cultural landscape at the county and city level-
- Alishan Forest Railway Culture Landscape（county）、Beimen station and Alishan Forest Railway(City)。
- 2012～2014年，執行「阿里山鐵道文化景觀基礎調查研究暨保存維護計畫」。
- From 2012 to 2014, the Alishan "Railway Cultural Landscape Basic Research and Storage and Maintenance Project" was implemented.
- 2019年將成為全國首例重要文化景觀-「阿里山林業暨鐵道文化景觀」。
- In 2019, it will become the first important cultural landscape in the country - Alishan Forest Railway Culture Landscape.

- 阿里山擁有**豐富的森林資源，多元的動植物生態**與特殊的**山形地勢**，為原住民**鄒族的傳統生活領域**，歷來都是不同族群生活活動的場域。明治時期的官營林場計畫，促使阿里山林場成為**台灣近代營林事業的開端**，進而開展出日治時期臺灣三大官營林場的輝煌事業。
- Alishan has rich forest resources, diverse ecology of the species and special mountain-shaped topography which are traditional living areas of the aboriginal Tsou and a field of life for different ethnic groups. In terms of official forest farm plan during the Meiji period, make Alishan Forest Farm become the beginning of Taiwan's modern forest management so that there are brilliant development of three official forest farms in Taiwan during the Japanese-Occupied Period.
- 阿里山林場開發後，先以從事**林業生產為主、並輔以育林及造林的環境**，近年則發展成為**保護森林**及**旅遊休閒**的地區，見證近代伐木產業逐漸轉型為**觀光產業**的聚落紋理，完整地展現出林業各階段及景觀的活動特質。
- After the development of the Alishan Forest Farm, the environment is mainly engaged in forestry production, supplemented by the environment for nurturing forest and afforestation, recently, it has developed into forest-protected, tourism, and leisure area. It had been witnessing the transformation of the modern logging industry into a tourism industry and it had completely demonstrated the characteristics of the various stages of forestry and the landscape.

1-1範疇的擴張—以登錄重要文化景觀理由為例

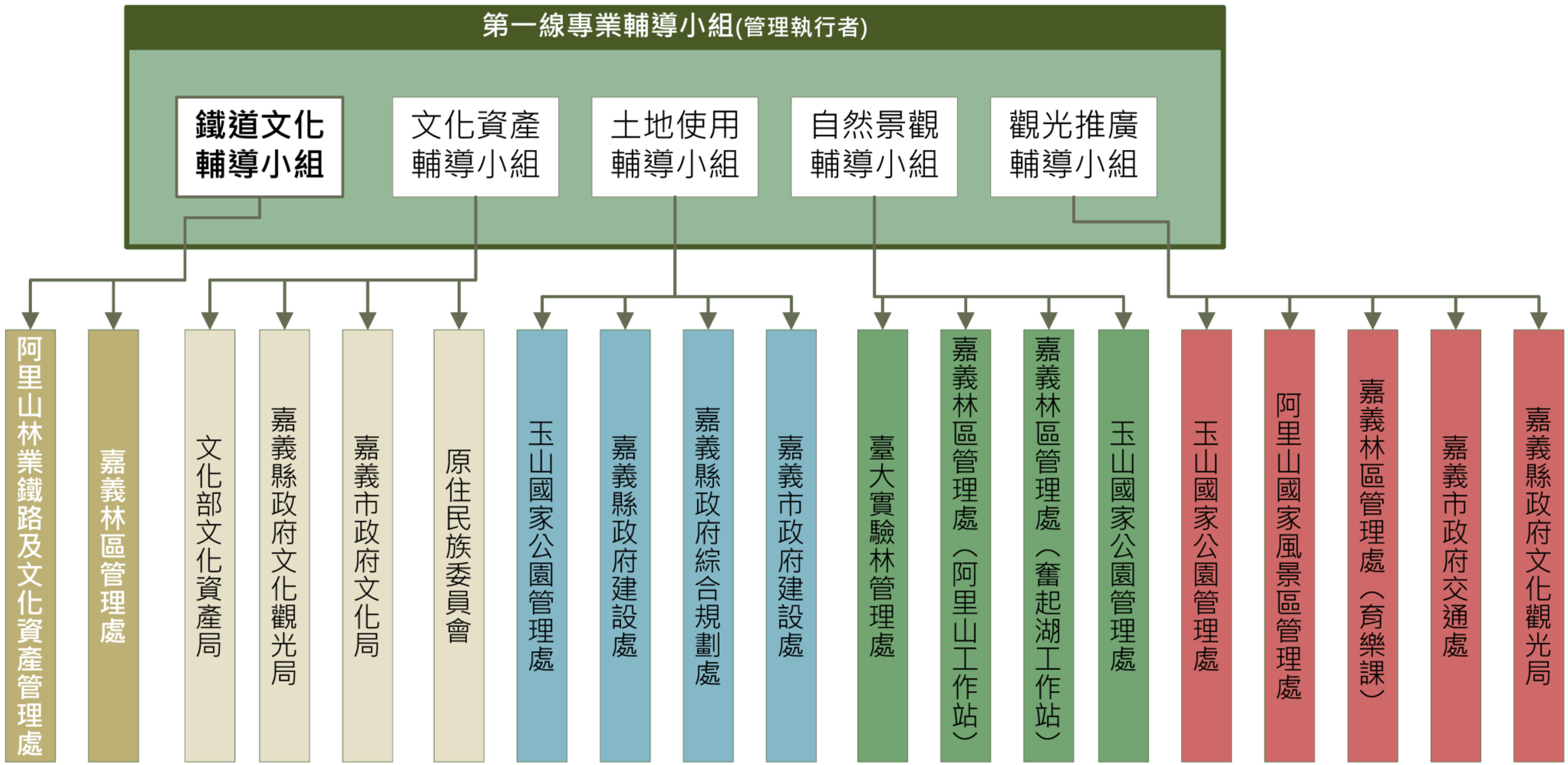
The expansion of scope - Take the example of applying important cultural landscapes

- 以林業鐵道作為主要運輸工具的阿里山林場，保存了平地至高山之登山鐵路完整發展歷程，其鐵道技術包含各式火車登山的**路線工法**與運行方式，並使用特殊的**直立汽缸Shay式蒸汽機車**，為臺灣僅存見證二十世紀初索道運材技術發展成熟前之林業鐵道特色。
- The Alishan Forest Farm, which uses forest railways as its main transportation, preserves the entire development of mountaineering railways from plains to mountains. Its technology includes the route and operation of various railways, and it uses a unique Shay Geared Locomotive which only witnesses the characteristics of forest railway before the development of cableway transportation technology in Taiwan early 20th century.
- 因阿里山林業鐵道的串聯，形成了**沿線土地使用**的興起及以木材為**城市景觀風貌**的基礎，特別是嘉義北門車站周邊的**製材遺構與鐵道維修基地**，與中途的奮起湖及沿線聚落的形成，其林業與相關人文自然遺跡，呈現出其歷史與文化發展特色。
- Due to the connection of the Alishan Forest Railway, it brings the rise of land use along the line and the basis of the wooden urban landscape, especially for the material structure and the railway maintenance base around the Beimen station in Chiayi. Also, the formation of the Fenqi Lake and the settlements along the railway, as well as forestry and related humanistic natural remains presents historical and cultural development characteristics.

1-1範疇的擴張—以登錄重要文化景觀理由為例

The expansion of scope - Take the example of applying important cultural landscapes

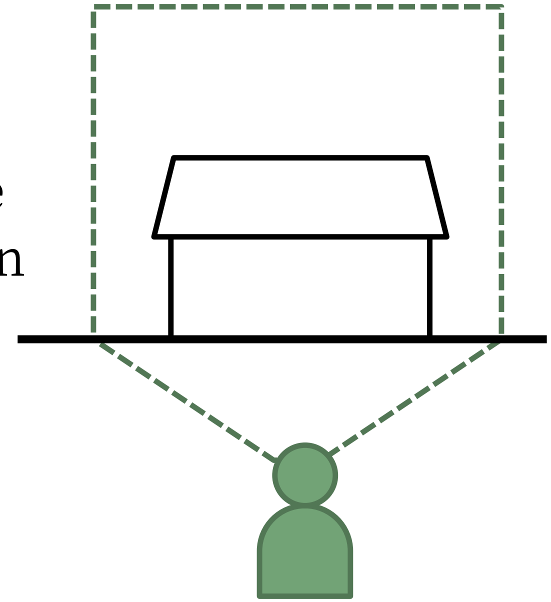
- 未來將會成為五大領域、19個以上之管理組織之競合的文化資產。
- In the future, it will become a cultural asset of management under five major fields and more than 19 management organizations.

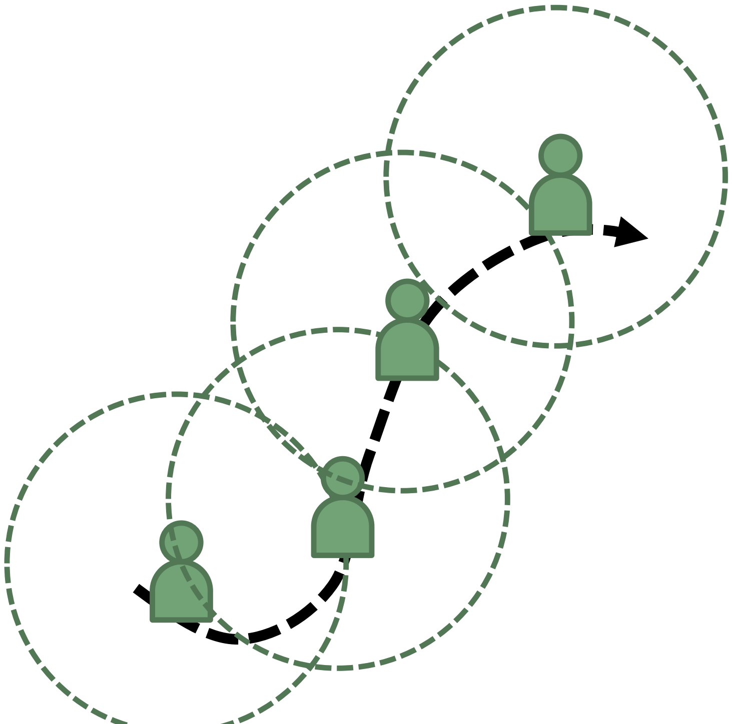


1-2 範圍的界定—線型文化資產的視野差異

The definition of scope - Visual differences of linear cultural assets

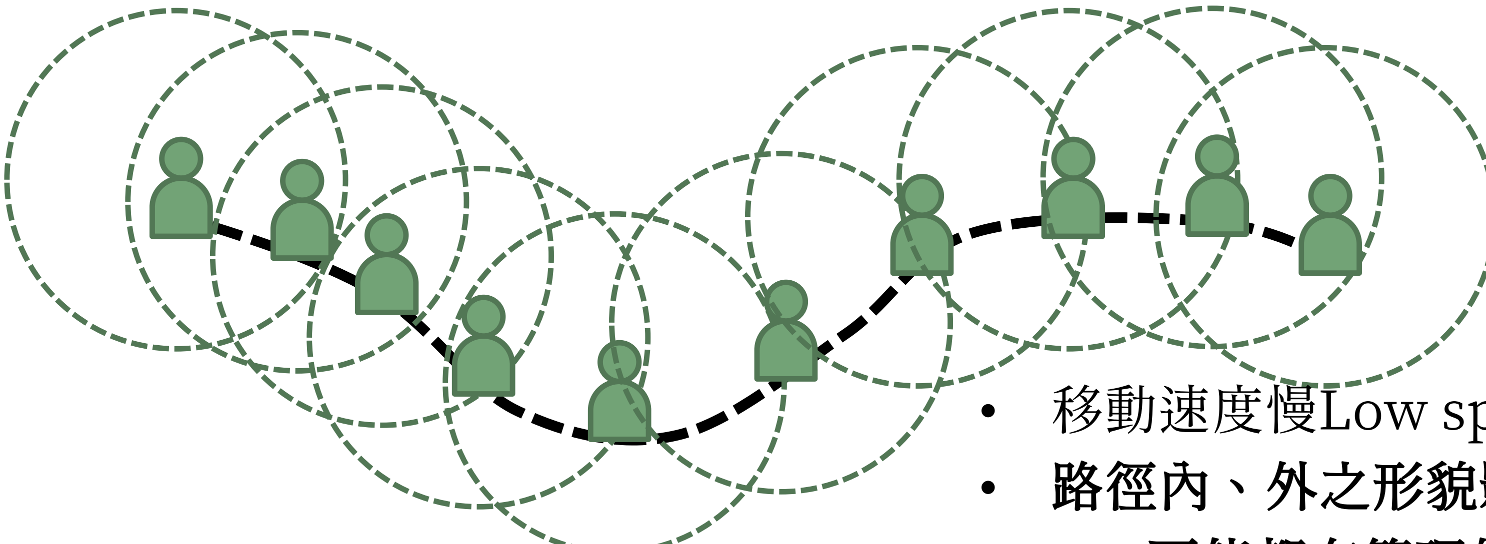
- **「點」狀文化資產的緩衝區視野**
  Buffer view of "point" cultural assets
  - 向「文化資產」看去Viewpoint of cultural asse
  - 重視文化資產本體的保全Value the preservation of whole cultural assets





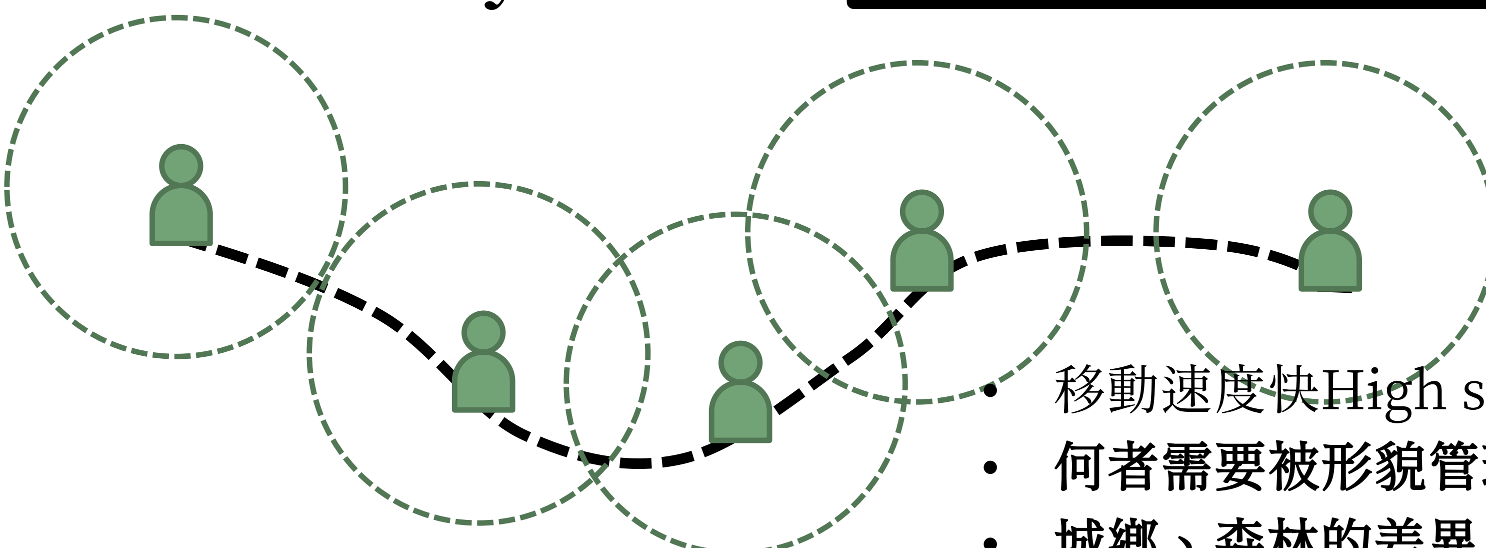
- **阿里山林業鐵道的緩衝區視野**
  Buffer view of Alishan Forest Railway
  - 從「文化資產」向外看Prospect from cultural ass
  - 重視周遭環境的保護Value protection of the surrounding environment

● 古道Historic Trail



- 移動速度慢Low speed
- **路徑內、外之形貌影響力皆強**
  → 可能都有管理的需要

● 鐵道Railway



- 移動速度快High speed
- **何者需要被形貌管理？**
- **城鄉、森林的差異與管制範圍?**
  → 需要可以深入討論的工具

2.動態保存下的阿里山林業鐵道

Alishan Forest Railway under dynamic preservation

- 以**《里加憲章》**為開端，為對應過去「靜態保存」無法解決之議題而發展出的觀念，主要目標在維持**近代機械類文化資產**的運作。
- Starting with the Riga Charter, the concept developed for the issues that cannot be solved by the past "static preservation" ,and it aim to maintain the operation of modern mechanical cultural assets

- 阿里山林鐵自2016年開始進行**「動態保存觀念建置」**，嘗試理解「鐵道運作」與「文化保存」等專業間的競合議題，並進行協調。
- Since 2016, "Dynamic preservation concept building" has been carried out in Alishan Forest Railway, and it try to understand and coordinate the issues between "railway operations" and "culture preservation"

木枕…
是不是文化資產要素？
Is sleeper a cultural asset element?

蒸汽機關車可以排放廢氣嗎？
How is emission allowance for steam train?

2-1 文化保存與其他領域的討論
Cultural preservation and discussion in other fields

- **運作中的鐵道與其他文化景觀的差異**
  Differences between the railway in operation and other cultural landscapes
  - 隨著時代、規章、機具、零件、設備的改變，鐵道必然會被要求擁有更高的「安全標準」。
- **「安全標準」與「文化保存」間的界線為何？**
  What is the boundary between "safety standards" and "culture preservation"?
  - 以世界遺產鐵道來看，會發現印度高山鐵道偏向原汁原味的**「文化保存」**，而瑞士與奧地利則傾向**「安全標準」**。

世界遺產

原始
文化
歷史

現代
安全
效率

- **文化與安全真的彼此衝突嗎？**

●目前我國社會大眾的討論中，對「鐵路安全」之定義較為狹隘。
The definition of "railway safety" is relatively narrow in the discussion of the public in our country.

●工作的安全
Work safety
↑
作業範圍？
工作方式？

●乘客的安全
Passenger safety
↓
更新零件規格

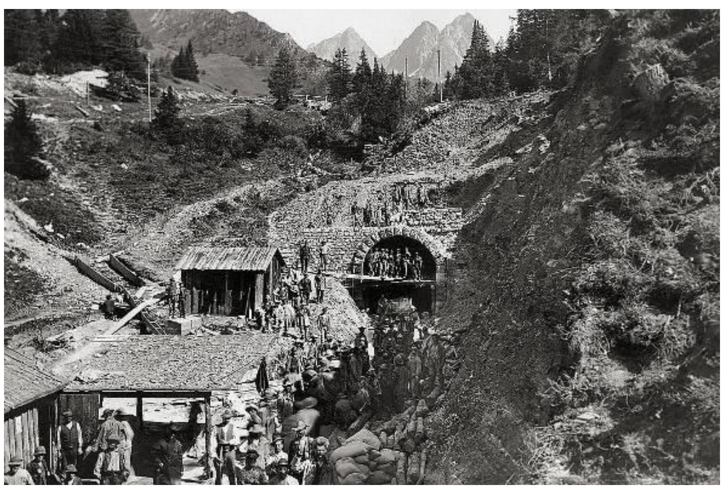
●環境的安全
Environmental safety
↑
砍樹？
開闢施工便道？

- 現有的零件不只具有文化價值，也蘊含與林業鐵路工作、環境相關的訊息。
- Existing components not only have cultural values, but also contain information related to work and environment in forest railway
- 更換零件，可能也必須一併更新**施工**、**材料的運送方式**、連帶的**其他零件**、**車輛設備**與**操作方式**….
- Replacement of components may also need to be updated with the construction, the transportation of the materials, the associated components, the train equipment and the way of operation.
- 零件更新議題，不該侷限「**樣貌**」的討論。
- Issues of updating components, should not be restricted only in the discussion of "appearance"
- 應蒐集更多的「**內涵資訊**」與「**環境的關連性**」，如此也能使營運達到最為完整的「**安全性**」保障。
- More "connotation information" and "environmental relevance" should be collected so as to enable the operation to achieve the most entire "safety" protection.

2-2 從瑞士世界遺產鐵路來看實務問題（動態保存第一期計畫）
Practical issues from the Swiss World Heritage Railway (First phase plan in dynamic preservation)

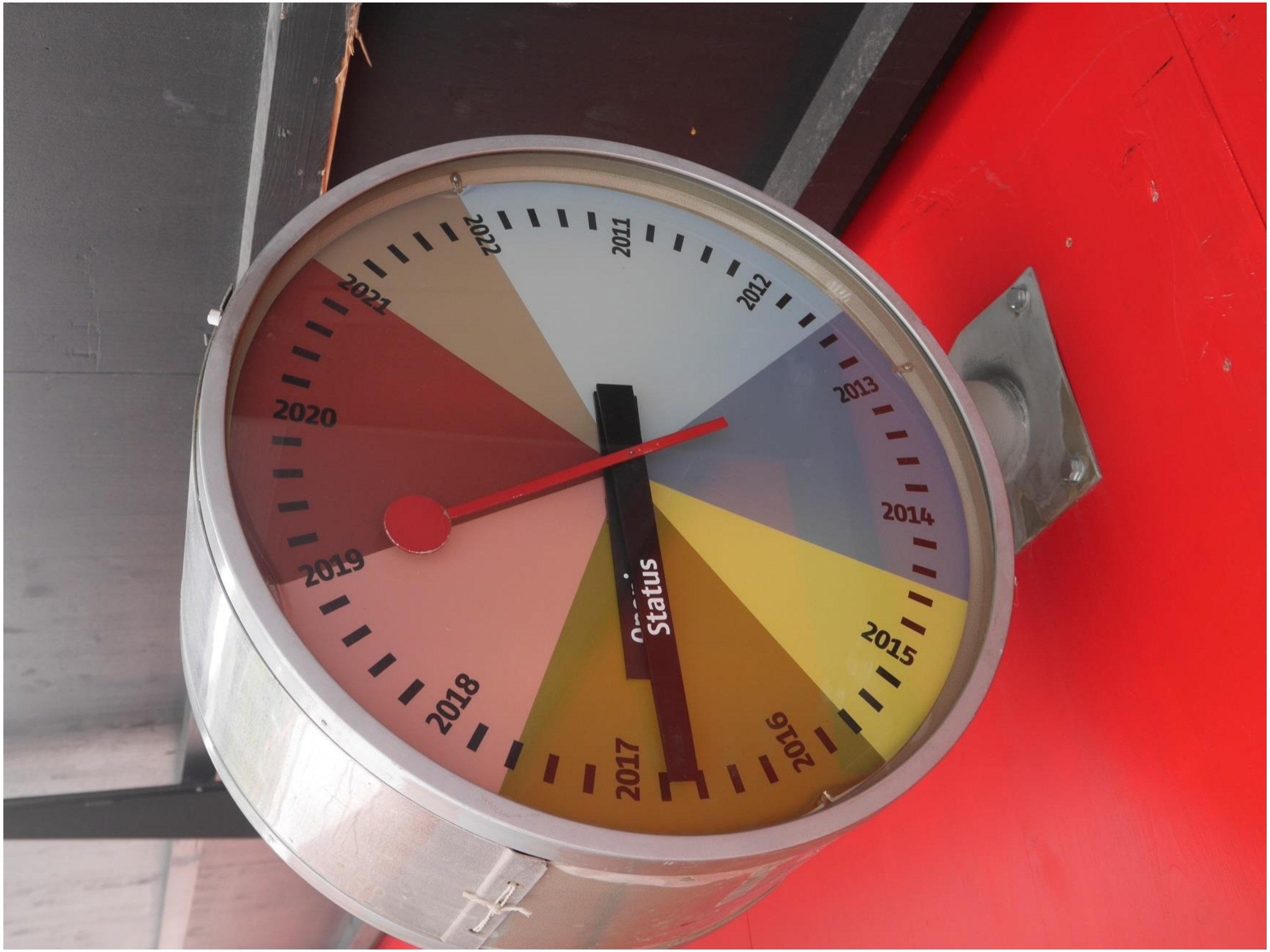
- 以瑞士RhB鐵道公司管理的**世界遺產**（2008）「阿爾布拉－伯連納線」（Albula/Bernina Line）現正執行**Albula隧道**新建改線計畫討論。
- World Heritage managed by Swiss RhB Railways(2008) “Albula/Bernina Line” get involved in discussion on the implementation of the new rebuilding plan for the Albula tunnel

– **1899年**舊隧道施工，環境危險導致16人死亡，至1903年通車
– 穿越的山脈上有湖泊，導致隧道內易滲水，長年有**安全疑慮**
– 2009年RhB公司進行規劃，在~
  原隧道加固（2,000萬CHF）
  挖掘新隧道（2億6000萬CHF）之間**2 選1**，後者勝出。

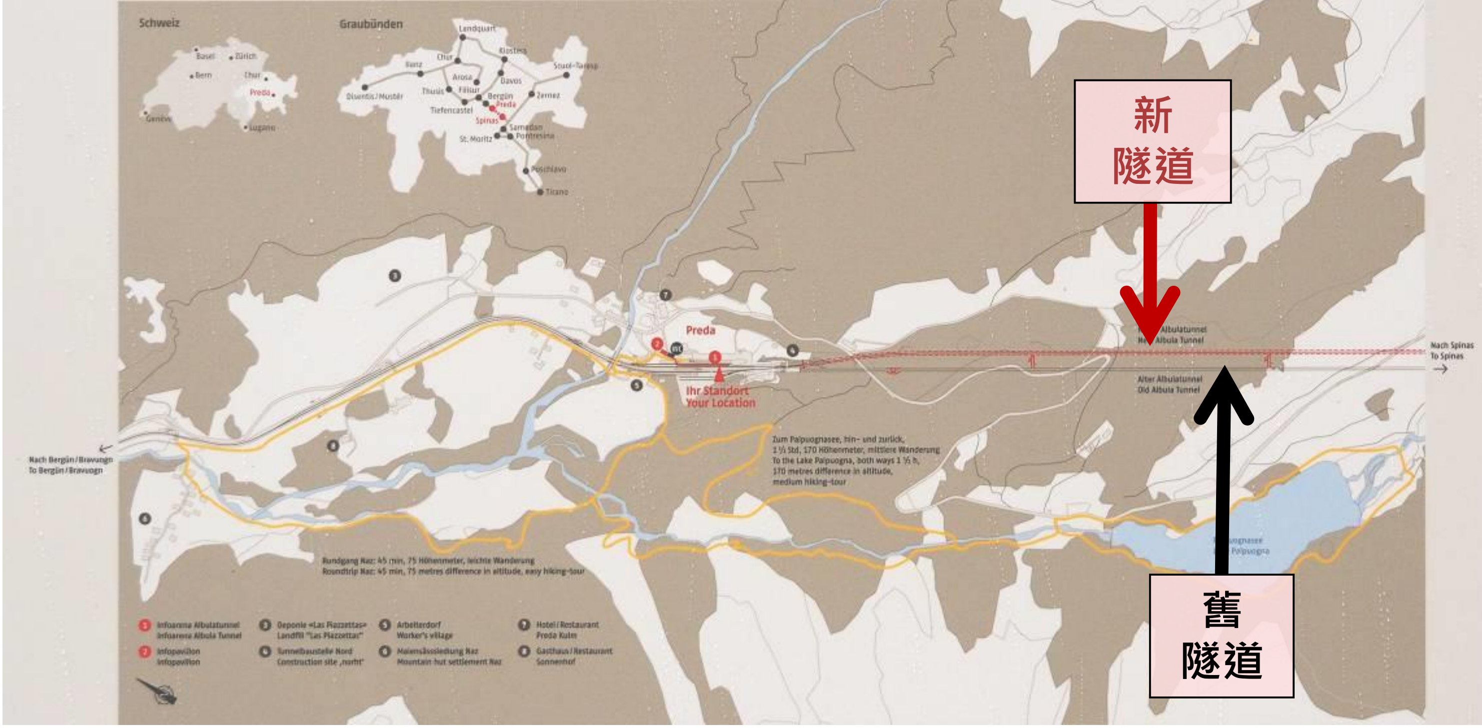



RhB官網，https://www.rhb.ch/de/unternehmen/projekte-dossiers/neubau-albulatunnel/rueckblick

舊隧道試爆
與殉職者紀念碑



規劃時間：5.5**年**（2010年 - 2015年）Planning time : 5.5 Years (2010-2015)
施工時間： 6.5年（2015年秋季～預計2022年完工）－－－合計12年
Construction time : 6.5 Years (2015, Fall - 2022) — Total 12 years

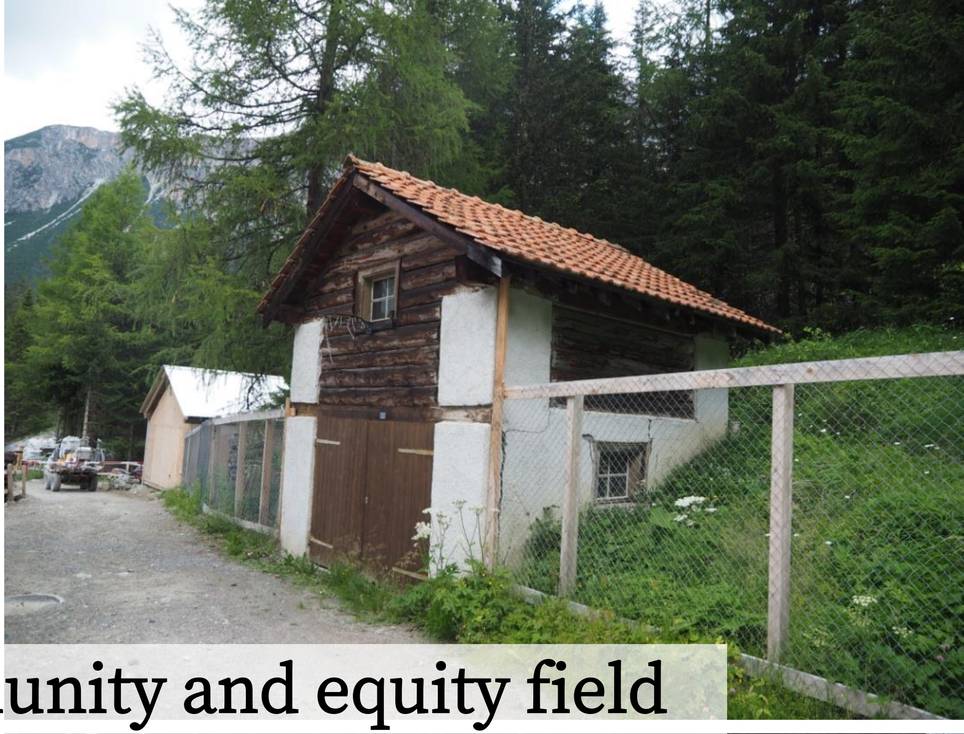


- **文化領域Cultural field**
  - 舊隧道被保證轉作逃生通道，並持續維護。
  - The old tunnel is guaranteed to be converted into an escape route and maintained continuously

RhB官網/現地展示
https://www.rhb.ch/de/unternehmen/projekte-dossiers/neubau-albulatunnel/der-neubau/zahlen-fakten

- **環境領域Environmental field**
  - 挖掘出的石料需分類，「作為混凝土回填」、「周邊堆置融入自然」
  - Excavated stone should be classified as concrete backfill or stack into nature.

鑽探試體

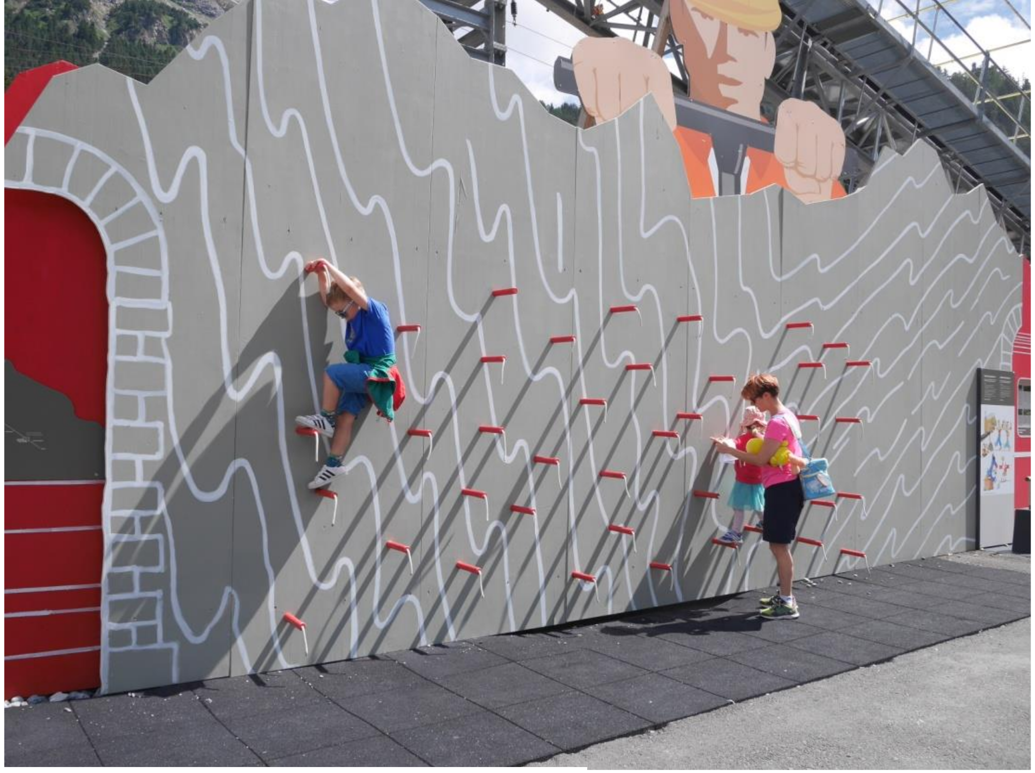


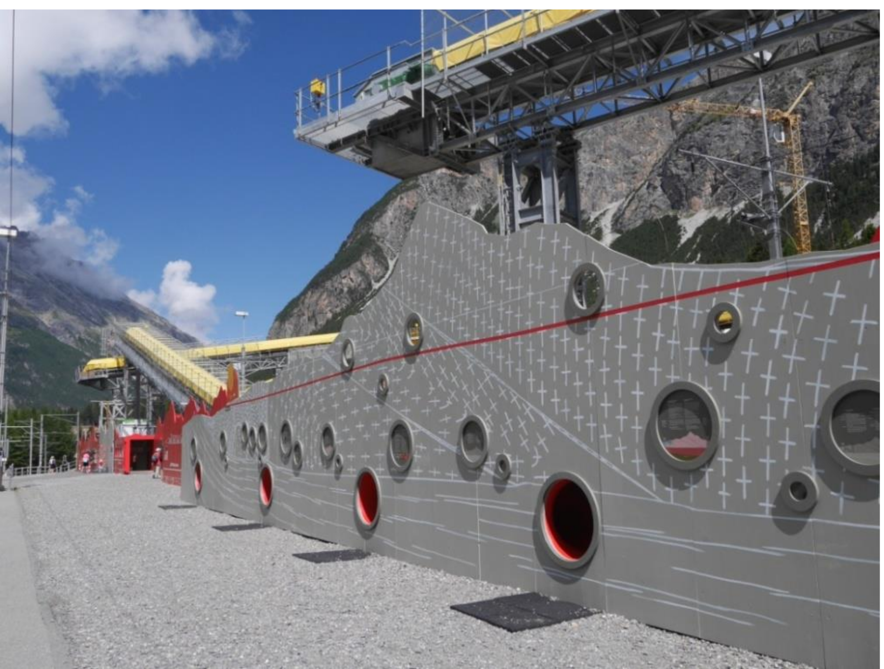
●社區與權益領域Community and equity field

- 民眾建築（非文資）完整搬遷至工地外，工程後搬回。
- 工程繞道，避開民居。

●經濟領域Economic field

- 在站點的販賣機中，刻意販售在地的農、牧加工產品，並分享公司的商標(阿爾布拉隧道LOGO)。
- In the vending machines at the station, agricultural and animal husbandry processed products are sold on the ground and share the company's trademarks. (Albula tunnel LOGO)





● **觀光領域**

Tourism Field

- 施工圍籬成為一種文化、遊憩場域。
- 在漫長工程期間，維持遊客前往此地的理由。


ARGE Frischbetonwerk AROSA


Gemeinde Bever
Bever municipality
Engadin St. Moritz


Parc Ela
hätische Bahn
Ferienregion
Engadin St. Moritz
Engadin St. Moritz
holiday region

施工圍籬
Construction fence

安全防護
Safety Protection

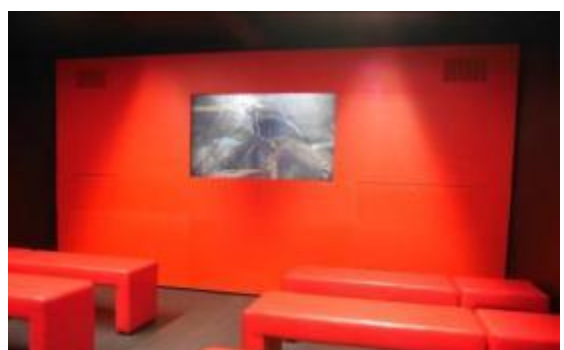
展示教育
Display education

工程參觀Project visiting

更加的...Extra

- RhB世界遺產專員策劃，將工程轉化成為世界遺產的一環。World Heritage commissioners in RhB plan to transform the construction into a part of the world heritage

親子活動Family events



多媒體介紹
Multimedia introduction

遊戲問卷
Game questionnaire

- 基礎資料的充實Various basic materials and datas
  - 瑞士世界遺產鐵道管理者－RhB鐵道的車輛維修資料
  - Swiss world heritage railway manager- RhB railway maintenance information
  - 保存歷來所有車輛（含零件）資料，修復前討論更改零件是否會造成新的問題。
  - Store all historical trains (including components) information, and make sure that changing components will not cause new problems before repairing.


RHB
Firma
28000
Nur noch gültig mit Ae-Index
Zchgs-Original nicht vorhanden
ZfW
MICROBOX CH 8108 Dällikon
Ersatz für:
Ersetzt durch:


«sichtbar?»

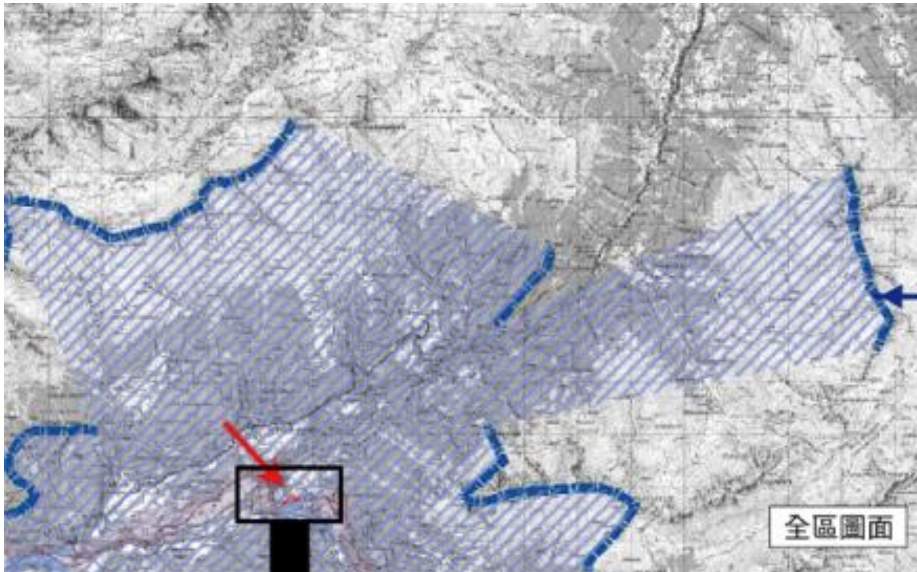

X rot et 9218-9219 Mech. Teil
Ge 4/4 611-620
Elek. Teil / Mappen 1-20
X rot int 9217 Mech. Teil
SANDA
MFO / BBC 500 000 …
AEBI

- 車輛、工作場域、路線經常更新規格，但都同時滿足乘客、工安與環境的安全與文化價值。
- Trains, workplaces, and routes are frequently updated, but meet the requirements for safety and cultural values of passengers, safety, and the environment.

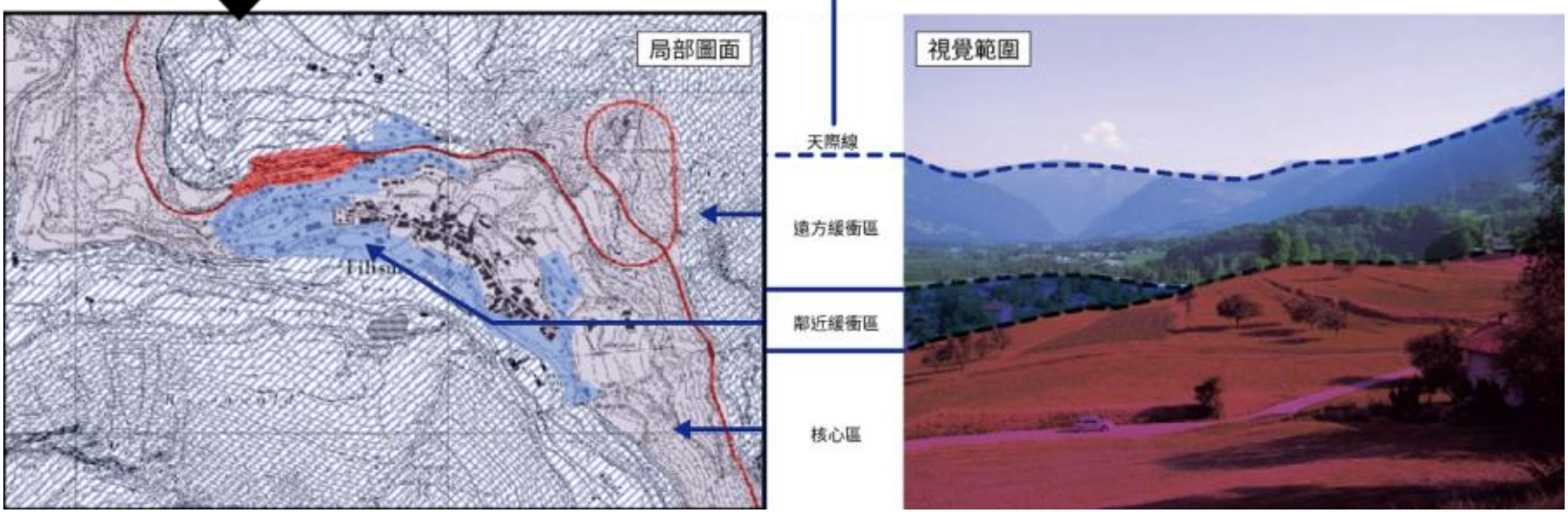
r retica
RhB Ferrovia retica
2
1

- 自主性研發檢測設備、零件規格，確保新技術、零件吻合環境特色與需求。
- Independent research and development of testing equipment and components specifications to ensure that new technologies and components match the environmental characteristics and needs.


KARL DEUTSCH



2-3
閱讀世界遺產
核心緩衝區劃設方式
Understanding the layout of world heritage core buffer



2-4 從文化景觀到動態保存（第一期）的成果
Results from cultural landscape to dynamic preservation (first phase)

- 基礎調查的逐步建置
- Gradual implementation of basic investigation

- 諸多議題的發掘與討論
- Discovering and discussion of many issues

- 國際上務實的操作方式蒐集
- Collecting internationally pragmatic operation methods

- 法規制度與實際執行的衡量
- Balance between legislation system and actual implementation

- 不同專業領域的對話嘗試
- Dialogue in different professional fields

3.阿里山林鐵全線360度環景紀錄
Alishan Forest Railway 360-degree scenery record

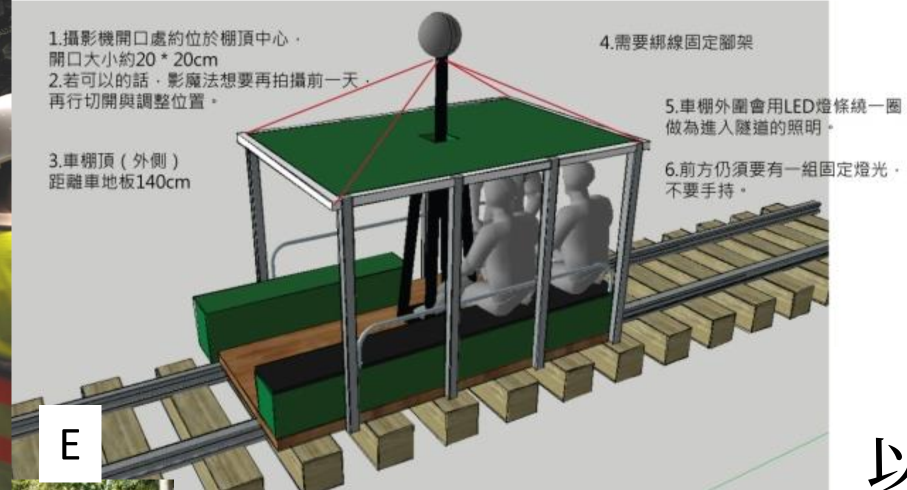
- **目標在於解決現有的議題Solve existing issues**
  - 現有工具使用上的問題
  - The problems with the use of existing tools

  - 現有工具無法有效解決問題的原因
  - The reasons why existing tools cannot effectively solve the problem

- **但多設想了「下一步」…One more step and thought**
  - 新的工具會引起的效應
  - The effect of new tools

  - 未來可能新需求的預設
  - Prediction of possible new needs in the future

D



E

F

E

F

G

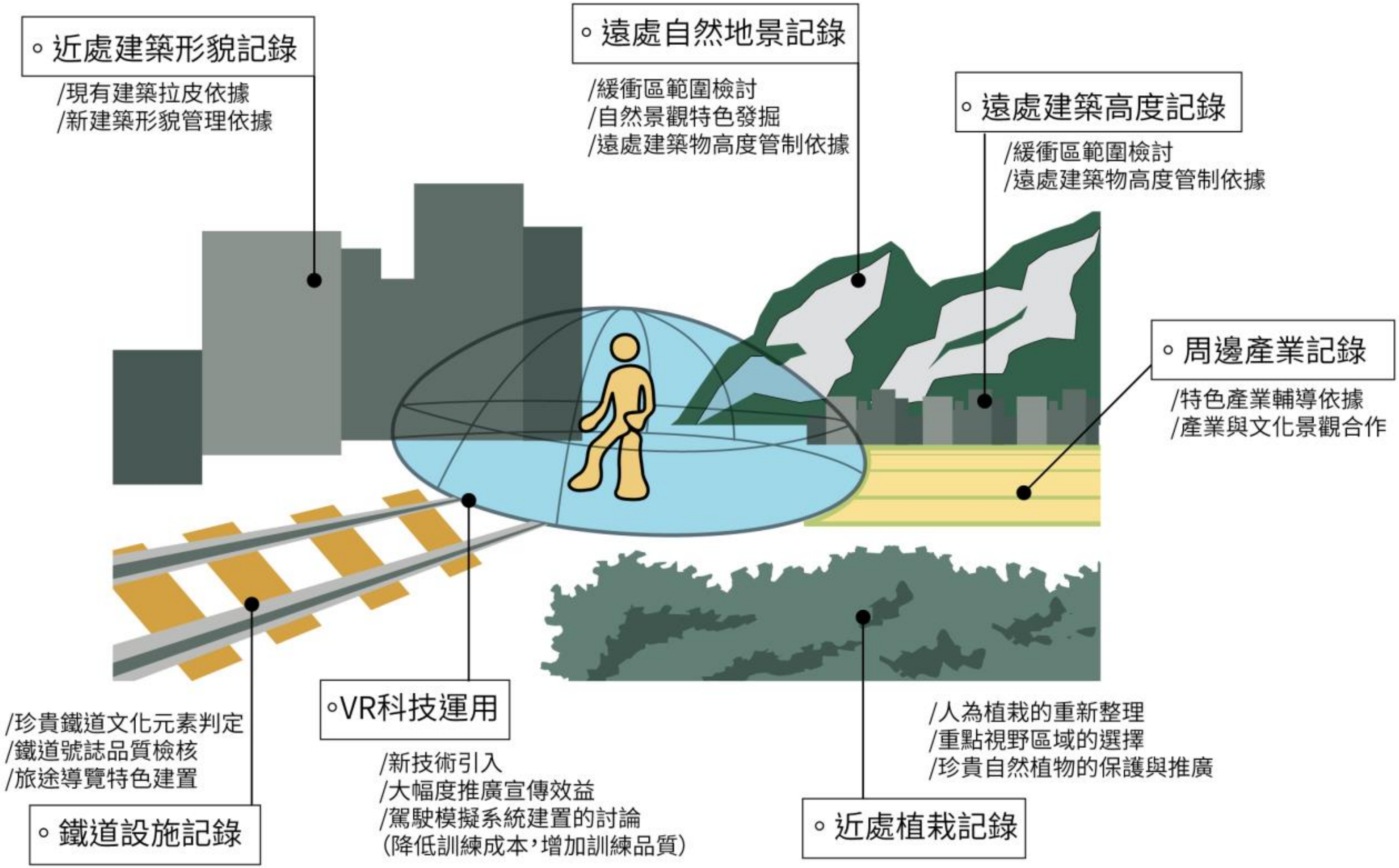
3-1 以VR技術進行基礎資料蒐集

Collecting the basic datas by VR technology.

A. 提出初步構想
B. 團隊組成安排
C. 完整計畫提案
D. 現場勘查
E. 輔助設備準備
F. 拍攝前細節計畫
G. 現地拍攝
H. 局部初步後製
I. 全段簡易後製
J. 後續公開計畫

A. 提出初步構想First idea

- 「為什麼」要拍？Why shooting?
- 「為誰」拍攝？For whom?
- 拍攝成果「誰可以」運用？

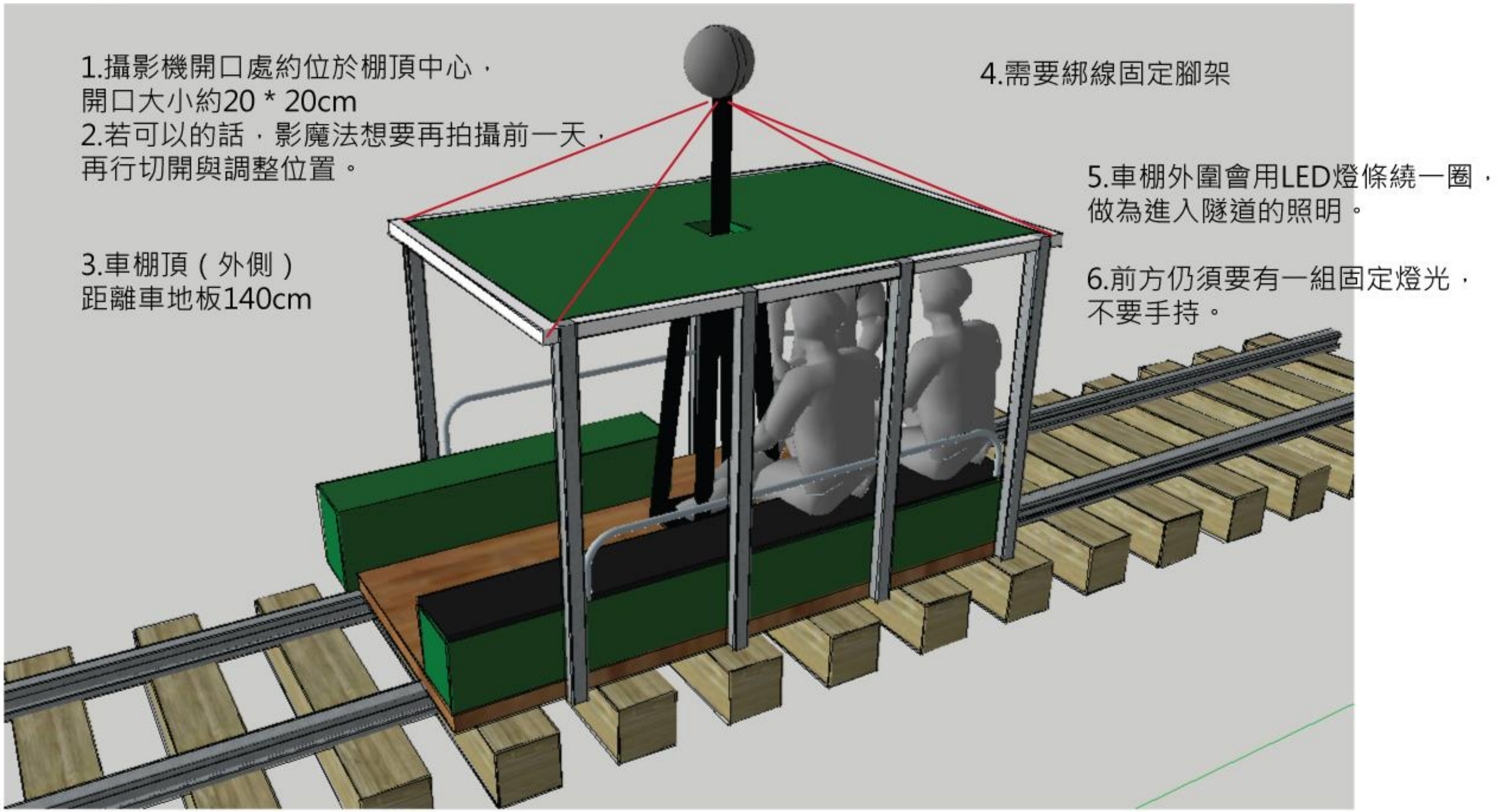


B. **團隊組成安排Team composition**
- 設備的了解？Equipment understanding？
- 完成品的規格了解？Finished product specifications understanding ？
- 執行團隊與執行方式的衡量？Balance between executive team and Implementation.

C. **完整計畫提案Complete project proposal**
- 拍攝的方式？The way of shooting?
- 拍攝時的需求？The needs while shootin

D. **現場勘查Field survey**
- 作業上的協調、協調與再協調 Coordination and re-coordination in working.

E. 輔助設備準備Auxiliary equipment



F. 拍攝前細節計畫
Detail plan before shooting

一、 沿線環景拍攝日程

第一天操作（11/13）				當日住宿（嘉義市）		
編號		地點	里程	預估抵達時間(HR)		工作重點說明
	1	北門車站	-	A 組 10:30 抵達進行調整	B 組 11:30 抵達進行調整(確認中)	1.設備安裝測試 2.局部路段拍攝測試 3.因有花絮拍攝問題，建議兩團隊分開作業，避免干擾。
		嘉義林管處行前會議		14:00		1. 拍攝團隊向林管處說明拍攝方式、注意事項。 2.林管處說明路程狀況、安全事項。 2.兩天因應方案討論。 3.成員交流。
本日裝設完成後，請各團隊針對設備、人員等進行最終確認。						

以下預估抵達時間，為兩團隊之第一車，兩車建議間隔 15~20 分鐘發車。

第二天操作（11/14）				本日住宿（奮起湖）		
圖面		地點	里程	預估抵達時間(HR) 第一組 B 組	第二組 A 組	拍攝重點說明
出發集合		北門車站		6:00		
A01	1	嘉義	0	7:00	7:20	
	2	北門車庫園區	1	7:08	7:28	維修工廠與園區
	3	北門	1.6	7:13	7:33	木造車站建築
A02	1	灣橋（遺址）	7.4	7:50	8:10	減速通過即可，無需特別停留拍攝
	2	鹿麻產	10.8	8:13	8:33	木造車站建築
	3	竹崎	14.2K	8:35	8:55	木造車站建築 地磅站 三角線
A03	1	牛稠溪橋	14.39k ~ 14.5k	出竹崎站立刻就是本橋		鋼構橋樑
	2	U-TURN-1	16 k	8:48	9:08	鐵道路線（環顧）
	3	U-TURN-2	17 k	8:56	9:16	鐵道路線（環顧）
	4	木屐寮	18.9k	9:10	9:30	道班房
	5	樟腦寮	23.3K	9:38 待避至 10:20	9:58 待避至 10:40	車站區 折返路線 水鶴 聚落建築
	6	獨立山螺旋線	23.3K ~ 27.4K		-	鐵道路線（環顧）
	7	第一觀景台	25.4	10:25	10:45	減速通過即可，無需特別停留拍攝
	8	獨立山	27.4K	10:48	11:08	車站區 聚落建築 -（過車站後）
	9	第二觀景台	27.6	10:52	11:12	減速通過即可，無需特別停留拍攝
A04	1	梨園寮	31.4K	11:16	11:36	車站建築 建議此站為工作天分段，隔日工作由站前之 15 號隧道開始。拍攝完成後，請司機直接開往奮起湖，便利團隊住宿，隔日早晨再回到此站拍攝。
晚餐時段進行隔日拍攝流程討論與調整，確認本日未完成路段。 拍攝團隊之支援車輛，本日建議停放至奮起湖。						

第三天操作（11/15）				當日住宿（森林遊樂區）		
圖面		地點	里程	預估抵達時間(HR) 第一組 B 組	第二組 A 組	拍攝重點說明
出發集合		奮起湖車站		5:30		
A04	1	梨園寮	31.4K	7:00	7:20	本日工作由站前之 15 號隧道開始。車站建築
	2	見晴台	31.9	7:05	7:25	減速通過即可，無需特別停留拍攝
	3	交力坪	39.4	7:52	8:12	聚落建築
A05	1	水社寮	40.5	8:00	8:20	聚落建築
	2	奮起湖	45.8	8:34	8:54	進站後依序為： 奮起湖車庫(木造) 奮起湖新站 奮起湖監工區（木造）
A06	1	多林	50.9	9:07	9:27	本站為 U-TURN3 聚落建築
	2	37 號隧道				特殊構造隧道，請打燈
	3	十字路	55.3	9:35	9:55	聚落建築 請盡可能安排靠近鐵路中斷處終止拍攝。
因應本案審查委員要求：請林管處在安全性考量下，盡可能靠近鐵路中斷處終止拍攝。 A. 請林管處確認，本日拍攝完成後設備拆卸場所為何？ B. 請林管處協助將 A 組設備、北藝大操作成員（3 名）載至森林遊樂區。 C. 本日下午需進行第二次台車裝設，請林管處確認設備裝設場所，並由兩組成員再次確認。 D. 晚餐時段進行隔日拍攝流程討論與調整，確認本日未完成路段。 E. 拍攝團隊之支援車輛，本日建議停放至森林遊樂區。						

第四天操作（11/16）				當日住宿（森林遊樂區）		
圖面		地點	里程	預估抵達時間(HR) 第一組 B 組	第二組 A 組	拍攝重點說明
出發集合		阿里山車站		5:30		
A07	1	第一分道	62.7	7:00	7:20	請盡可能安排靠近鐵路中斷處開始拍攝。 Z 字型路線
	2	第二分道	64.5	7:15	7:35	Z 字型路線
	3	U-TURN-4	64.5	-	-	鐵道路線（環顧）
	4	二萬平	66.8	7:32	7:52	U-TURN-5 鐵道路線（環顧）
	5	神木	69.6	7:54	8:14	Z 字型路線
	6	阿里山	71.4	8:08	8:28	Z 字型路線
	7	沼平	72.7	8:20	8:40	
	8	祝山	+6.25（非本線之外加里程）	9:00	9:20	U-TURN-6 弧形月台
	9	水山	+1.61	沼平線空檔拍攝約 10 分鐘路程		自然森林
A. 因應本案審查委員要求：請林管處在安全性考量下，盡可能靠近鐵路中斷處終止拍攝。 B. 拍攝完成後，煩請林管處協助將 A 組設備運回嘉義市。						

二、 A 組基本操作與需求

（一） **拍攝前測試**

1. 在正式拍攝前一天，再做一次試拍。
2. 每日拍攝前需提早半小時準備設備。

（二） **拍攝時需求**

1. 每一個車站皆需停車，待攝影人員設定分段記錄(約 2~5 分鐘)。
2. 車速請控制在 10k/hr 左右。
3. 需折返進入樟腦寮車站。
4. Z 字型延伸路線至少進入 1/2 處。
5. 遇到隧道滲水的情形，離開隧道口後需停車待操作人員擦拭設備。
6. 車棚設備拆卸後，請暫時保留至明年 6 月，以利後續可能之補拍作業。

三、 B 組基本操作與需求

（一） **拍攝前測試**

1. 在正式拍攝前一天，再做一次試拍。
2. 每日拍攝前需提早半小時準備設備。

（二） **拍攝時需求**

1. 台車的駕駛員，進入隧道不要使用手電筒照明鐵道路況，透過車上的固定式燈具做照明即可。
2. 拍攝約 30 分鐘請駕駛暫停，更換設備電池或記憶卡。（還請雙方於操作時，自行協調停車於安全之處。若有比較長且難停車的路段，請駕駛提早告知攝影團隊準備。）
3. 車速請控制在 10k/hr 左右。
4. 需折返進入樟腦寮車站。
5. Z 字型延伸路線至少進入 1/2 處。
6. 遇到隧道滲水的情形，離開隧道口後需停車待操作人員擦拭設備。
7. **因應本案審查委員要求：請在安全性許可下，盡可能安排靠近鐵路中斷處開始拍攝。**
8. 車棚設備拆卸後，請暫時保留至明年 6 月，以利後續可能之補拍作業。

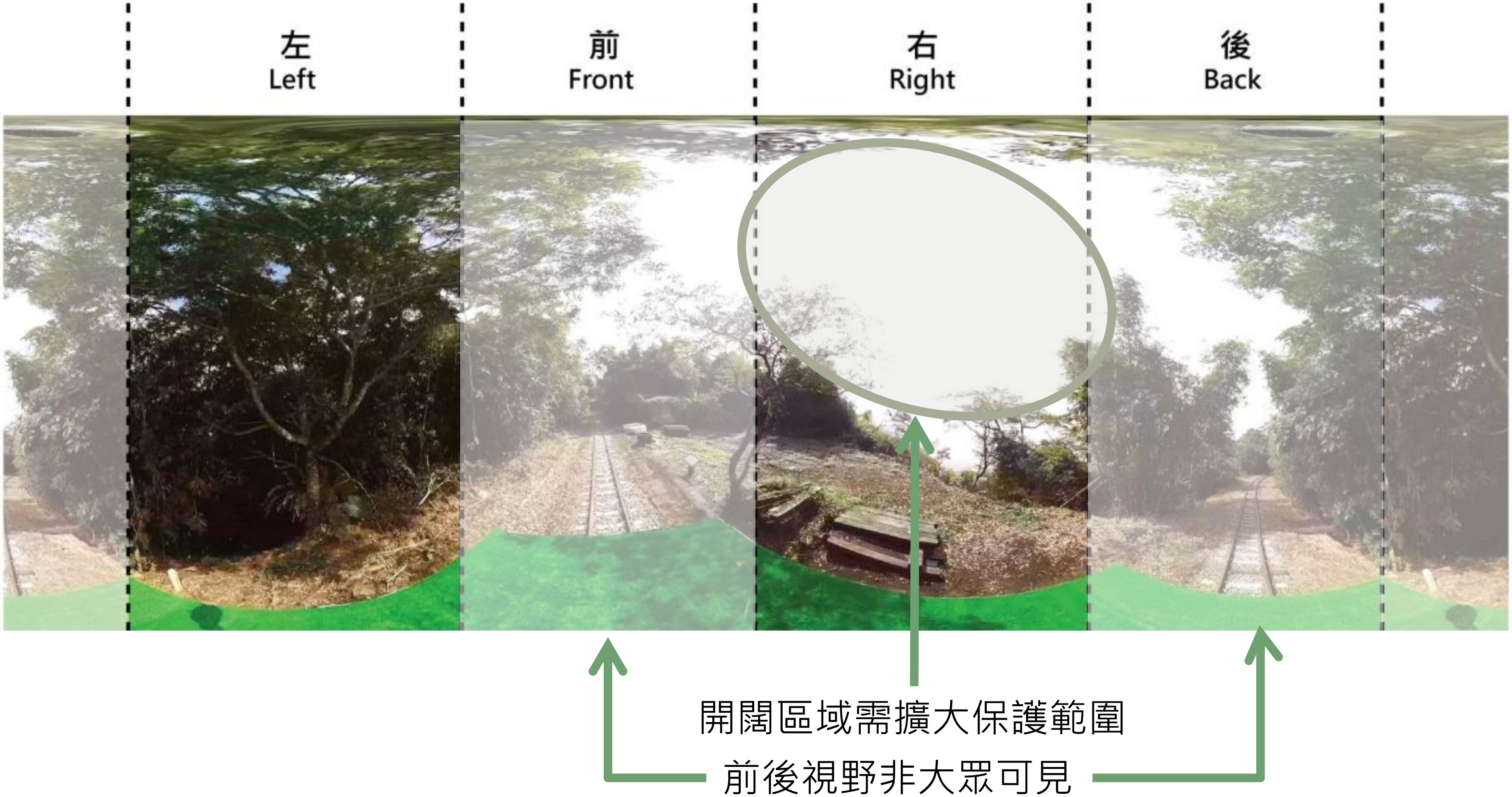
四、 雨天備案

1. 若拍攝時間遇氣候因素問題，需要重新執行；建議參考本次拍攝之基礎，進行部分路段之重拍。
2. **B 組之重拍作業：**由 B 組及嘉義林管處約定時間，並於本次拍攝基礎下，擬定拍攝計畫後通知北藝大參與執行。
3. **A 組之重拍或花絮拍攝作業：**由 A 組確認拍攝成果與花絮需求後，由 A 組、北藝大、嘉義林管處三方協調時間與方式再執行。

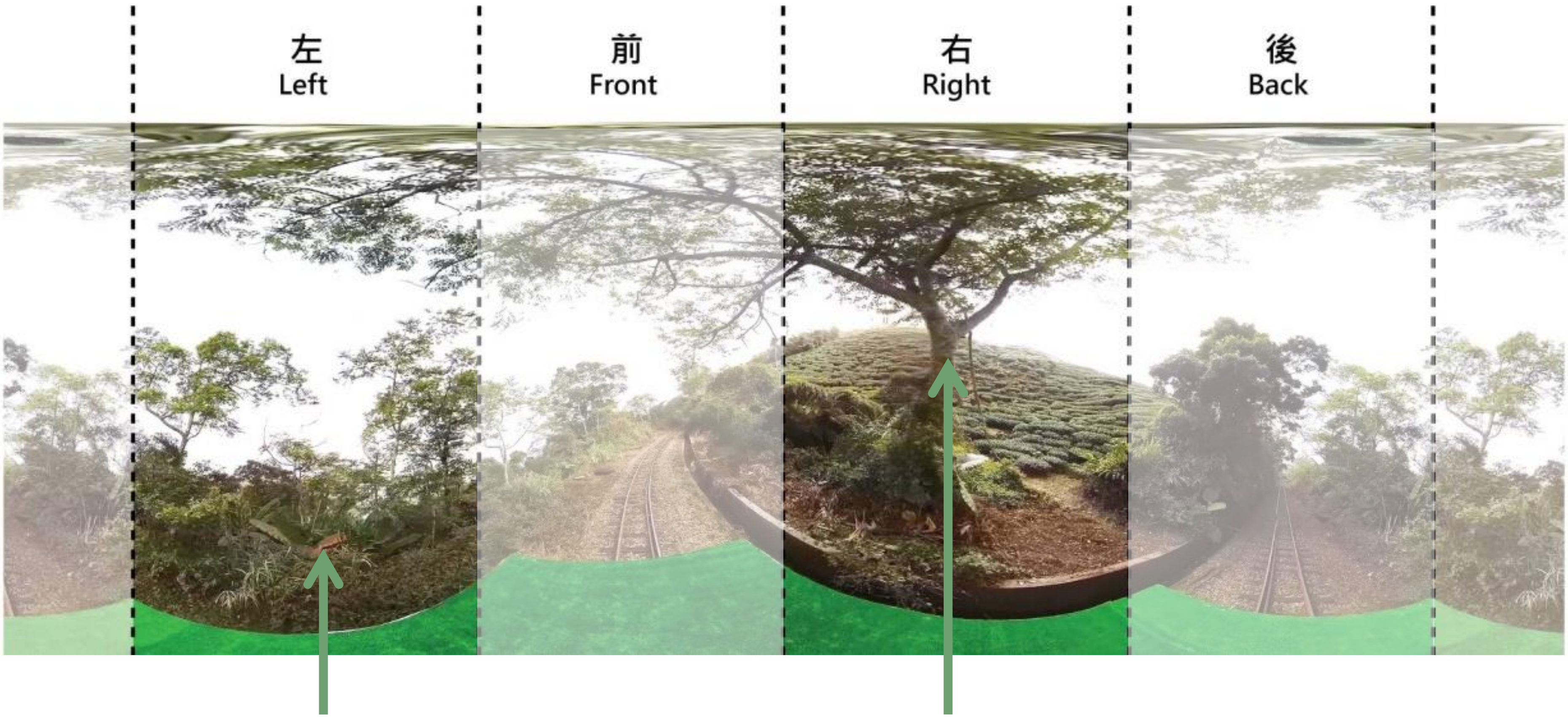





3-2 成果運用說明－路線視野分析（太興村）
The description of results application - route vision analysis (Taixing Village)



見晴臺



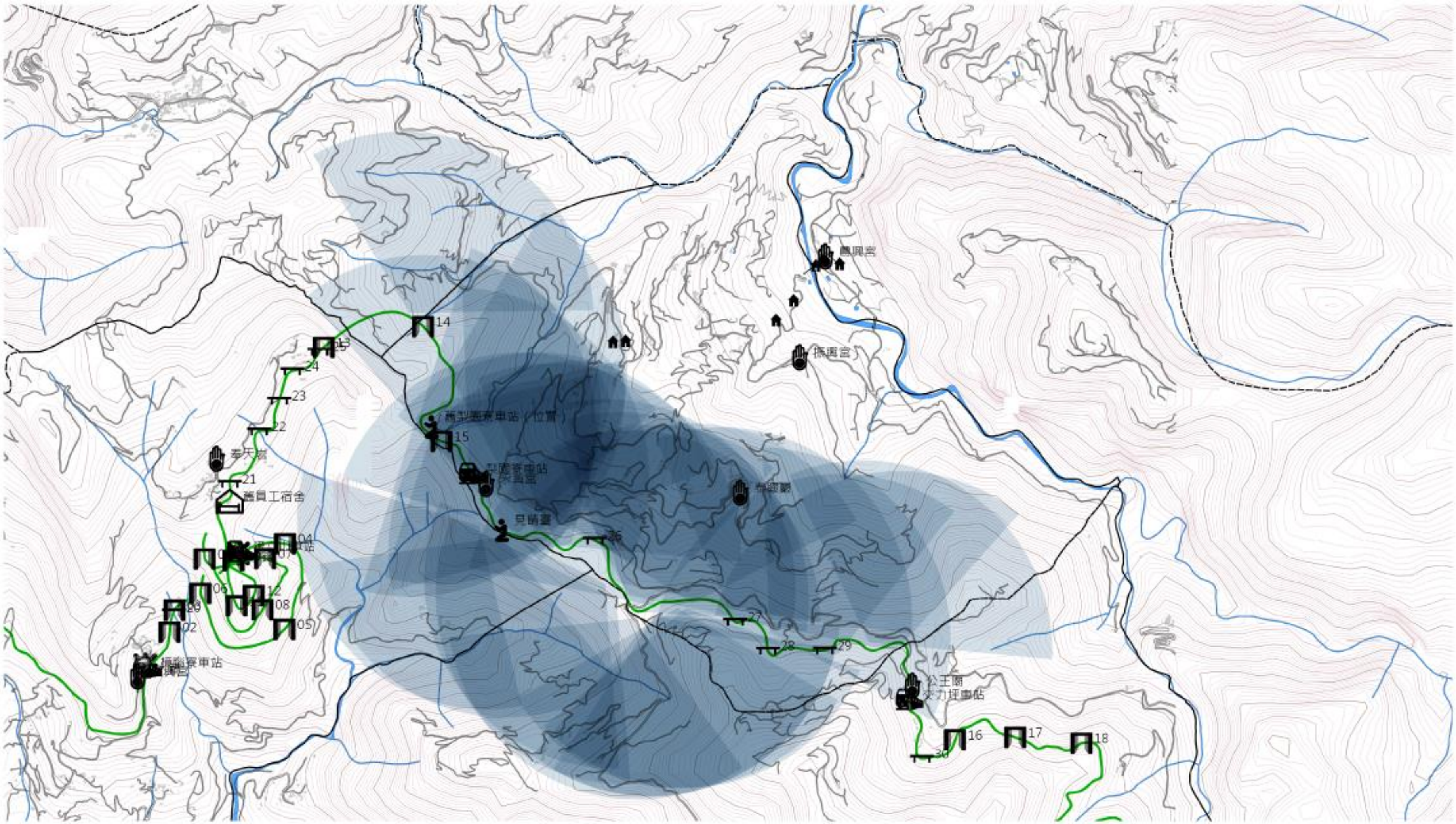
陡下坡面視覺影響較低
Visual impact is low form steep downhill

緩上坡面視覺影響較高
Visual impact is high from slow uphill

一支杉

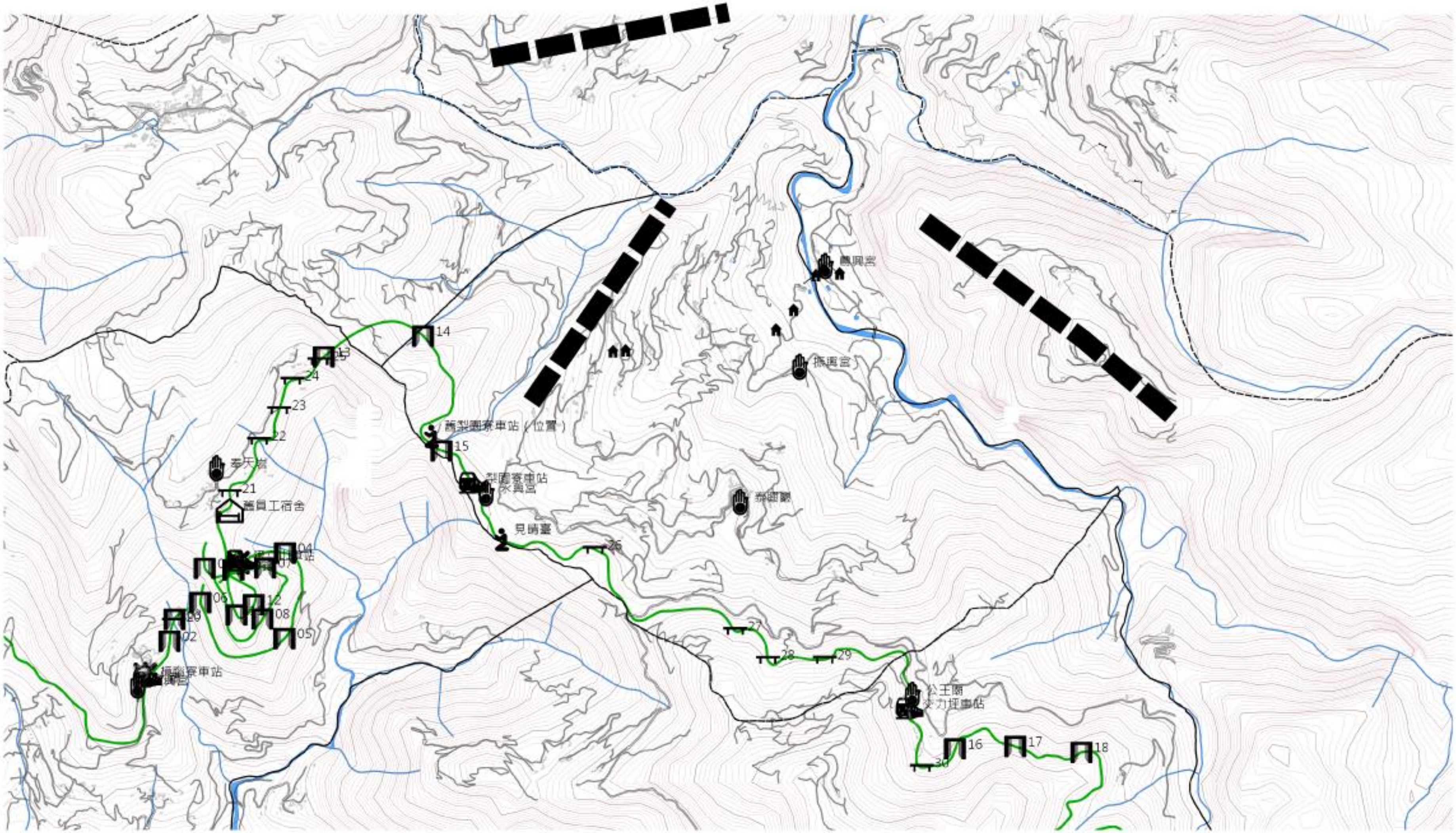
●沿線視野開闊位置

Open areas along the field of vision



●沿線景觀影響程度檢核

Inspection of landscape impact extent along the line


14
24
23
22
21
舊員工宿舍
舊梨園寮車站（位置）
15
梨園寮車站
永興宮
見晴臺
04
06
12
08
05
02
振興宮
27
28
29
公王廟
16
17
18
30

●天際線Skyline

3-3 未來的設想
Vision in the future
鐵路駕駛模擬器
Railway driving simulator

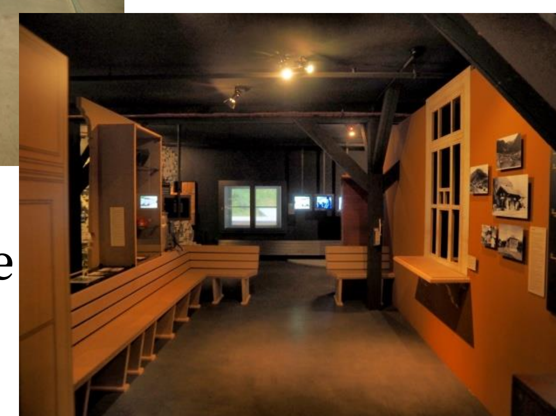
● 展覽系統運用Exhibition application

- 過往林鐵展示規劃，多以「鐵路」為核心，然近年各執行單位，逐步**邁入與「人」的互動討論與記錄**。
- Recenely, execution teams in forest railway gradually enter into interactive discussions and records with "people" from the previous display which was mostly based on the "railway"
- 目前已有資料或正執行中：
  - 鐵道沿線360環景影像（**駕駛員視野**）
  - 竹崎地區鐵路員工口述歷史調查、木枕之知識資訊（**道班工視野**）
- 可於展示規劃案中補充：
  - 車輛維修紀錄影像（**維修人員視野**）
  - 車站工作說明（**站務人員視野**）

駕駛
engine driver

道班workman

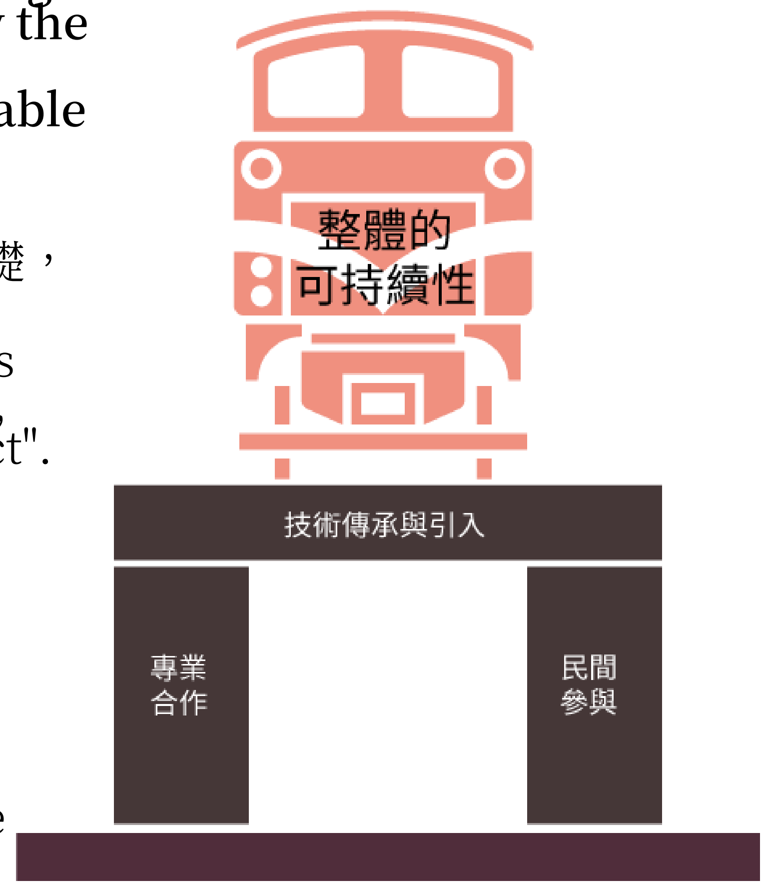
維修
Maintenance



站務station work

科技於文化資產保存應用…
Technology applying for preservation of cultural assets

- 動態保存觀念原則：「尊重多元專業、促成民間與官方積極的運用各種新舊技術，並以全環境的可持續性發展為目標執行鐵道保存工作」
- The principle of dynamic preservation: "Respecting for diverse professions, promoting the active use of old and new technologies by the public and the government, and carry out railway preservation with the goal of sustainable development of the whole environment.
  - 基礎資料的建置是所有鐵道文化保存工作的基礎，但「永遠都無法完備」才是常態。
  - The establishment of basic data is the basis for the preservation of all railway cultures, but it is normal that "it can never be perfect".
  - 蒐集資料的方式與目的都在「溝通」。
  - The way and purpose of collecting information is "communication"
  - 科技是解決問題的方法與工具，而非目的。
  - Technology is the method and tool to solve problems, not the purpose.



Appendix 10 - *Experience on Young Volunteers participating in Railway Cultural Heritage Promotion*

Chih-Ting Lin

Young volunteers participate in promotion of heritage railway culture experience

青年志工參與鐵道遺產文化推廣經驗

阿里山青年大使

AliShan young AmbaSSadors

Taiwan's Potential World Heritage

臺灣世界遺產潛力點

- The World Heritage Site is aimed to pass on the common heritage of mankind to future generations, preserve wonderful ruins of great civilizations or buildings with high cultural value left by human beings in history, and protect the precious natural environment that may disappear from the earth. 登錄世界遺產是為了將人類共同遺產傳與後世，保存人類在歷史上所留下的偉大文明遺跡或具高度文化價值之建築，並保護不該從地球上消失之珍貴自然環境。

Taiwan currently selects 18 candidates of World Heritage Sites with "significant universal values". 國內目前選出**18**處具有「顯著的普世價值」之臺灣世界遺產潛力點。

阿里山世界遺產潛力點

阿里山森林鐵路示意圖

（底圖圖片來源：「新高山阿里山鳥瞰圖」，1933（昭和8）年7月30日發行）

Draft of Young Ambassador Program
從文本初稿譜出青年大使

The world heritage needs to be promoted by all the people. The United Nations Educational, Scientific and Cultural Organization also attaches great importance to communities participating in promotion of world heritage. However, most of the promotion work of Taiwan's world heritage remains in the stage of "slogan", and the people have no ideas about the world heritage and the connotations.

- 推動世界遺產需凝聚全體人民的共識，聯合國教科文組織對世遺推廣也十分重視社區參與，但過去臺灣世遺的 推廣工作，大多還停留在「標語口號」的階段，一般民 眾仍無感於何謂世界遺產及其背後的內涵。

How to enter the communities? 如何走進社區？

How to let community residents know world heritage? 如何讓社區居民認識世界遺產？

How to make promotion of World Heritage becomes easy and interesting? 如何讓世界遺產議題變得活潑有趣？

Among thousand ways, we select the way of providing youth with在千頭萬緒中我們實驗性選擇了

education of local cultural assets 青年進行地方文化資產的教育

阿里山青年大使

Alishan Young Ambassadors

社團

2015.03.18

Associations

青年大使1.0 培育期
Cultivation period

2015.03.18 — 2016.02.20

- Course training 課程培訓
- Visit activities 參訪
- Workshop 活動工作坊

阿里山青年大使 1.0
Course training 課程培訓

The key contents of the association courses include “World Heritage Knowledge”, “Alishan Forest Railway Courses”, “Cultural Assets and Community”, etc.

社團課程主軸包含「世界遺產知識」、「阿里山森林鐵路相關課程」、「文化資產與社區」等

阿里山青年大使1.0
Visit activities 參訪活動

The United Nations Educational, Scientific and Cultural Organization textbook specifically mentions the importance of "visiting to world heritage sites".
In 2015, we visited Taiwan's other potential world heritage in addition to visiting the communities. Now we have the opportunity to bring the youth to visit the World Heritage Sites.

聯合國教科文組織《世界遺產與年輕人 **(The KIT: World Heritage in Young Hands)**》教材特別提出「到世界遺產地參觀」的重要 。

2015年除參觀社區還赴臺灣的其他世界遺產潛力點見學。

現在我們更有機會帶青年親臨世界遺產點參觀學習

阿里山青年大使1.0
Workshop 工作坊

- Intensive summer workshop 密集式的暑期工作坊
- Significantly enhance the recognition of cultural identity and cohesion of youth ambassadors 大幅度提升青年大使認同感與向心力
- Establish the interaction between the youth ambassadors and the Macao heritage ambassadors 開啟了青年大使與澳門文物大使的互動
- At the same time, it will become the annual work focus of the youth ambassadors 同時成為青年大使年度工作重點

工作室

2016.09.02

嗨森青年創意工作室

(hāi sēn)

阿里山青年大使

社團

2015.03.18

青年大使2.0

成長期

2016.02.21－2016.12.24

- License examination 證照考取
- Guide service 導覽服務
- Competition to increase exposure 競賽提升曝光率
- Establishment of work studio 成立工作室

阿里山青年大使2.0

License examination 證照考取

Handle guide certificate, review the effect of the training of the Alishan youth ambassadors, issue guide certificate and increase confidence of the youth ambassador for the guide explanation, extend the opportunity for many youth ambassadors to practice the tour guide, provide guide tour for station, go to kindergartens for theater, and introduce "Historical Site Day".

導覽認證辦理，檢視阿里山青年大使受訓成果，有了導覽 證照的頒發同時加深青年大使對於導覽解說的信心，因此 延伸了許多青年大使實務導覽的機會，因此開始於車站導 覽解說、赴幼兒園進行行動劇場、「古蹟日」專題介紹等。

阿里山青年大使 2.0
The youth can participate in the competitions 參與競賽

During promotion of the young ambassador program, it is really hard for youth who have heavy study tasks, and the promotion may affect their study. For parents of the youth ambassador, the association is still an organization for entertainment. They participate in the competitions of Ministry of Education and make a come to the fore, so that the youth ambassador's promotion work is gradually valued by parents.

推動青年大使的道路上，實在難以突破升學掛帥的難題，社團對一般青年大使的家長而言還是歸類成娛樂性的組織。參加教育部的競賽並在其中嶄露頭角，讓青年大使推動工作逐漸受到家長重視。

- 教育部進擊偏鄉比點子創意競賽【金獎、最佳人氣獎】
- 教育部青年團隊政策好點子競賽【優勝】
- 九華山服務利他獎【第三名】
- 高中地理奧林匹亞地理小論文【入圍】
- 教育部青年和平志工績優團隊【佳行獎、最佳吸睛獎】

教育部好點子競賽
榮獲優勝




青年大使獲頒
教育部進擊偏鄉金獎

阿里山青年大使2.0
Establishment of work studio 成立工作室

Counsel graduate students to participate in the program through the 2016 “College Graduates Entrepreneurship Service Plan”, to accompany the Alishan youth ambassador to build a sense of local identity, and to preserve the Zhuqi Community. Preservation of traditional forest railway is the key work of the studio.

輔導研究生以「手感重溫」通過105年度「大專畢業生創業服務計畫」，以陪伴阿里山青年大使建構地方認同感，及保存竹崎社區因林鐵傳統產業為工作室核心工作。

- Received the 2016 “College Graduates Entrepreneurship Service Plan”
- 獲得105年度「大專畢業生創業服務計畫」
- (U-start) Excellent Entrepreneurship Team and Social Enterprise Awards
- **(U-start)**績優創業團隊及社會企業獎勵

- **接受教育部廣播電臺【青春故事館】專訪**

阿里山青年大使協會籌備處

非營利組織

2017.06.10

Non-profit organizations

工作室

2016.09.02

嗨森青年創意工作室

阿里山青年大使

Alishan Young Ambassadors

社團

2015.03.18

- Linked community 鏈結社區
- Non-profit organization preparation 非營利性組織籌備
- Towards self-sufficiency 邁向自給自足

青年大使3.0

獨立期

2016.12.25－2017.05.02

Independence period

青年大使

3.0+

2017.05.03~

- Take root in local place 在地紮根
- International development 國際發揚

阿里山青年大使 3.0

Establishment of work studio 成立工作室

- The youth ambassadors try to move around the community and begin to refresh residential's memories of past Zhuqi. Therefore, many community experience activities and achievements are held.

青年大使努力於社區走動，開始拼貼居民之間對於竹崎的斑駁記憶，因此舉辦了不少社區體驗活動與成果展示。

阿里山青年大使 3.0
Non-profit organization preparation 非營利性組織籌備

- The senior youth ambassadors begin to prepare for the association after graduation. 資深青年大使在畢業後開始籌備協會組織。

阿里山青年大使3.0
Towards self-sufficiency邁向自給自足

- 手工油禮盒(社區傳統產業，以林鐵人元素重新包裝)

- 那就薑吧(青年大使家中產業，林務局作為阿里山櫻花季伴手禮)

阿里山青年大使 3.0+

Take root in local place 在地紮根

- Community base: The youth ambassador program has broken through the barriers of the campus, from schools to communities. The studio actively searches for communities and officially built a youth ambassador base near the Zhuqi station.

  社區據點：青年大使業務推動已突破校園藩籬，為正式從校園走入社區，工作室自發性尋找社區據點，於鄰近竹崎車站處（嘉義縣竹崎鄉中山路5 號）正式建構青年大使社區基地。



- Visits by well-known literary writers and foundations

  知名文學作家及基金會來訪



阿里山青年大使 3.0+

Take root in local place 在地紮根

- Speech sharing 演講分享
- 2017 initial speech training for youth of public affairs

  106年公共事務青年人才初階培訓演講
- Speech by a volunteer of Forestry Bureau 林務局志工演講

阿里山青年大使3.0^{+}

International development國際發揚

- 論文投稿
  - 2017ICOMOS研討會「A Self-supporting Model of the Youth for Heritage Management of the Alishan Forest Railway as a Potential World Heritage Site in Taiwan」
  - 新北市政府文化局「世界遺產保存與居民對話」國際研討會「在地學校參與世界遺產潛力點推廣教育之機制-以嘉義縣立竹崎高中為例」
- 國際交流
  - 澳門邀請參加兩岸三地青年論壇
  - 馬來西亞見學交流
  - 扶輪社(Rotary International)國際交換生導覽

Alishan Youth Ambassador and Zhuqi Community
阿里山青年大使與竹崎社區

- ARTS-ED CEO encourage youth to discover cultural assets with their eyes. ARTS-ED執行長讓青年以青年目光發現文化資產

Thoughts on Zhuqi Community (visit to Taixi)
竹崎社區的遐想(大溪取經)

- Through the “training exchange” and “practice” in Daxi, the youth ambassador brought the experience back to Zhuqi. Finally, the youth and the aged work together to explore and create the Zhuqi street stories and promote Alishan as an ecological museum. 青年大使透過在大溪的「見習交流」、「實務操作」將經驗帶回竹崎，最終以「經驗回流」的方式以青年力量青銀合創，探索建構竹崎街角故事館與推動阿里山成為生態博物館之願景。





Recreation of Zhuqi Community's old stories
竹崎社區老故事再造

Recreation of Zhuqi Community's old stories
竹崎社區老故事再造

英興旅社的往昔

茶餘飯後 榕樹下

難忘的蘭草香

兒時的東昇戲院

Recreation of Zhuqi Community's old stories
竹崎社區老故事再造

壽安本草堂


木工店

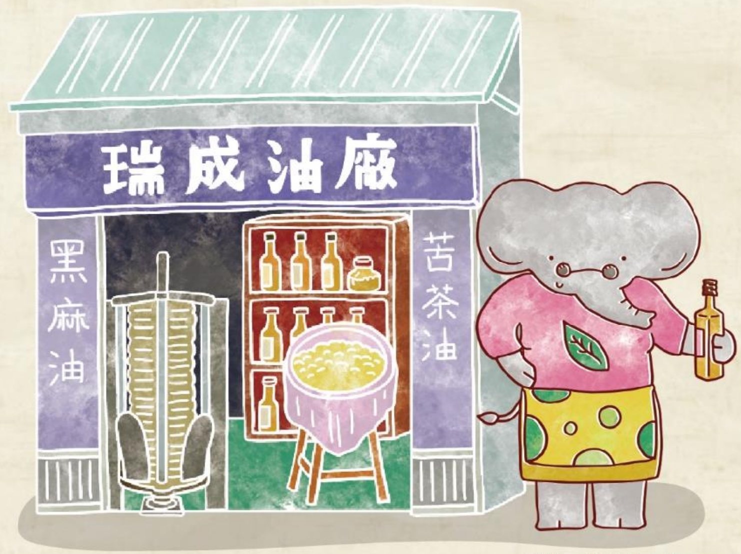
清雪冰店

不識字印章店

Recreation of Zhuqi Community's old stories

竹崎社區老故事再造

三順米店



瑞成油廠

西洋照相館

Recreation of Zhuqi Community's old stories
竹崎社區老故事再造

阿里山青年大使

回 顧 與 展 望

Review and outlook

50-Month Alishan Youth Ambassador

阿里山青年大使50個月(since 2015.03.18)

01 學習

70 場
450 小時

02 服務

40 場
400 小時
3600 人次

03 競賽

20 項
全國 教育部績優團隊2項
個別競賽金獎及優勝
高中論文晉級、甲等

地方 服務利他競賽第3名

04 推廣

展覽 書展2場
成果6場

報導 平面新聞50則
(92個媒體)
廣播專訪3則
電視拍攝2場

其他 繪本1本
寄送國外森鐵聖誕卡

05 產品

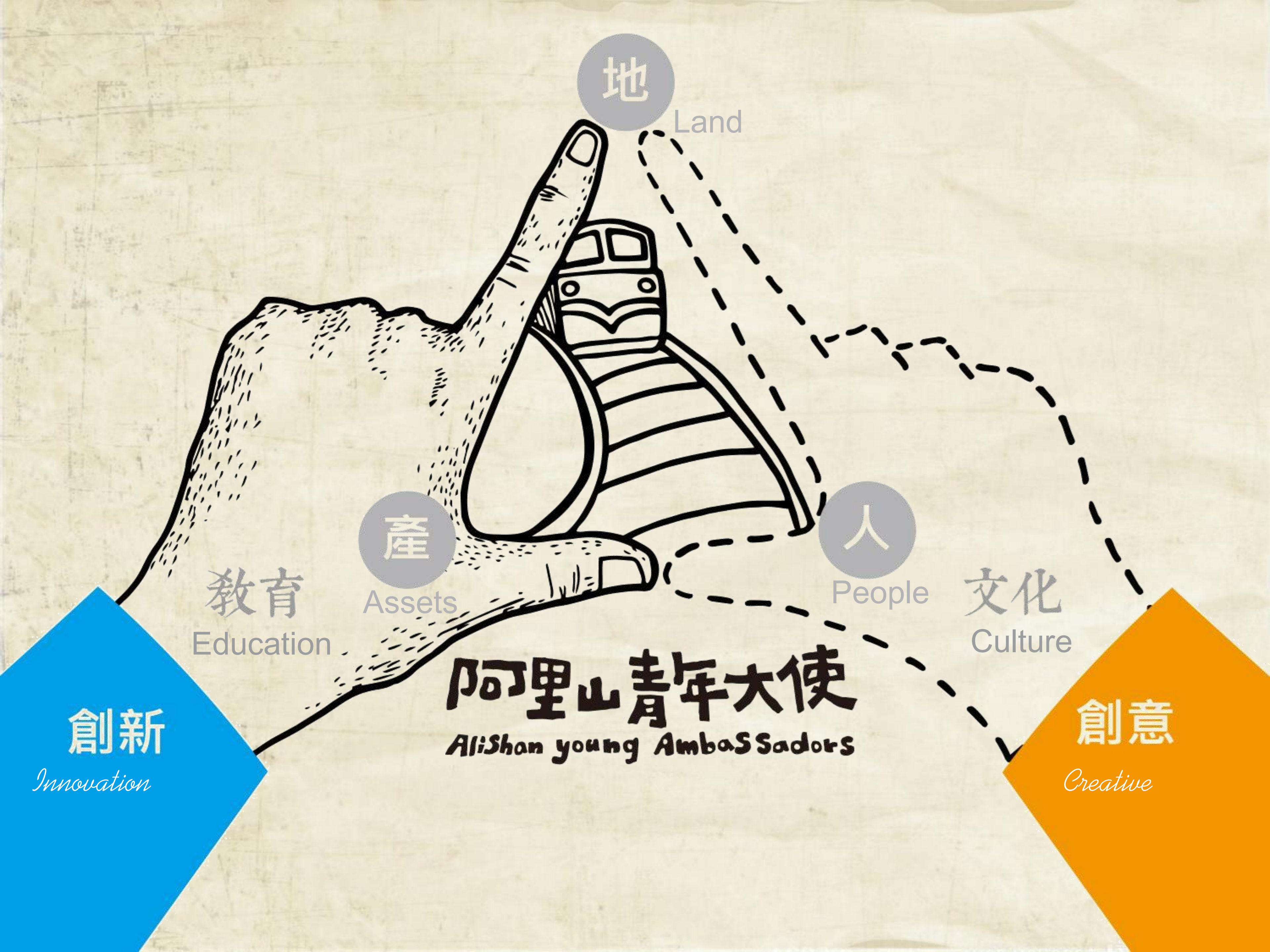
傳統產業 手工油禮盒

青年家族產業 那就薑吧禮盒
茶葉禮盒(待包裝)

家長認同度 Parental acceptance

反對 Oppose | 認同 Agree | 支持 Support

Executive Strategy for Alishan Youth Ambassador
阿里山青年大使執行策略


地
Land
產
Assets
人
People
教育
Education
文化
Culture
阿里山青年大使
AliShan young AmbaSSadors
創新
Innovation
創意
Creative

阿里山青年大使

Alishan Youth Volunteers

THANK YOU

在我們心目中的文化資產傳承
是一道減法料理，應該保留最
原味的家鄉故事，應該保存最
原始的故鄉場景，並且用人情
味去烹 調這道料理。