RMES
Rugby Model Engineering Society Limited
Rainsbrook Valley Railway, Onley Lane, Rugby, Warwickshire, CV22 5QD

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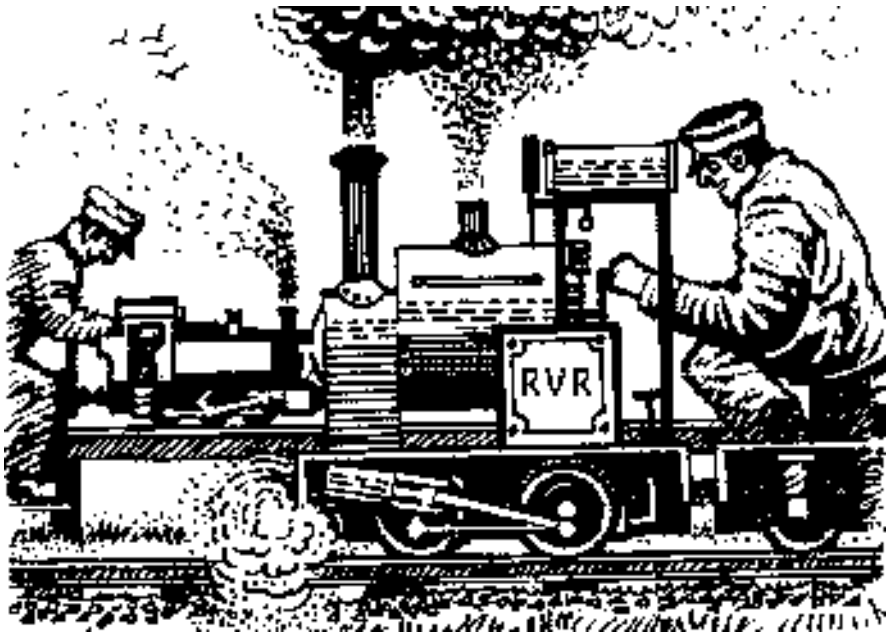
Safety Investigation Report 01/2017



RAINSBROOK VALLEY RAILWAY

Published: 8th May 2017
By: Safety Officer

Passenger train derailment and coach overturn at birthday party event, 8th April 2017

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Introduction

1. This investigation was carried out by the Safety Officer of Rugby Model Engineering Society Limited (RMES) in accordance with the Society's Safety Management Manual and the Society's obligations under the Health and Safety at Work etc Act 1974 (as amended).
2. The incident was reported as a "dangerous occurrence" to HSE under RIDDOR reference CBDBD86422
3. RMES is the owner and operator of the Rainsbrook Valley Railway, a miniature railway established at Onley Lane, Rugby, Warwickshire, CV22 5QD.
4. The sole purpose of an investigation is to prevent future accidents and incidents and improve safety.
5. The investigation does not establish blame or liability.
6. Access was freely given by RMES to their members, data, records and facilities for the purpose of this investigation.
7. Throughout this report, vehicle and track components are described as "left" and "right" relative to the direction of travel.

Summary of the report

Key facts

On Saturday 8th April 2017 a miniature train was carrying members of the public attending a private children's birthday party event when the second coach tipped onto its left side while negotiating a right hand curve. This led to the derailing of the other coach and the locomotive driving truck.

Two passengers suffered minor cuts and grazes as a result of the coach overturning. The locomotive driver suffered a minor wrist sprain. There was only minor damage to the stock involved, but the track was severely damaged over a length of approximately three metres.

Conclusions

Several known causes of rail vehicles derailing and overturning were considered in the light of what little hard evidence was available at the time of the investigation.

From these considerations, it emerged that the most likely immediate cause of the incident was the tipping of coach 108 towards the outside of the curve due to a combination of speed, carriage loading and track alignment which caused it to overturn onto its left side. The forces involved in coach 108 overturning resulted in the derailment of coach 100 and the locomotive driving truck both of which remained upright.

The investigation found three causal factors, two contributory factors and one underlying cause.

The first causal factor was that the track alignment around the curve was to a radius less than the minimum running track radius decided at the design phase.

The second causal factor was that the overall speed limit for the running track did not take into account curves of a smaller radius than that decided at the design phase.

The third causal factor was that a previous occurrence of a curve laid to a smaller radius, which had been corrected when pointed out, did not trigger a risk assessment of this on the speed limits or a rigorous checking procedure to ensure that it did not happen again.

Contributory factors were possible rail expansion due to the temperature affecting the radius of the curve and possible rail movement affecting the stability of the train.

The underlying cause was that the RMES Management Committee did not produce a documented track laying specification which set out the minimum desirable radius for the running tracks or what action to take if this could not be met.

Recommendations arising from the incident

Recommendations can be found at page 22. They relate to the following areas:

- re-assessment of the maximum speed limit for the track to include section restrictions where track alignment cannot be made to comply with the desirable minimum radius;
- documented specifications for major projects affecting the infrastructure of the railway;
- consideration of fitting of speedometers to trains, and
- the accelerated implementation of competency assessment for safety critical roles.

Learning Points arising from the investigation of this incident

Learning points identified can be found at page 22. They relate to the following areas:

- preservation and collection of evidence following an abnormal occurrence;
- passenger welfare following an abnormal occurrence;
- completion of operational paperwork.

The Incident

The Infrastructure

The Rainsbrook Valley Railway (RVR) is a miniature railway owned, constructed and operated by members of the Rugby Model Engineering Society Ltd (RMES) and is located on the outskirts of Rugby in Warwickshire. Trains are operated by members both for their own hobby purposes and, on certain occasions throughout the year, for members of the public. There are two tracks at the site: a ground level 7¼" gauge track provides journeys of up to around 2 Km over various routes and a multi gauge raised track providing journeys of around ½ Km for 5", 3½" and 2½" gauge trains. This incident occurred on the ground level track to which all further comments are related. The track has been in operation by RMES since 1991, but a major extension commenced in 2014 following the acquisition of the lease on the adjacent land. The full circuit was completed in November 2016 and first used for public trains in December and it was on a section of the most recently laid track that this incident happened.

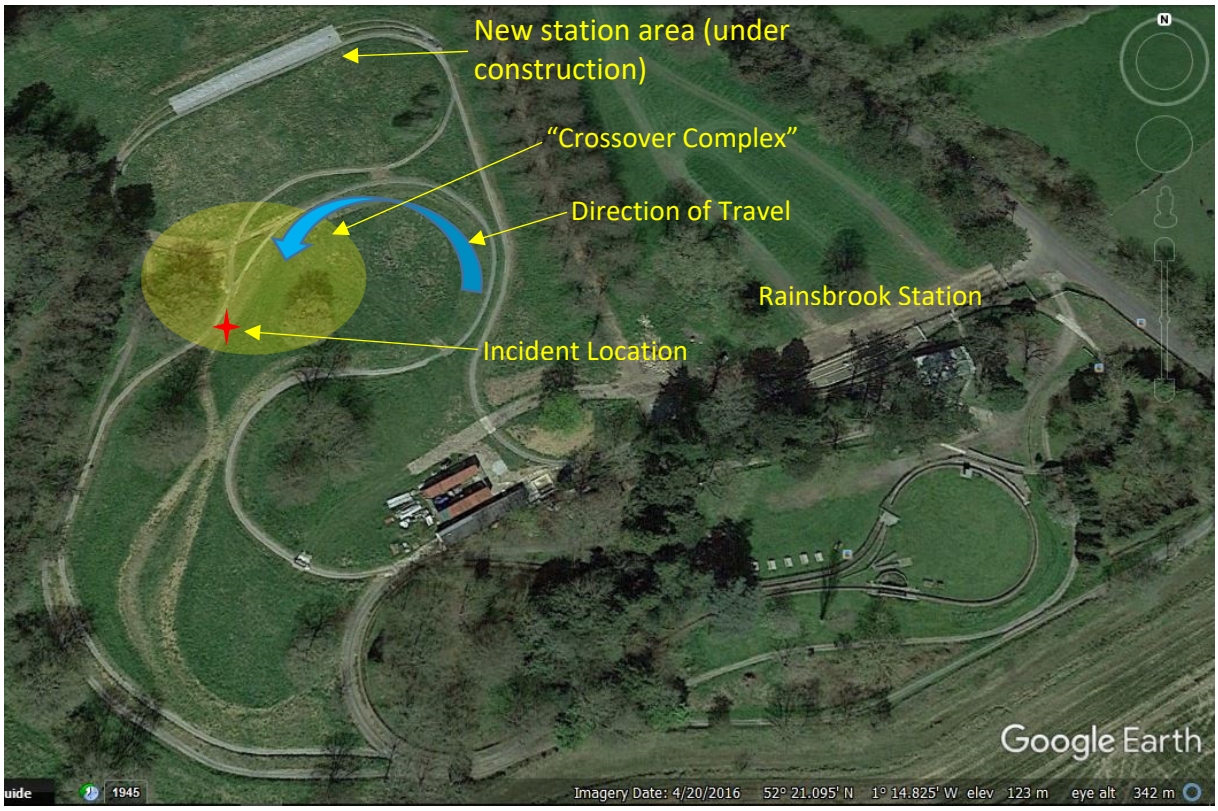

Figure 1 Aerial view of RVR site (Google Earth)

Summary of the incident

On 8th April 2017 at 1540, the rear coach of a miniature train carrying a number of adults and small children tipped over onto its side and caused the derailment of the two preceding vehicles.

The train crew checked the passengers for injury and made the train safe. The guard then used his whistle to stop another train which was following and summon assistance. Three RMES members who were on site and alerted by the guard's signal attended the scene to assist.

The passengers returned to the station on foot and two children were offered first aid for minor cuts and grazes sustained in the incident.

The derailed vehicles were checked to ensure there was no major damage and then put back on the track and returned to the storage shed for later inspection.

The parties involved

The railway infrastructure and the coaches in use were constructed, owned and operated by RMES. The pre-operating track inspection was carried out by two RMES members and the drivers and guards of the two trains in use were RMES members. The locomotive and driving truck involved in the incident were owned and maintained by the person driving it that day. Other RMES members acted as Organiser and assistants for the event.

The passengers on the train were members of the public attending a birthday party celebration for one of the minors.

Location

The Rainsbrook Valley Railway is located at Onley Lane, Rugby, Warwickshire CV22 5QD. The ground level 7¼ inch gauge track is a continuous circuit with the option to select several different routes.

This incident occurred on a section of the track laid in the Autumn of 2016 known locally as the "crossover complex" adjacent to the proposed new station (see Figure 1) and designed to permit trains to enter or leave the station in either direction using different routes. The complex consisted of two sets of points and a crossing (see Figure 2). At the time of the incident the two sets of points were physically locked to permit operation only on the route selected for the event and the crossing was not used.

The complex was near the highest point of the layout and was approached via a series of curves on a climbing gradient and left by a further series of curves on a descending gradient. The incident occurred on the first, right hand, curve after the second set of points**.**

External circumstances

The weather at the time of the incident was fine and dry. The temperature recorded at a nearby weather station was +20°C which was the highest recorded temperature since the track at the location had been laid.

The RVR was hosting an event booked by the parents of a child celebrating his birthday with friends.

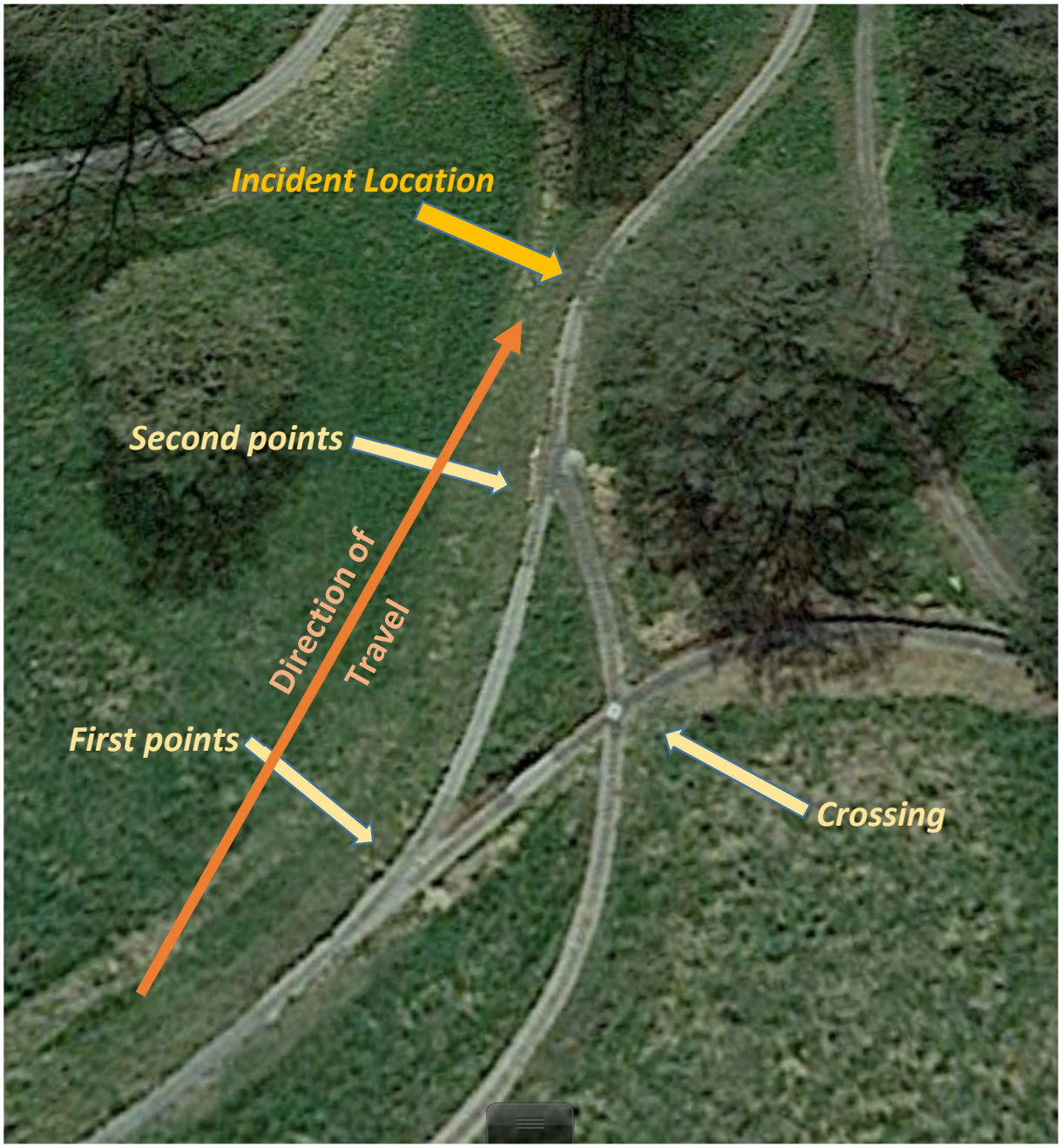

Figure 2: The Crossover Complex where the incident occurred

Trains and rail equipment

The train involved in the incident consisted of four vehicles:

- The locomotive was a scale model of a BR Class 20 locomotive driven by two 24V direct current electric motors powered from two 12V lead acid batteries connected in series. The body was mounted on two four-wheeled bogies (Bo-Bo arrangement in the original BR notation);
- The locomotive was followed by a twin bogie driving truck with seating for the driver, the power controls for the locomotive and the braking controls for the train.

- The first passenger coach was a standard RMES 100 series type consisting of an open box wagon body with a central sit-astride bench seat along its length, mounted on two four-wheeled bogies. The coach is vacuum brake fitted with braking on all wheels. RMES stock number 100.
- The second coach was similar in construction but has a guard's compartment at the rear fitted with a flag stowage box and an emergency vacuum brake lever. RMES stock number 108.

Figure 3: The train formation with "Class 20" battery electric loco, driving truck and standard Series 100 coach pair.

The main running track is constructed of 6lb/yard profiled steel flat-bottomed rail fixed to tanalised wood sleepers with proprietary moulded plastic baseplates and clips, and steel screws. The track is ballasted with 14mm granite chippings. The site has a gentle south to north slope with the highest level being in the new station area shown at the top of Figure 1. Track gradients continually vary around the route with an average gradient of 1:100.

The track in the vicinity of the incident location was laid by RMES members during 2016 using all new materials including the two sets of points and crossing.

There was no signalling in this part of the track layout and train separation was strictly line of sight, that is, trains must be driven at a speed which would enable the driver to react and bring the train to a stand within the distance he can see to be clear ahead. A new signalling system was under development for future installation.

Events preceding the incident

On 8th April 2017 the birthday party event had been booked to run from 1400 until 1600 using two trains. A break was scheduled halfway through for the birthday refreshments.

The track was inspected and signed-off as safe to use by two RMES members and the two train crews brought their trains into service carrying out the prescribed checks of the vehicles and their equipment.

Both trains completed five or six circuits of the track prior to the break without incident. The incident occurred during the first circuit after the break.

Events during the incident

After the break, the train involved in the incident was the first departure. The train was loaded with two adults and two or three children in each coach plus the guard at the rear of the second coach.

The journey proceeded normally until the train had passed the second set of points in the crossover complex.

As this area marks the summit of the track on this part of the route the driver reported that he had almost shut off the power to the traction motors in preparation for the descent.

Approximately 8.5 metres past the tail of the second pair of points, the rear coach started to tip to the left as the train was rounding the right-hand curve. The tipping continued very quickly causing parts of the underbody to strike the sleepers and then dig into the ballast.

The train was brought to a stop very quickly and with some force over a distance of approximately 2 metres with the rear coach lying on its side against a shallow embankment, the front coach derailed, but upright, and the driving truck partially derailed. The driver was thrown forward onto the locomotive roof but managed to shut off the locomotive power and apply the train brakes.

The passengers and guard in the rear coach ended up partly in the coach and partly on their sides against the embankment. The front coach passengers remained seated.

With the train stopped, both the driver and the guard checked the passengers and confirmed that there were no serious injuries. The guard then used his whistle to warn the following train and summon assistance.

Consequences of the incident

The driver suffered a sprained wrist due to being thrown forward as the train stopped. One child had bitten his lip and another had grazed her thigh.

The two coaches sustained superficial damage due to collision with sleepers and ballast.

The track was severely disrupted over approximately 3 metres with sleepers and ballast displaced.

The following train stopped on hearing the three whistle blasts from the incident guard and was then routed back to the Rainsbrook station via an alternative route.

Events following the incident

The guard's signal had alerted several RMES members who were on-site and three made their way to the incident site and helped in dealing with the passengers and recovering the train.

The passengers were directed back to the Rainsbrook station area on foot.

An RMES member who was helping in the station area checked the passengers and offered first aid to the two children with minor injuries. She also recorded details of the injuries.

The damaged track section was cordoned off pending inspection and repairs.

The RMES Chairman who was on-site attempted to notify the Safety Officer (SO) of the incident and seek advice on how to proceed. The SO was not immediately contactable but received a voicemail message at approximately 1900. Details of the incident were passed and arrangements made for the SO to inspect the site and stock the following day.

Following the site inspection, the Chairman asked the SO to commence a Safety Investigation in accordance with the RMES Operations Manual Volume 1 – Safety Management System.

The incident was reported to the Health & Safety Executive as a RIDDOR Dangerous Occurrence on 10th April 2017 following discussion with the Environmental Health Department at Rugby Borough Council.

The Investigation

Sources of evidence

Information was obtained from the following sources:

- Statements by RMES members involved in organising and running the event;
- Statements by RMES members involved directly in the construction and maintenance of the track and rolling stock;
- Evidence gathered on site and from examination of the train;
- Procedures and records which form parts of the RMES Operations Manual;
- Discussion with the operator of another miniature railway;
- Internet resources related to the stability of rail vehicles on curves;
- Study of Rail Accident Investigation Branch (RAIB) reports.

Previous occurrences of a similar nature

RMES had a similar incident at a Public Running event on October 18th 2015 in which a coach derailed and overturned while negotiating a left-hand curve into the cutting at the lower end of the site. No formal investigation was carried out at the time but what evidence was available was discussed at a meeting of the Management Committee. No conclusion was reached as to the cause, but contributory factors may have been train speed and the carriage of two large adult passengers at adjacent ends of two coaches. A permanent speed restriction of 5 MPH was put in place through the curved cutting and coach loading procedures were reviewed during annual refresher training for guards.

There have been several low speed derailments at the entry points to the Rainsbrook station all related to the operation of the points.

Analysis

Identification of the immediate cause[1]

The most likely immediate cause of the incident was that the train entered a right-hand curve at a speed that was too high for the combination of curve radius and specific coach loading and the resultant forces caused the second coach to overturn towards the outside of the curve. The first coach was derailed by the lateral forces applied at the couplings generated by the second coach overturning.

It was not possible to determine the degree to which speed, load or curvature contributed to the overturning as the train had no means of measuring or recording speed and the precise loading of the two coaches was not recorded at the time. The radius of curvature immediately before the point of overturning was found to be 50 feet.

Identification of causal[2] and contributory[3] factors

The stability of a railway vehicle transiting a curve is based largely on the balance of forces resulting from the weight of the vehicle acting vertically downwards and supported by the track, combined with the centrifugal force acting laterally towards the outside of the curve. Both forces, and the resultant force, are assumed to act on the centre of gravity of the vehicle.

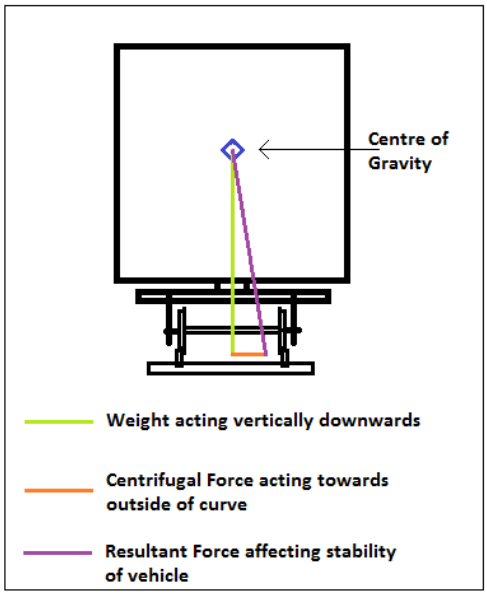

Figure 4: Forces affecting stability of a rail vehicle.

Therefore, the stability of the vehicle depends on the following factors:

- Speed;
- Track alignment – radius of curvature;
- Track construction – stability of foundation;
- Vehicle design;
- Vehicle loading.

It is generally assumed that the vehicle is stable if the resultant force acts through the middle third of the distance between the rails (track gauge). If the resultant force moves to the outside rail the risk of tipping is high. As the vehicle tips the centre of gravity will move outwards compounding the tipping force.

[1] The condition, event or behaviour that directly resulted in the occurrence.
[2] Any condition, event or behaviour that was necessary for the occurrence. Avoiding or eliminating any one of these factors would have prevented it happening.
[3] Any condition, event or behaviour that affected or sustained the occurrence, or exacerbated the outcome. Eliminating one or more of these factors would not have prevented the occurrence but their presence made it more likely or changed the outcome.

The above factors have been considered in the light of what evidence was available from the investigation of this incident.

Speed

In this case, the speed of the train at the time of the incident is not known as the train had no speedometer or means of recording speed fitted (which is common for this type of railway).

The RVR has an overall maximum speed limit of 8 MPH with Permanent Speed Restrictions (PSR) of 4 MPH through the Rainsbrook station area and 5 MPH through the lower cutting. With no speed indication available, compliance with these limits relies on the judgement and experience of the driver. To some extent it also depends on the experience of the guard. There was a train brake valve available at the guard's position which he could use to alert the driver if he considered the train speed excessive.

Independent statements from the driver and guard of the train indicate that neither considered the speed immediately prior to the incident excessive or significantly different from the speed at which they had passed the same point during the five previous trips that day.

The actual speed being unknown, it can only be considered in relative terms. Since centrifugal force increases with the square of the speed the relative force for a given weight, centre of gravity and radius of curvature can be shown as:

- 1 MPH 1F
- 2 MPH 4F
- 4 MPH 16F
- 6 MPH 36F
- 8 MPH 64F
- 10 MPH 100F

…… indicating that the centrifugal force would be four times higher at 8 MPH than at 4 MPH.

Track alignment

Track alignment or, specifically, the radius of a curve in the track, directly affects the centrifugal force generated. The smaller the radius, the higher the force.

When the decision was taken to extend the ground level track at RVR it was decided that the minimum curve radius for the running tracks was to be 70 Feet (21.3 Metres). The main reason for this was to permit the operation of longer wheelbase locomotives, but it was also considered in the setting of the 8 MPH overall maximum speed limit on the railway.

During the site inspection, the radius of the curve where the coach overturned was found to be 50 Feet (15.2 metres).

During the construction phase the agreed alignment was marked out and the track bed excavated. The person in charge of the excavation stated that he informed the track laying gang that some of the curves were approximate and that they needed to ensure the minimum radius was maintained during track laying. This was not recorded and different opinions were evident among the track gang members.

At one point during the track laying a casual observer commented that one curve looked very tight and, on checking, it was found to be near to 40 Foot radius (12.2 metres). This was corrected by adjustment of the groundworks and replacing the curved rails with ones bent to the correct radius. This experience did not appear to lead to any specific checks to ensure that the minimum radius had been achieved elsewhere on the new track. Neither did it raise any question about what should be done if it was not possible to achieve the desired minimum radius.

In the "crossover complex" the priority was to get the correct relationship between the two sets of points and the crossing. The track was then connected to the complex but the tight curve from the end of the second set of points was not picked up at the time.

Figure 5: Track at the incident site. Coach 108 overturned between the cones.

Track construction

During the site inspection, the track either side of the incident location, but well clear of the section disrupted by the incident, was found to move laterally under light foot pressure. There was also slight vertical movement.

Any movement of the track as a train passed over it would tend to increase the instability already existing in the train and may have been a factor in this incident.

Vehicle design

Design factors mainly affecting stability of a vehicle include weight, centre of gravity and suspension.

The coach that overturned, No. 108, was found to weigh 211 Kg and the centre of gravity estimated to be 350mm above the railhead. The seat height was 440mm above railhead level.

Post incident inspection of both coaches involved showed no defects that might have affected the stability of the vehicle and only superficial damage caused by the incident.

The maintenance records for both coaches indicated no significant history that might have contributed to the incident.

Figure 6: Coach 108 pictured during post incident inspection.

Vehicle loading

No details of the loading were recorded on the day. The guard's statement suggested the following seating arrangement:

Child / child / adult / child / adult / guard

Using average weights as used by airlines, this would suggest a loading of:

20 Kg / 20 Kg / 80 Kg / 20 Kg / 80 Kg / 80 Kg = Total 300 Kg

with a combined CG 230mm above seat, 670mm above railhead

Using the vehicle figures above, this suggests a total vehicle weight of 511 Kg with a centre of gravity 538mm above the railhead.

Vehicle stability

As an illustration only due to the various assumptions made in the absence of hard data, the likely stability of coach 108 loaded as above was calculated using various internet tools to determine the centrifugal force.

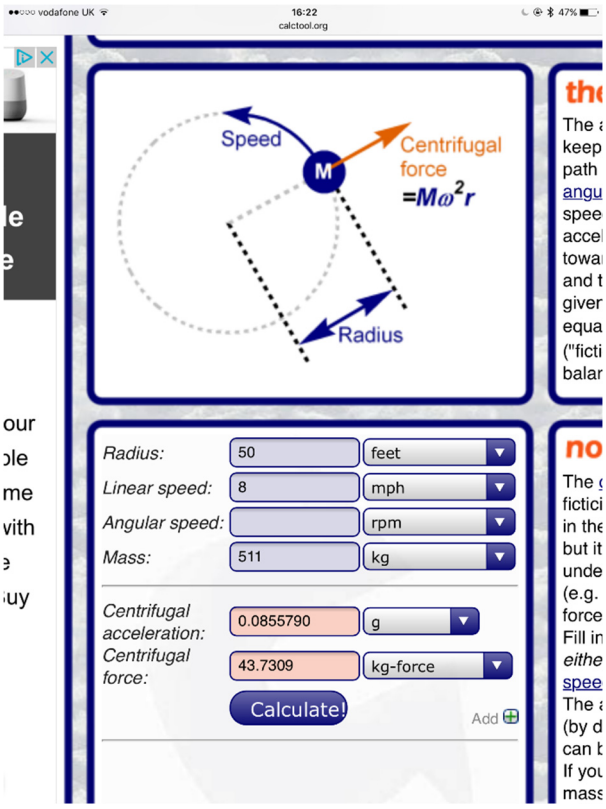

Figure 7: Internet tool to calculate centrifugal force with example for 8 MPH.

Stability for 7¼" (184mm) gauge track with a curve can be assumed if the resultant force vector is within 30.7mm of the track centreline. Using a weight vector of 511Kg and the centrifugal force calculated above the following figures were obtained:

Speed MPH	Force Vector from Centre mm	
	Radius 50ft	Radius 70ft
6	26	18
8	**45**	**33**
10	**71**	**51**
12	**103**	**74**

The amber figures in the table above show that the force vector is outside of the optimal middle third of the track gauge and the risk of tipping is increased. The red figure shows that the force vector has moved outside of the outer rail and tipping is inevitable. All figures are only valid for the specific loading assumptions made above.

This suggests that the stability was already into the unstable area at the track speed limit of 8 MPH. For completeness, the speed at which the resultant vector moved outside the outer rail was found to be just slightly less than 12 MPH on a 50 ft radius curve.

Other factors

The illustration above only considers stability under the influence of centrifugal force. Stability can also be degraded by the following factors:

- Track cant or super-elevation – applied correctly this can counter the centrifugal force experienced by a vehicle transiting a curve. An adverse cant will add to the centrifugal effect. The cant of the track at the incident site could not be measured due to the disruption caused by the incident. No documentation could be found regarding use of cant at RVR.
- Track vertical alignment – any vertical alignment discontinuity may cause a vertical force which might adversely affect stability. On inspection, the first rail joint 6.1 metres after the second set of points was found to have a gap of 20mm, although it could not be confirmed as existing before the incident. The tipped coach struck sleepers during the incident and this may have caused the gap to extend. A vertical discontinuity may also occur if track is not sufficiently supported at rail joints so that it is moved downwards by the passage of a train. On inspection of the same rail joint, a slight vertical movement was observed when standing on the rail, but not sufficient to have had a significant effect on a passing train.
- Passenger movement – passengers, especially children, have been known to lean or reach out of a coach while the train is moving and this would tend to destabilise the coach by moving the centre of gravity away from the track centreline. Passengers are briefed not to do this before each departure and it is one of the guard's duties to prevent it during a journey, stopping the train if necessary. The guard on the incident train stated that no such behaviour was observed at any time.
- Weather – the track was clean and dry at the time of the incident and when inspected the following day. It was noted that the ambient temperature at the time was around +20°C and this represented the highest recorded temperature since the track was laid. The actual rail temperature was not known, but any track lateral movement due to rail expansion would have tended to push the track out of the curve effectively decreasing the radius by a small amount.

Evidence at the incident site

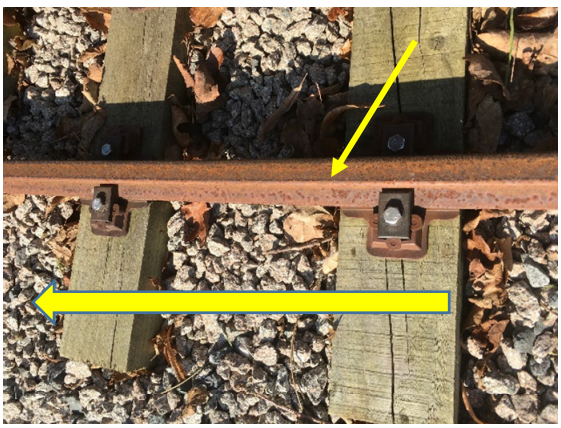

Figure 8:Witness mark on outside edge of left rail. Arrow shows direction of travel.

At approximately 6.2 metres from the end of the second set of points there was a light witness mark on the outer edge of the left rail. This continued for 2 metres and suggests that a vehicle had transferred its weight to the outer edge.

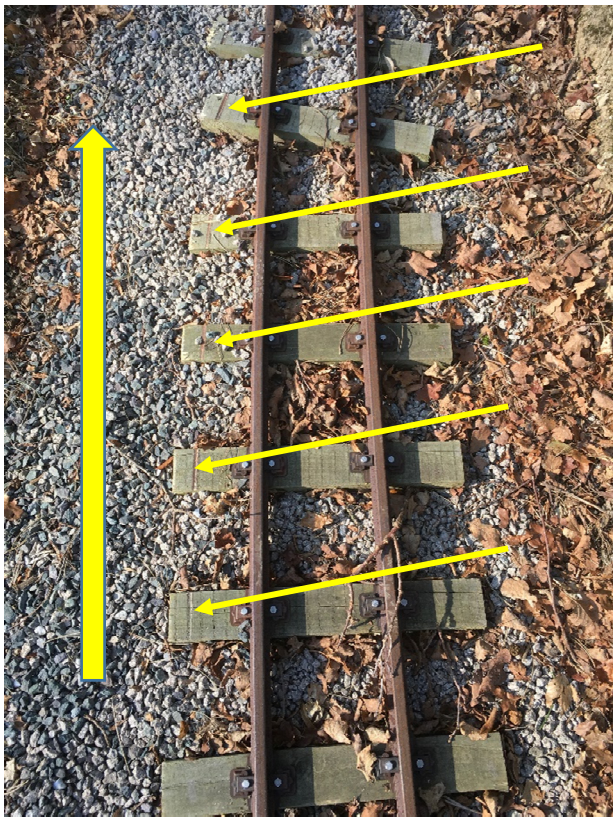

Figure 9:Witness marks on left end of sleepers

At 8.5 metres from the end of the second set of points there were witness marks of something striking the top of the sleepers with increasing force. At first this was thought to have been caused by a derailed wheel but later tests showed that it was more likely the front vacuum release valve and/or the lowest point of the coach underframe. This continued for approximately 1.2 metres after which the sleepers started to be displaced by either the front crossmember of the coach or the front bogie.

Figure 10:Displaced sleepers and ballast

Once the sleepers were being struck and displaced the train quickly stopped with its front edge 11.5 metres from the end of the second set of points and resting on its side against the shallow embankment to the left of the track.

Nothing was found that suggested the train had derailed and then tipped, but rather that it had tipped first and derailed as a consequence.

Severity of consequences

Speeds on miniature railways are generally low but are often dependent upon the train driver's estimate of his speed as very few miniature locomotives are fitted with a speedometer.

In this case, the few minor injuries sustained suggest that the train speed was not excessive and probably within the existing speed limit. Also, coach 108 did not tip right over onto its side as it came to rest against a shallow embankment.

The consequences may have been more serious if the incident had happened elsewhere on the track.

It was noted that, once the passengers had returned to the station area, basic first aid was offered by a person who had experience of supervising young children, but had no current first-aid qualification. Had the incident been more serious, the lack of trained first-aiders may have exacerbated the outcome.

Conclusions

Immediate cause

The immediate cause of the incident was the tipping of coach 108 towards the outside of the curve due to a combination of speed, carriage loading and track alignment which caused it to overturn onto its left side. The forces involved in coach 108 overturning resulted in the derailment of coach 100 and the locomotive driving truck both of which remained upright.

Causal factors

Causal factors were as follows:

a) a section of track had been laid to a radius of 50 feet instead of the minimum 70 feet agreed at the design stage;
b) the 8 MPH maximum speed limit on the RVR did not consider curves of smaller radius than the agreed 70 feet;
c) another incidence of the track being laid to too tight a radius did not trigger a risk assessment of the effects of this on the speed limits or a rigorous checking procedure to ensure that it had not happened elsewhere.

Contributory factors

The following factors were possibly contributory:

a) The temperature on the day may have led to rail expansion that would have exacerbated a) above;
b) Rail movement both laterally and vertically in the area of the first rail joint after the points may have triggered forces sufficient to adversely affect the already inherent instability in the train.

Underlying cause

The underlying cause of this incident was that the RMES Management Committee, who retained overall responsibility for management of the track extension project, did not produce a documented project specification for use by those who did the works. Additionally, it did not put in place sufficient checks and balances to ensure that the verbally agreed specifications were adhered to or carry out an assessment of the risks that might result if it were not possible to meet the agreed specifications.

Actions reported as already taken or in progress relevant to this report

a) RMES has imposed a temporary speed limit of 4 MPH through the “crossover complex” to be re-assessed following track repairs and easement of the curve;

b) RMES has commenced a review of first-aid provision at public events.

Recommendations

The following safety recommendations are made to the RMES Management Committee:

1) An immediate survey of the existing trackwork should be undertaken to identify any other sections that do not comply with the intended specifications and may need a lower speed limit to be put in place.

2) A formal project management system for all major works affecting the infrastructure of the railway should be implemented. This should:

   a) Set out the specifications for the work so that they are readily available to those undertaking the works;

   b) Formalise the method of ensuring that the specifications are met;

   c) Provide procedures to be followed in cases when the specifications cannot be met.

3) The fitting of a means of indicating and/or recording train speed should be considered.

4) The implementation of competency assessment for safety critical roles introduced by the April 2016 update to the Operations Manual Volume 1 should be accelerated to ensure that all persons carrying out these roles are fully conversant with their duties and responsibilities in both normal and abnormal circumstances.

Learning Points

During the investigation the following points were noted:

1. The train was put back on the track and removed from the scene. In order to gather as much evidence as possible for any subsequent investigation it is essential that the scene should not be disturbed other than to permit assistance to persons trapped. At the very least, photographs of the scene showing how the vehicles ended up should have been taken.

2. The passengers left the scene unaccompanied and returned to the station area. Passenger welfare is a critical area of incident response.

3. The guard on the incident train had not signed the self-declaration of competency and fitness for any role. It is essential that all persons engaged in duties at public events sign the declaration for each role they are rostered for or intend to carry out.

4. Out of date forms were used to report the incident even though the correct forms were available on the club-house notice board. The current forms were designed to assist persons completing them in providing as much information as possible about the event. It is essential that all Committee Members and others likely to be rostered as Organiser at public events be familiar with the location and correct use of the normal and incident reporting forms.