

Matheran`s Toy Train - the Joy and Pride of Maharashtra, India

Safety under Scrutiny

The Ultimate Goal to provide safe Joy Rides on the Heritage Rail Road

After 17 Month of Suspension the Toy Train resumed its Service on the Shuttle-Route Matheran-Aman Lodge on a partly rehabilitated Track



Chuckling around Panorama Point on the Abyss without any Protection Barrier and without any Protection Guard-Rails to prevent derailed Coaches to tumble down the Precipice; Train-Service until May 2016

**Feature Article by
Dr. Frank August Wingler, Germany**

Matheran, October 2016;
updated Matheran, November 2017

FAZIT and RECOMENDATIONS:

In May 2016, after two Train-Derailments with narrow escapes for the Passengers, the Safety of the Toy Train Service has become under Scrutiny. Therefore, Indian Central Railway had temporarily suspended the train-service.

To rehabilitate the toy train up to modern state-to-the-art **SAFETY STANDARTS** the author had made October 2016 the following recommendations:

- ◆ The rail-track has to be brought on a well-drained stable formation with a top formation width of about 5.50 to 6.00 metre with the trough steel-sleepers resting on a clean and un-fouled 6 to 7 inch ballast-cushion,
- ◆ the curves have to be provided with transitions of appropriate length to ease the offset at the coach-couplers, when the rolling stock enters a tight circular or body-curve,
- ◆ kinks at the rail-joints, especially on curves, have to be eliminated,
- ◆ on traces alongside of precipices and on bridges protection guard-rails have to be provided,
- ◆ to safeguard trains on traces alongside of precipices, sturdy retaining/barrier walls/devices have to be erected, preventing derailed rolling stocks to tumble down the abyss,
- ◆ or alternatively the track has to be shifted to the hillside and conducted in protection-galleries,
- ◆ the rolling stocks should to be provided with jerk and shock absorbing coupleers,
- ◆ as train-brake system, an easy to maintain and to service direct working single-pipe compressed air-brake system without the need of distributor valves and reservoirs, working on **SPRING LOADED BRAKE CYLINDERS**, is advisable (as in use on NG scenic railways in England).

See:

- ◆ Publication: **INDIAN RAILWAY TRACKS – A TRACK ENGINEERING COMPENDIUM, 2016**
- ◆ and Technical Railway Paper **RISK AND HUMAN ERROR MANAGEMENT, 2016,**

with affiliated literature, free for downloaded from the website:

<http://www.drwingler.com> .

On October 30th 2017, after 17 month of suspension, the shuttle-service resumed its service on the upper 3 km section between Matheran and Aman Lodge with a speed restriction of 10 kmph on a partly rehabilitated formation and with a graduate release dual-pipe (feed- and brake-pipe) compressed air-brake system mounted on the coaches. Since there is no elasticity in the primitive coupling system sans dampers, the jerk-problem has not become less. It seems, that with the installation of the dual pipe, non-exhaustive compressed air brake system in lieu of the manual operated brakes, the jerk-problem increased on the

shuttle service train-set with front-and rear locomotives. Jerks contribute to derailment proneness.

However, the rail-track itself has not been rehabilitated. The Steel-Trough Sleepers are still resting on earth and mud, and kinks at joints had not been eliminated. As long pedestrians, and even horses, are allowed to use the track as a trail, it will not be possible to maintain a clean and un-fouled ballast cushion.

Although the likelihood for a train to derail has not been reduced, the impact that a derailment might have and the harm a derailment might produce are mitigated by the retainers and crash barriers on the shuttle-service route.

On the shuttle-service section between Matheran and Aman Lodge, at certain locations gabions have been erected as retainer-walls to retain the formation from yielding and to broaden the top formation width. At risky sections, where derailed coaches might be prone to tumble down the precipice, Guard/Crash-Barriers, as used on highways, had been installed. On such risky sections in addition one or two guard-rails have been added between the running rails to prevent derailed rolling stocks to leave the formation.

On the main-section, on the west-side around Panorama Point, the rail-track itself is at it has been 17 month before. There are still severe formation defects, aprons washed out, joints are kinking and there is no ballast under the sleepers. The safety related works for new gabions, retaining walls and crash-barriers, to prevent a derailed train to tumble down the abyss, started November 2017 on the Governor Bungalow Hill west-side as well on Mt. Berry east-side. There is still a lot to do in order to make the main-section on its full length safe for passenger service.

INTRODUCTION

The Matheran Toy Train, opened on 22nd March 1907, had been planned and constructed as a 2 ft Narrow-Gauge **TRAMWAY** by the Entrepreneur **ABDUL HUSSEIN**, the son of the business tycoon Sir Adamjee Peerbhoy. The construction of the line was authorised by the Public Works Department Bombay under notification No. 34, dated July 28, 1904. Abdul Hussein floated a company in the title "**MATHERAN STEAM LIGHT TRAMWAY COMPANY (MLR)**", wholly owned by the Peerbhoy Family.

The line climbs 720 metres from the rail-link of the Bombay-Puna line at Neral 720 with a maximum gradient being 1 in 29 over 21 km with 221 curves of tightness of up to 60 feet radius and with one short "**ONE KISS TUNNEL**".

Until 31.03.1948 the **MATHERAN STEAM LIGHT TRAMWAY** had been a private enterprise managed through an agency of the company, when on 01.04.1948 the Matheran Light Railway was taken over by the Indian State. The Toy Train is now managed and run by Central Railway.

The German Manufacturer Orenstein and Koppel engineered and delivered 1905/1907 in two batches 4 three-axle Steam Locomotives with articulated hollow axles managing to negotiate the tight curves. They served until 1955, when they have been replaced by articulated Diesel-hydraulic B+B Locomotives, tailor-build in Germany by **A. Jung**.

A "carcasses" of Steam Locomotive No. 741 is exposed on a pedestal at the Matheran Station:



Steam Locomotive No. 741 exposed at Matheran Station

The remains of the Locomotive No. 739 found its way to the National Rail Museum in Delhi. No. 740 had been gifted in working condition to the nostalgic Leighton Buzzard Narrow Gauge Railway in Bedfordshire, England, where it is nowadays still running well restored, preserved, maintained and serviced:



Steam Locomotive No. 739 at Delhi National Rail Museum



Steam Locomotive No. 740 at Leighton Buzzard Narrow Gauge Railway in Bedfordshire, England

No. 738 had been 2013 restored at Parel Workshop of Central Railway.



Down the Memory Line: Nostalgic Steam Train Run

After few nostalgic test-runs on the hill section, it had been found as too difficult to run this rehabilitated Steam Locomotive with skilled personnel. The forest department did not allow

to run any more a fired steam Locomotive. The locomotive is now resting exposed to the corrosive weather conditions on a pedestal at the Neral loco-shed.



Steam Locomotive No. 738 after Rehabilitation exposed to Corrosion on a Pedestal at Neral



B+B Diesel-hydraulic articulated Locomotive NDM1, build in Central Railway Loco Workshop, Parel, based on the articulated Engineering of ARNOLD JUNG LOKOMOTIV-FABRIK, Germany

To learn more about the history of the Matheran Light Railway, read the book **MATHERAN LIGHT RAILWAY** (1904-2003) by R.R. Bhandari, published 2004 by National Rail Museum, New Delhi; <http://www.railmuseum.org>.

An article in **TIMES OF INDIA**, May 14th, 2016, (“Goodbye to Matheran's toy train for now - Times of India timesofindia.indiatimes.com › City › Mumbai) raises question about the **SAFETY** of Matheran's Toy Train, which has become an instinctive part of Tourism in Maharashtra.

In April/May 2016 unwanted **MISHAPS**, two coach **DERAILMENTS** and a **RUN-AWAY** with narrow escapes for the passengers, have send safety related authorities into a tizzy. In the May 2016 development on the **SAFETY-ISSUE** the toy train service has been suspended. A report has stated that Central Railway has not the independent technical expertise to redesign the toy train up to modern state-to-the art **SAFETY STANDARTS**. Central Railway has recommended to tie-up with international consultants in order to revamp it and to make it safe for passenger service.

This issue has also brought talks of doing more for the tourism in this hill station. The suspension of the train service has left about 5000 locals worried about their daily income for livelihood from tourism.



Matheran's Toy Train Coach-Derailment near Aman Lodge; 01. May 2016



Narrow Escape for Passengers at the Abyss at Jummapatti, 25. April 2016

>Passengers had a close escape on the Neral-Matheran railway line when the famous toy train derailed and nearly tumbled into the valley yesterday < www.mid-day.com > News > National News

SAFETY ISSUES

As already mentioned, Matheran`s Toy Train has been built and taken into service over 100 years ago as a private **LIGHT STEAM TRAMWAY** and not as a Railway as the other scenic Indian Hill Railways (**KALKA-SHIMLA, KANGRA-VALLEY RAILWAY, DARJEELING RAILWAY** and **OOTY NILGIRI RAILWAY**) had been engineered.

Under modern Safety and Risk Management perspectives, until May 2016 nobody has raised serious concerns until May 2016 about the **SAFETY-SHORTCOMINGS** of Matheran`s Toy Train.

Although India has made progress in the last decades in Railway Safety and Safe Train Operation, India is still regarded internationally as a country with a relatively low **SAFETY RECORD** of its Railways. There is no other country around the globe, other than India, from where so many nasty Train Accidents with high mortality rates can be reported. According latest press-release, 53 % of the Train-Accidents are related to Train-Derailments on account of wheel-rail-system in-service failures.

The **ULTIMATE GOAL** should be to prevent Railway Accidents; see Arya Bhushan and M.M. Agarwal **INDIAN RAILWAY SAFETY – Ultimate Goal to prevent Railway Accidents**, Bahri Brothers, Delhi 2015, ISBN 81-900613-x and James Reason, **THE HUMAN CONTRIBUTION**, Ashgate Publishing Company, Farnham, UK, ISBN 978-0-7546-7402-3, 2013.

People want to use a safe railway. It is the obligation of the Indian Government to keep rail tracks safe by **Strategic Investments**.

Worldwide modern technical organisations of high risk potential as in nuclear or thermal Power Generation, Space Technology, Aviation, Oil Exploration/Rigging, Railways, Chemical Industries and Land and Sea Transport make nowadays use of the methodologies, error management tools and practical guides in **MANAGING THE RISKS OF ORGANISATIONAL ACCIDENTS** by James Reason; Ashgate Publishing Company, Farnham, UK, ISBN 978-1-84014-105-4, 2011. Essential is a so-called “**Generative Culture**” with proactive measurements. Engineering a **SAFETY CULTURE** and an **INFORMATION SYSTEM** on observations about unsafe matters are essential tools of a modern Risk Management. The latest trend in Safety and Risk Management is to follow the **RISK-BALANCE MODEL**; see **RISK-BALANCE MODEL – a STRATEGY TO MANAGE SAFETY AND RISKS IN RAILWAYS**; see <http://www.drwingler.com>.

On basis of those methodologies and doctrines **GB RAIL SYSTEM (UK)** and by following the guidelines of the **Railway Safety and Standards Board (RSSB), UK**, as well of the worldwide operating Safety Consultant **CRA RISK ANALYSIS, UK**, has gained in the last years a remarkable improvement off its safety records. In the last 12 years it has established as one of the safest in the world, with not a single train-passenger killed. South African, New Zealand, Canadian, Austrian, Swiss and German Railways follow the methodologies and doctrines on their path to avoid unwanted bad events. For Japan Railway any unwanted bad event or near missed event is affiliated with **ORGANISATIONAL SHORTCOMINGS**.

In modern, state-to-the art **SAFETY and RISK MANAGEMENT** each unwanted bad event or near missed bad event has to be investigated and regarded as an outcome of an **ORGANISATIONAL FAILURE** with the “parents” of **PREVAILING LATENT UNSAFE CONDITIONS**, often with far reaching history, and based on **FAILURES IN THE SYSTEM**; see Dr. Frank Wingler: **RISK AND HUMAN ERROR MANAGEMENT**, and **Chapter 20** of the internet Publication **INDIAN RAILWAY TRACKS – A TRACK ENGINEERING COMPENDIUM** (free for download from <http://www.drwingler.com>) and the affiliated literature.

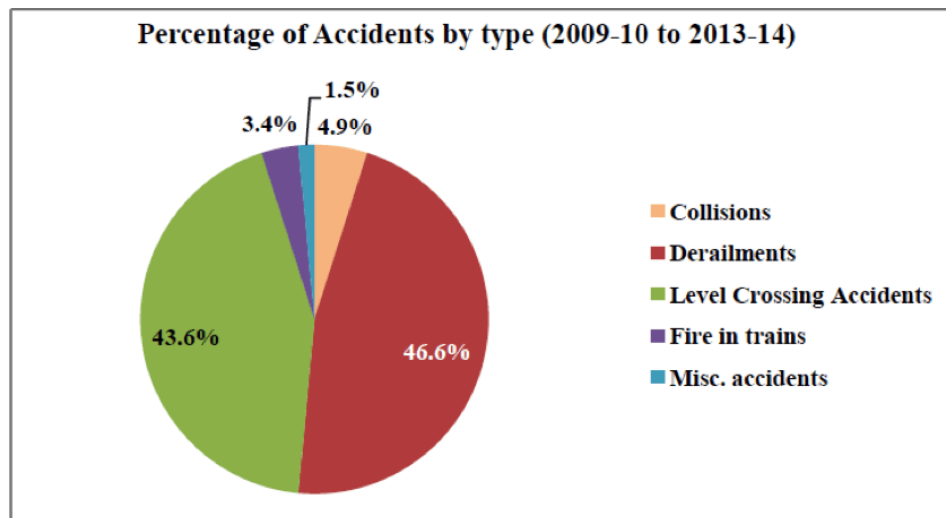
According a paper presented by Dr. Ing. Willem Sprong from GIBB (PTY) Ltd., South Africa, on: “**Does 'Zero Incident' really exist in the Transport Environment?**” at the World Conference on “**THE FUTURE OF TRANSPORTATION**,” held 5-6th July 2017 at Cologne, Germany, not all risk can be averted, but should be mitigated to an acceptable tolerance! Influential factors for safety are - amongst others - appropriate budgeting and the system`s safety-culture. The question is, what the **ACCEPTABLE TOLERANCE** is, how much safety the technical organisation of high risk-potential wants, how much money it is willing to spend and how much it can afford to spend; see the relevant Technical Railway Papers by the author: **HOW MUCH SAFETY ON INDIAN RAILWAYS, PART, I, II & III**; free for download from the website: <http://www.drwingler.com>

RISK is the product of probability that an incident will occur, the impact that it will have and the harm it will produce. **ZERO FATALITY VISION** in transport environment is unrealistic. Risk cannot be reduced to zero. Hence, on the likelihood of bad unwanted incidents with their calamitous consequences has to be reduced as far as possible, and the effect or impact of the bad incident must be mitigated as well the harm, it produces, has to be damped to an acceptable level. So, if one cannot bring the nasty and unhappy incidents to zero, one has to reduce their likelihood and their impacts and harms. The demand is: “**Keep your Risk as low as reasonable!**”

Although it is impossible to gain **ZERO** risk-probability, effective and efficient risk management must include the proactive mitigation in tackling with the impact and harm, that bad incidents will have. Recent developments in Safety Management tend to use **PREDICTIVE RISK BASED STRATEGIES**. In **RISK-BALANCE MODEL**, the strategy is to

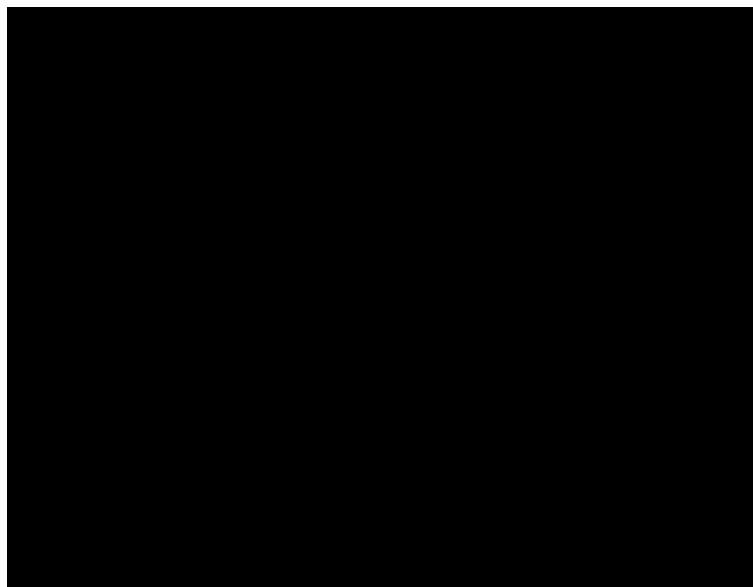
find an economical balance between minimizing the probability that an unwanted bad incident will occur and mitigating resp. damping the impact and harm, which it will have resp. it will produce. The challenge is to keep within a balance the risks as low as reasonable.

The percentage of the types of accidents of INR for the period from 2009 to 2014 is given by the chart below:



Up to 2104 Derailments contributed to Accidents in India with 46.6 %. Until 2017 the percentage has increased to 53%. Safety Experts are nowadays very sensitive for Derailments on their way to improve the overall Safety Records; so also for the recent **Matheran Train Derailment**.

The worst recent Derailment event with over 145 killed passengers, INR had to face faced on 20-11-16 at about 3 am at Pukhrayan in Kanpur District:



Derailed Indore Patna Express 19313 at Pukhrayan near Kanpur

Risky procedures, which might had been allowed or tolerated in the past, cannot any more allowed and tolerated under the auspices of modern Safety and Risk Management Norms and Standards. “***What did not happen yesterday is more likely to happen tomorrow***”. From the **NON-OCCURANCE** of bad unwanted events in the past one cannot make predictions for the future – this is a fundamental teaching in modern Safety, Risk and Human-Error Management.

Indian Railways have nowadays to invest Railway Accidents with international Safety Methods looking for **Organisational Shortcomings**, prevailing **unsafe Conditions** and **Failures in the System**.

The April/May 2016 incidents on the Matheran Toy Railway show that this system is not safe, and that it is derailment prone. Luckily the passenger coaches did not tumbled down the precipice or capsized, since at the derailment spot there had been a rudimentary formation. On other sections, there is no ballast, and the formation has been swept away by water or trampled down by pedestrians and horses using the rail track as a trail or foot path as delineated by the following pictures:



Formation and Ballast missing along the Track, October 2016

After suspension of the Train Service on the Matheran Line in May 2016, the NDM6 Locomotive No. 603, build 1998 by SAN Engineering & Locomotive Company Ltd. in Bangalore had been transferred to New Jalpaiguri to work on the scenic Darjeeling Hill Railway:



NDM6, No. 603, build 1998 by SAN, Bangalore

The Loco had been re-painted in the Darjeeling Railway livery. This loco derailed on 10th January 2017 with three coaches on down-run near Mahanadi, 8 km before Kurseong, injuring 6 people:



Derailement of NDM6, No. 603 near Mahanadi, Darjeeling Railway, 10. Jan. 2017

This successive 2ft NG Derailment got Safety Experts of Indian Railways even more in a real tizzy.

Outside Guard-Rails, as used in England on the scenic 2ft NG Festiniog Railway, could have dwarfed the Derailment-Impact:



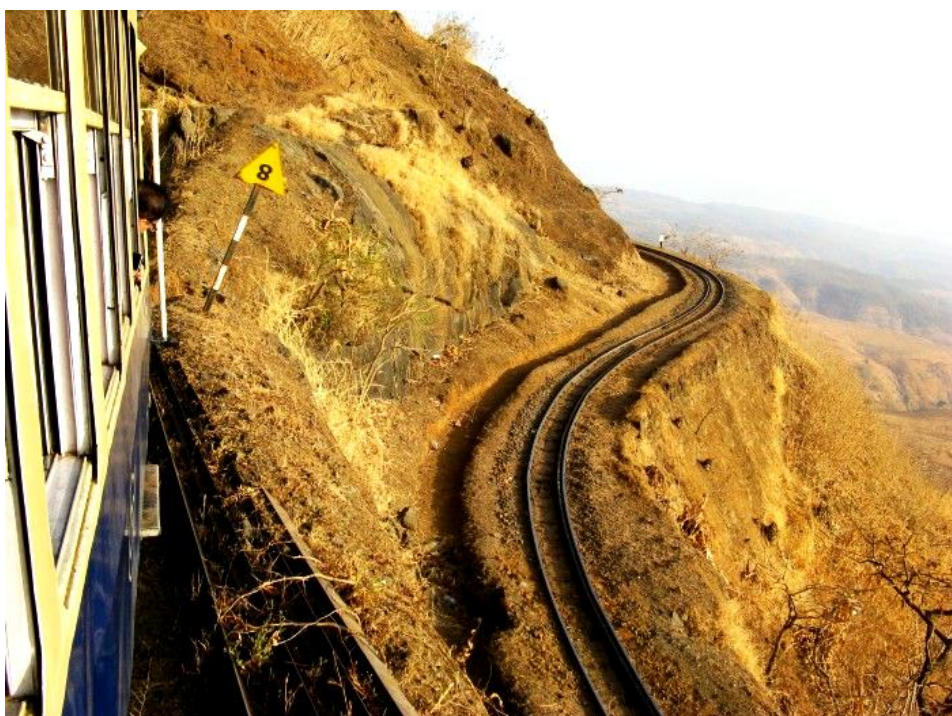
Outside Guard-Rails on 2 ft NG Festiniog Railway, Wales, England

Keeping a track in good condition reduces the likelihood of a train to derail, and Guard-Rails mitigate the impact in case of a derailment, preventing derailed rolling stocks to leave the formation.

January 2017 in the related developments, Railway Minister Suresh Prabhu sanctioned Rs. 6.8 crore to build anti-crash barriers, retaining walls and gabion walls along the Neral-Matheran section to ensure the toy train does not fall into the valley in case of a derailment. Central Railway had also decided to bring clean ballast on the entire 22 km corridor to improve the track.

As elucidated by the following Picture Gallery, on many sections the Matheran Track had been laid along the rim on the abyss without any Protection Walls and without any Protection Guard-Rails, which could mitigate the impact of Derailments and prevent a derailed train to leave the formation and to tumble down the precipice.

PICTURE GALLERY; 2016





Until May 2016, chuckling at the Abyss without any Protection Devices



Until May 2016, chuckling around Panorama Point at the Abyss without any Protection Devices



Until May 2016, chuckling around Panorama Point on the Abyss without any Protection Devices and without any Protection Guard-Rails to prevent in Case of a Derailment Coaches to tumble down the Precipice



Yielding Formation flowing down the Precipice between Aman Lodge and Matheran below Wayside Inn; kinking Curve Rail-Joints; no Guard Rail, which could dwarf the Impact of a Derailment with a derailed Train tumbling down the Precipice; 2016

The May 2016 Derailments show all signs of a so-called **“SLOW-SPEED FLANGE-CLIMBING DERAILMENT”**; see Chapter 20.2: **“DERAILMENT INVESTIGATIONS AND MECHANISM”** in the internet Publication **INDIAN RAILWAY TRACKS – A TRACK ENGINEERING COMPENDIUM**; free for download from <http://www.drwingler.com>, and the affiliated literature.

A Slow-Speed Flange-Climbing Derailment may occur, when several shortcomings come together as there are:

Track Misalignment (Geometry) Parameters, worn Wheel-Treat Profiles, Train-Set Jerks, Sand or Dirt at the Rail Running Corner, corroded or rusted Rails.

If such parameters coincide, a derailment can be triggered off. To mitigate derailment proneness, train-set **JERKS** should be avoided, rails should be kept clean and rail running corners in curves lubricated.

At many spots, the rails had not been not aligned as it should have been. One could detect risky and badly maintained kinks at several curve rail joints:



Kinking Rail Joint in a Curve make the Track Derailment prone, October 2016

The Steel-Trough Sleepers are mostly laid on mud and red earth instead on a 6 to 7 inch clean un-fouled ballast cushion. Missing ballast makes it difficult to maintain properly the track alignment.

The coach brakes had been operated until 2016 mechanically by handbrakes with a weight-lever. The operator ("**Brake Porter**") hangs between two coaches without any safety provision or platform. Since the coaches are **NOT** coupled by an elastic coupling device with shock absorbing dampers, **JERKS** can be easily produced, if the handbrake system is not operated synchronically with the Locomotive brake. **JERKS can contribute to Derailments!**

The author had suggests to provide the Matheran RLW rolling stocks with a jerk-free elastic coupling system, which can damp shocks and jerks:



Jerk damping German Coupling Systems for NG Train-Sets with Telescope Damper



“Brake Porter” operating the manual Coach Brake between the Coaches until 2016



Inelastic simple Coupling Device sans Shock absorbing Dampers adding to Train-Set Jerks

The technical system must become such that the wellbeing of the passengers becomes independent from the skills of the “brake porters” and not put on risk by derailments caused by lapses or malfunctions of the “brake porters”.

Indian Railways have decided to install on the coaches the **two-pipe graduate release compressed and non-exhaustive air brake system** with brake cylinders, distributor valves and compressed air reservoirs. However, such a sophisticated system has to be regarded as not advisable for the small coaches under the poor maintenance, repair and test facilities. For the needs to service, maintain, repair, test and check with brake certificates of **two-pipe graduate release compressed air brakes**; see P.C. GUPTA: **AIR BRAKE SYSTEM GUIDE**, 5th Edition 2006, available at Jain Book Agency, New Delhi, JBA Book Code 5537, 150 Rupees; **AIR BRAKE SYSTEM FOR DRIVERS AND GUARDS**, April 200, Centre for advanced Maintenance Technology, Maharajpur, Gwalior, India

This dual-pipe compressed air-brake system previously mounted on Matheran Toy Train Coaches for test trials had been that time vandalized:



Vandalised Dual-Pipe Compressed Air Brake Components at Neral; October 2016

The prevailing conditions of this toy train are not such that the described procedures for the Broad Gauge Coaches and Train Brakes can be easily followed to satisfaction.

Since there is no elasticity in the primitive coupling system sans dampers, the jerk-problem has not become less. It seems, that with the installation of the dual pipe, non-exhaustive compressed air brake system in lieu of the manual operated brakes, the jerk-problem increased with the shuttle survive train-set with front-and rear locomotives. Jerks contribute to derailment proneness.

Anyway for Safety Reasons, one wanted to become independent from possible lapses and malfunctions of the hand-brake operators, who can easily produce jerks contributing to derailments, like recently near Aman Lodge:



01.05.16 Aman Lodge Derailment

or even can forget to apply the brake as at the Jummapatti incident of 26th April 2016.

One could learn from Heritage Narrow-Gauge Toy Railways in England and Germany, some of which use a **simple one-pipe, direct working compressed air-brake system without distributor valves. The Brake Cylinders are loaded with a Spring**. When compressed air is introduced into the cylinder it will work against the load-force exerted by the spring and keep the brake system in a released state. The brake is applied by gradually exhausting the air-pressure allowing the load-spring to bring the system into braking position. The system is “**fall-safe**”. With the drop in the air pressure pipe or host in case of a rupture or leakage the brake applies mechanically. With a lever the brake can be released mechanically in case of absent of any air-pressure supply.

The bogies of the Matheran coaches have only a primary suspension with a short play making it difficult to follow short length track irregularities. The tight curves are not provided with transitions of appropriate length, resulting in a coach-end off-set between the coaches with their primitive inelastic coupling system, when entering a curve from straight (see: Technical Railway Paper by Dr. F.A. Wingler **RAIL TRACK GEOMETRY** under <http://www.drwingler.com>). Those facts contribute to the **DERAILMENT PRONENESS** of the coaches.

One reason, why this fragile tramway could operate in former times without major severe bad incidents is that that time there had been a common awareness for hazards amongst in the minds of the operating personnel with strong commitments, and everybody identified himself with the operational rules and the safety. This can nowadays not anymore be expected. The technical system has to be adopted therefore accordingly to dwarf human malfunctions.

How a 2 ft NG rail-track can be laid with trough steel-sleepers on a well ballasted cushion for safe passenger's service can be learned from the UK, North Wales, 25 miles nostalgic and scenic **WELSH HIGHLAND RAILWAY**, which had been recently rebuild and revamped (see also the Technical Railway Paper by Dr. F.A. Wingler **RAIL TRACK GEOMETRY** under <http://www.drwingler.com>):



**Laying 2 ft. NG Rail Track on Trough Steel-Sleepers on a well ballasted Formation;
Welsh Highland Scenic Railway, Wales, England**

On risky sections along the precipices, as around the Panorama-Point/Mt.Berry/Governor Hill Rim, the track-trace could be shifted towards the hillside and the track run through a Protection-Gallery as delineated on a following picture of Canadian National, Canada;



Protection-Gallery, Canadian National, Canada



Inside and outside Guard-Rails on Sakleshpur-Subramaniam Road Ghat Section, Karnataka, India, to prevent derailed Trains to tumble from the Bridge



Protection at Precipices by outside Guard-Rails on 2 ft. NG scenic Festiniog Railway, Wales, England



Outside Guard-Rails on 2 ft NG Festiniog Railway, Wales, England to mitigate the Impact in Case of a Derailment

TRAIN SERVICE PARTIALLY RESUMED AFTER 17 MONTH OF SUSPENSION

On October 30th 2017, after 17 month of suspension, the shuttle-service resumed its service on the upper 3 km section between Matheran and Aman-Lodge under a speed restriction of 10 kmph on the partly rehabilitated formation and with a graduate release and non-exhaustive dual-pipe (feed- and brake-pipe) compressed air-brake system mounted on the coaches. Since there is no elasticity in the primitive coupling system sans dampers, the jerk-problem has not become less. **On 13th and as well on 15th November the author experienced on the Shuttle 52146, 8 30 am down runs in the 1st class coach vigorous train-set jerks. Jerks contribute to derailment proneness.**

However, the rail-track itself has not been rehabilitated. The Steel-Trough Sleepers are still resting on earth and mud, and kinks at joints had not been rectified. As long pedestrians are allowed to use the track as a trail, it will not be possible to maintain a clean and un-fouled ballast cushion.

Although the likelihood for a train to derail has not been reduced, the impact a derailment might have and the harm a derailment might produce are mitigated by the retainers and crash-barriers.

On the shuttle-service section between Matheran and Aman-Lodge at certain locations gabions have been erected as retainer-walls to retain the formation from yielding and to broaden the top formation width. At risky sections, where derailed coaches might be prone to tumble down the precipice, Guard/Crash-Barriers, as used on highways, had been installed. On such risky sections in addition one or two guard-rails have been added between the running rails to prevent derailed rolling stocks to leave the formation.

But nothing has been done in order to bring the trough steel-sleepers on a ballast cushion and to prevent rail-joints in curves to kink.

On the main-section, on the west-side around Panorama Point, the rail-track itself is at it has been 17 month before. There are still severe formation defects, aprons washed out, joints are kinking and there is no ballast under the sleepers. The safety related works for new gabions, retaining walls and crash-barriers, to prevent a derailed train to tumble down the abyss, started November 2017 on the Governor Bungalow Hill west-side as well on Mt. Berry east-side.

Before resuming the train-service on the Neral-Matheran main-section still a lot of further works have to be done in order to assure a safe Joy-Ride for the Matheran Visitors by rehabilitating rail-track and formation, by installing formation retaining walls or gabions and crash-barriers along the precipices as announced January 2017 by Railway Minister Suresh Prabhu, and as already partly performed on the upper Aman-Lodge-Matheran section.

The following Picture Gallery with images from November 1st 2017 gives an impression of the rehabilitation works for the resumed shuttle service:

PICTURE GALLERY MATHERAN-AMAN LODGE;
November 2017



Gabions as Retaining Wall securing the Formation from yielding; but Track laid without Ballast, only on Earth! The Likelihood for a train to derail has not been reduced. However, the Impact a Derailment might have and the Harm it might produces are mitigated by Retainers and Crash-Barriers.



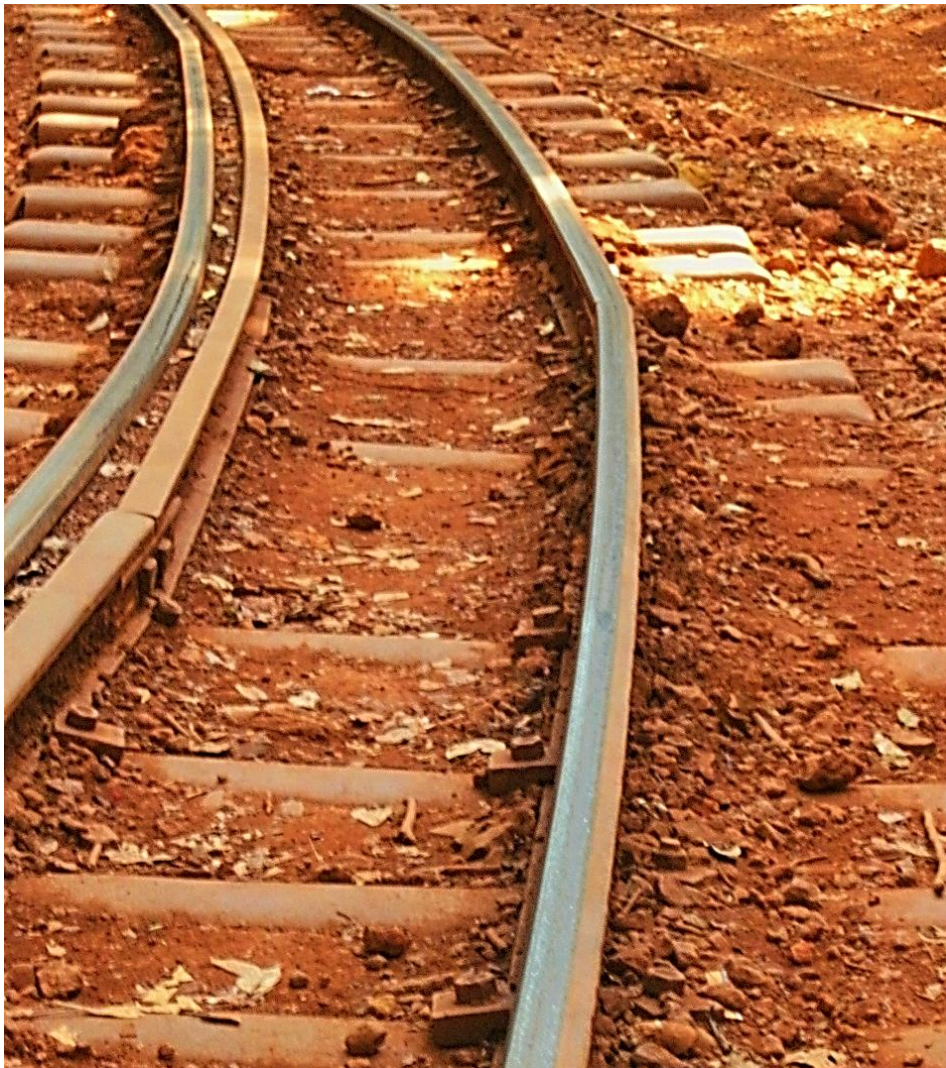
**Gabions as Retaining Wall securing the Formation;
but Track laid without Ballast, only on Earth!**



“Ballast-less” Earth Track on damaged Formation with pending Trough Steel-Sleepers



“Ballast-less” Earth Track with pending Trough Steel-Sleeper on damaged Formation



Kinking Rail-Joints in Curve of Earth-Track for the Shuttle Service



Misaligned Earth-Track with Central Guard-Rail; Pedestrians walking over the Track making the Maintenance of clean and un-fouled Ballast Cushion impossible



Earth-Track Curve with two inside Guard-Rails; no Ballast



New erected Steel Crash-Barrier securing Rolling Stocks in Case of Derailment to tumble down the Precipice



Brake Cylinder of dual-Pipe compressed Air-Brake; White: = Feed-Pipe, Green: = Brake Pipe; Cut-Off Angle Cocks and House Coupling



Defective Feed-Pipe Cut-Off Angle-Cock/House Coupling-Palm of Shuttle-Service Train-Set



Distributor Valve of dual-Pipe compressed Air Brake System



Brake Porter and Attendant Crew for 15th November 2017 Shuttle 52146 down Run

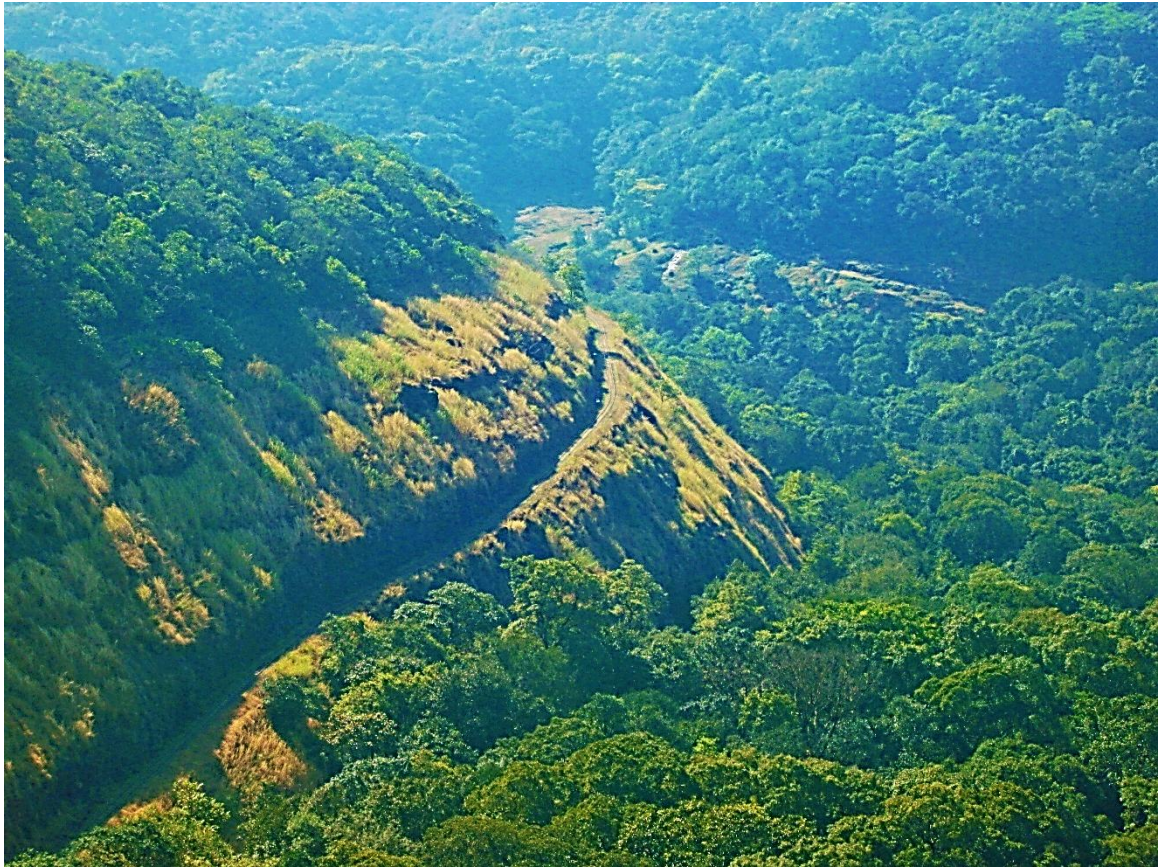


Shuttle-Service 52146 leaves Matheran on 01.11.17 at 9 am

PICTURE GALLERY OF MAIN-LINE AROUND **PANORAMA POINT & MOUNT BERRY & GOVENOUR** **BUNGALOW HILL; November 2017**



Work started Begin of November 2017 to provide Formation-Protection by Gabions near Aman-Lodge



**Safety related Works have not yet reached the Track on the West-Side around
Panorama Point Hill**



Slope Erosion with washed-out Apron



Formation-Slope Failures, washed-out Apron



Formation-Slope Failure; washed-out Apron



Formation-Shoulder Failure



Formation-Shoulder Failures



Kinking Outer-Curve Rail-Joint



Missing Crash-Barrier to prevent derailed Rolling Stock to fall into the Abyss



Missing Crash-Barrier to prevent derailed Rolling Stock to fall into the Abyss



Missing Crash-Barriers to prevent derailed Rolling Stock to fall into the Abyss; West Side



Arduous ongoing Works at on Governor Mt. Berry (East) Side



Erecting Crash-Barriers on Mt. Berry (East) Side; NM 134



Rock-Fall Protection at NM 134, East Side