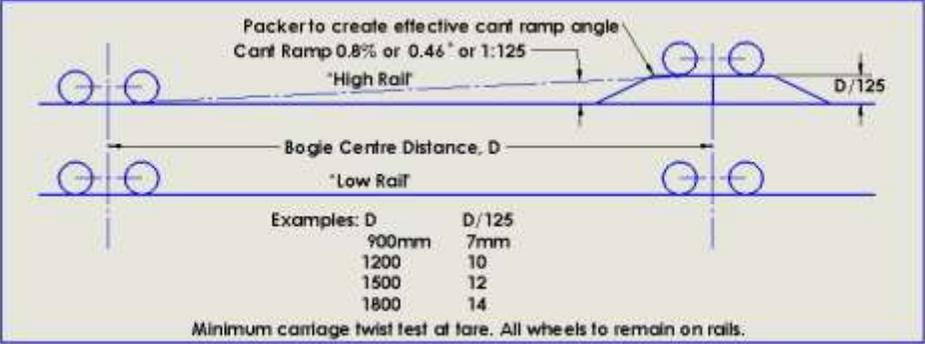


Proposed revisions to the Code of Practice "Standards for interoperability and safety of Miniature Railways, Road Vehicles and Plant."				
26/9/2016 Author Allan Wallace, Chair AALSSC				
Topic	Instigation	Code of practice section	proposal	Comment/justification
Chopper couplings	Castledare submission The proposal is summarized in the letter sent to the clubs in May 2016 titled " Consultation Process on Nominated Key Safety Issues" Document: 7-25 Chopper Couplers - Different Heights - A[1].pdf (Internally titled "Castledare Standard CMR-001")	11.3	Delete the image currently in this section, and replace it with 4 pages as supplied by Castledare. There are two edits to the supplied document: Remove the clause on page 4 beginning "Bogie mounted couplers" (which will be addressed elsewhere). Add a sentence after "Efforts should be made to keep the coupler overhang to a minimum" as follows: "Carriages new to a track should be checked that the couplers do not bind due to horizontal offset when negotiating the worst case horizontal curvature, which will typically be when the couplers are near the point of inflection of an S curve, e.g. on a turnout." In addition, preface this clause with the qualifier "The design shown in this section should be regarded as a recommended standardised arrangement."	The replacement drawings add further information to the current drawing and the new dimensions are compatible with the old. In addition to the hook arrangement, a link arrangement is mandated for use in passenger hauling.
Safety chains		6.2.3	Existing clause says "Automatic type couplings shall be permitted on ground level tracks only." Amend to add "Safety chains must be fitted where couplings are not positively locked or there is any possibility of couplings disengaging."	Added for clarification as to when chains are required. Chains are logically redundant where couplers cannot mechanically disengage and are of sufficient strength.
Safety chains	W Allison submission 24/8/2016	6.2.1.2	delete the existing clause. Replace with "Be fitted with a backup arrangement. Acceptable backup arrangements include (a) adequate safety chains (b) link pins fitted with R clips or equivalent means of positive retention.	The requirement should be driven by the mechanical locking properties of the coupling instead of by size. This revised clause embeds a principle that any coupling used in public passenger carrying service needs to be designed with a backup arrangement, either a) designed such that the likelihood of it breaking is extremely low, or b) provided with an double securing arrangement which a provision of safety chains would provide.
Bogie mounted couplers	Castledare submission	Add 6.2.4	Add clause "Couplers are not to be mounted on bogie frames"	The only foreseeable exception would be where a successful full size prototype is being followed, e.g. some locomotives. Not applicable to this section on public passenger carriages.
Bogie sidebearers	Castledare submission W Allison submission 24/8/2016	6.3.1.6	Existing clause is "Incorporate a suspension arrangement that ensures the vertical forces act within the wheel gauge." Add: "Specifically, bogie sidebearers must lie within the wheel gauge. The recommended sidebearing spacing is between 0.8 and 0.93 of track gauge."	Refer to AME Issue 95 which has a paper entitled "Track and Train Dynamics on a 5 inch Gauge Railway" by W Allison.

Twist capacity	W Allison submission 24/8/2016	Add 6.3.1.12	<p>Be capable of negotiating, at tare and without lifting a wheel off the rails, the worst case twist in the track being used for passenger hauling. All newly-built carriages shall be capable of negotiating, at tare and without lifting a wheel off the rails, a cant ramp gradient of 0.8% (1:125).</p>  <table border="1" data-bbox="584 523 831 635"> <thead> <tr> <th>Examples: D</th> <th>D/125</th> </tr> </thead> <tbody> <tr> <td>900mm</td> <td>7mm</td> </tr> <tr> <td>1200</td> <td>10</td> </tr> <tr> <td>1500</td> <td>12</td> </tr> <tr> <td>1800</td> <td>14</td> </tr> </tbody> </table> <p>Minimum carriage twist test at tare. All wheels to remain on rails.</p>	Examples: D	D/125	900mm	7mm	1200	10	1500	12	1800	14	<p>A requirement of this nature is a practical, fast and objective way to check several aspects of bogie carriage dynamics in one test, viz. the sidebearer spacing and the capacity of the centre pin to tilt and lift as required.</p> <p>Under twist test conditions the carriage will rest on diagonal sidebearers and the centre plates will unload. The centre pin must have sufficient radial clearances and length to pass the twist test.</p> <p>The test borrows from established practice in AS7509.2 (Railway Rolling Stock - Dynamic Behaviour) and it involves only running one side of one bogie on to a spacer with a thickness equal to 1/125 of the distance between the bogies.</p> <p>It tests the freedom of the bogie to rock under the sidebearers by an angle which depends on the length of the carriage and the track gauge, which will generally be limited by the arrangement of the centre pin. The rock angle range is easily calculated from angle = <math>2 \cdot \text{atan}(D/125G)</math> where D is bogie distance and G the track gauge, and this will typically vary from 6 degrees for a short car to 13 degrees for a long one.</p> <p>While the twist test can also be done with loading, the suspension deflection acts to improve the situation so there's no real point.</p> <p>The ability of a vehicle to maintain vertically downward forces between the wheel gauge due to a tipping body, and the vehicle performance under a track twist are related. In both cases the intent is for all wheels to remain on the rails, irrespective of the degree of body tip or track deformity.</p> <p>There are physical limits to these ideals, and the track twist of 0.8% cant ramp gradient should be considered a minimum only. Experience has shown that it is practical to have vehicles accommodate a cant ramp of 1.4% and potentially beyond. As the greater degree of twist capability provides greater tolerance to vehicle body tip before wheellift is encountered, it is recommended that vehicles be designed and tested to this standard.</p> <p>The figure of 1.4% is based on a paper entitled "Track and Train Dynamics on a 5 inch Gauge Railway" by W Allison in AME 95.</p>
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900mm	7mm													
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Bogie yaw resistance		Add 6.3.1.13	<p>Where plain gap-type side bearers are fitted, the weight of the carriage when centralised must be carried on the centre plate such that there is a finite gap at each sidebearer. Gaps of approximately 1mm are appropriate.</p>	<p>This is a legacy clause because usually ball bearings are used now, but it should be covered in order to minimise bogie yaw torque. Observe that under twist test conditions (6.3.1.12) the carriage will rest on diagonal sidebearers and the centre plates will unload. The centre pin must have sufficient radial clearances and length so the bolster can rock enough to pass the twist test.</p>										