

North County Model Railroad Society Operating Standards for Rolling Stock

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If you right-click on one of the NMRA links while connected to the web, you will be able to download the referenced PDF file for the indicated Recommended Practice document.

All of us want our trains to run well and without problems. As with a real railroad, such quality running is not an accident, nor can it be achieved with a little bit of "quality glue" added here or there. Quality running requires common goals and coordinated teamwork and effort and diligence and responsibility and a lot of cooperation. We have every reason to be proud of our layout. We can be proud of the way our trains run too.

1. Purpose and Scope:

1.1. Purpose:

The purposes of these Operating Standards for Rolling Stock are:

- 1.1.1. To encourage the improvement of rolling stock modeling skills, mechanical skills, electrical and DCC skills, and related operational skills,
- 1.1.2. To keep all rolling stock on Club layouts to the same high craftsmanship as demonstrated by the Club layouts, tracks, and scenery.
- 1.1.3. To protect the investment of the Club's layout, rolling stock, scenery, and equipment and to protect the rolling stock of all fellow train operators.

1.2. Scope:

The minimum mechanical and electrical standards are defined for all rolling stock operated on any of the Club layouts at all times. A very few items apply to specific layout or areas on a specific layout and they are clearly labeled as such.

No member is at any time given license to override any portion of these Standards.

- 1.2.1. The Club Support for the upgrade and maintenance of rolling stock is described in Section 3.
- 1.2.2. The Club Enforcement is described in Section 4.

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- 1.2.3. Standards that are applicable to all rolling stock are described in Section 5.
- 1.2.4. Standards that apply to all Locomotive rolling stock are described in Section 6.
- 1.2.5. Standards that apply to all Car rolling stock are described in Section 7.

1.3. Definitions:

A minimal list of defined terms is supplied here to aid the reader. Only terms that are used in this document and need to be clearly delimited are on the list. Examples are provided for some definitions.

- 1.3.1. Articulated Train with Power Car – For our purposes the term “Articulated Train with Power Car” shall include any type of self contained train rolling stock that is made up of components that are permanently connected together. Examples include models of:
 - ..1. The Union Pacific M-10000 City of Salina.
 - ..2. The CB&Q 9900 series Zephyrs.
- 1.3.2. Car – For our purposes, the term “Car” shall include any type of rolling stock that does not move by itself on flat track under track power. A car can be coupled to most other cars and most locomotives.
- 1.3.3. Locomotive – For our purposes, the term “Locomotive” shall include any type of rolling stock that moves when track power and throttle settings command it to move and is capable of pulling a mixture of cars in a train. In the case of a steam locomotive with one tender, that tender shall be considered as a part of the whole locomotive. Tenders shall meet the car standards.
- 1.3.4. Poor Operation – Any condition that causes even a single piece of rolling stock to “go to ground” or causes an electrical short or otherwise requires a manual operation that could interfere with the other train operators is considered “poor operation.”
- 1.3.5. Poor Running Practice – Any activity by a train crew member that violates restrictions set in this document or in any way puts another crew in a situation that could cause even a temporary secession of operations is considered “poor running practice.”

Good Running Practice is not a part of the scope of this document, but one person’s poor behavior could negate the positive efforts of many club

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members. Only a few generic examples of poor running practice are provided here and even then only for context.

- ..1. Operating a locomotive or car that does not meet the requirements of this specification can lead to dirty track or a broken train or damage to scenery.
- ..2. Lapses of attention leading to the potential damage to the layout can lead to accumulated overheating of connections within Tortoise switch machines or damage to trackwork.
- ..3. Inattention to the wellbeing of other train crews can lead to fouled turnouts, trains parked on the mainline, or even crewless trains roaming about.
- ..4. Moving a train at a scale speed greater than what is prototypical for the situation.

1.4. Effective:

As of the date of approval by the membership, this document will then supersede all previous documents pertaining to the Club Standards for Locomotives and Cars or any other Rolling Stock operated on the Club tracks or operated on any portion of any Club owned layout.

1.4.1. In particular, this document will then supersede the document titled “North County Model Railroad Society - Operating Standards for Locomotives and Cars” and all appendices and attachments to that document, all of which are dated on or before Friday, August 24, 2007.

2. Operations:

2.1. Specific Formal Club “Operations” Activities:

2.1.1. During any specific or scheduled formal Club operations activity or any other form of organized guidance that in some way simulates “Realistic” Operations, additional standards and rules may apply. Any additional standards and rules will be made known prior to the activity and will be enforced by the activity organizer. However, any additional standards and/or rules do NOT negate, weaken, or in any way modify any of the Standards described herein.

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2.2. *Informal Train Operations:*

- 2.2.1. During ALL types of informal “train running” operations, the Standards described in this document shall apply in full force to any Rolling Stock and to any train operator on any Club layout at all times.

3. Support:

3.1. *Maintenance Department Responsibilities:*

- 3.1.1. The Maintenance Department has been assigned the responsibilities of:
- ..1. Keeping supplies, tools, parts, and other equipment on hand to assist members upgrade, clean, and otherwise maintain their own and Club owned Rolling Stock.
 - ..2. Educating and assisting members upgrade their Rolling Stock in the condition required by these Standards.
 - ..3. Educating and assisting members keep their Rolling Stock in the condition required by these Standards.
 - ..4. Verifying that Rolling Stock meets the standards in this document.
 - ..5. Maintaining a file of all incident reports including Bad Order reports.
 - ..6. Maintaining and publishing a common “Bad Order Form” that shall be used to report all incidents of Poor Operation and/or Poor Operating Practice on any Club layout.

3.2. *Maintenance Department Resources:*

- 3.2.1. Special workbench and test tracks are provided for members to do maintenance and to perform certification tests.

4. Enforcement:

4.1. *Responsibility:*

It is the responsibility of all members to provide the enforcement for the Standards and Restrictions of this document on themselves and on other train operators.

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4.2. Certification:

All rolling stock that is used on a club layout shall be certified by the Maintenance Department as meeting the Club Standards at least once a year.

4.3. Removal:

Any poor running practice or any rolling stock that causes poor operation or violates restrictions set in these Standards shall be removed from the layout until corrective actions are performed.

4.3.1. The methods for dealing with a train operator cited for a poor running practice or for a violation of restrictions are outside the scope of this document.

4.3.2. Any rolling stock removed for poor operation shall be written up as a Bad Order report using a Club supplied "Bad Order Form."

- ..1. The Bad Order report must be filled out in a manner that will allow the Maintenance Department to understand the problem and discuss it with the person reporting the problem.
- ..2. The rolling stock may be repaired by the owner or by a member delegated by the Maintenance Department to do the work. In either case, the person doing the work shall sign the Bad Order report in the appropriate place and add any further explanation as to the cause of the problem and/or the effective repair as appropriate.
- ..3. The rolling stock shall be certified by the Maintenance Department as meeting the Club Standards and the Bad Order report completed, signed-off, and filed before the rolling stock can be put back on a Club layout.

5. Standards Common to all Rolling Stock:

The following standards apply to rolling stock models based on North American prototypes. The occasional running of a complete European train is allowed on an individual basis, so long as it is in good working order and has clean wheels that match the HO gauge track.

5.1. Wheels and Trucks:

Items listed in **Bold Font** shall be checked by the operator EACH time any rolling stock is placed on a layout.

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- 5.1.1. All wheels shall be metal and shall conform to the [NMRA RP-25](#) (*Wheel Contour*) and shall not show visible wear. In particular, the fillet shall meet the recommended practice and neither the flange nor the tire can have any burs, scrapes, dings, flat spots, or other damage due to derailments or shorts or hard use.
- 5.1.2. **All wheels shall be clean prior to running on any Club layout.**
- 5.1.3. **All wheel sets and axles and trucks shall be free of lint and threads prior to running on any Club layout.**
- 5.1.4. All wheel widths shall be in gauge to [NMRA RP-2](#) (*Gauge*) specification.
- 5.1.5. All trucks shall be mounted firmly to the carriage bolster and shall pivot freely, but without any propensity to swing to one side. Rolling stock shall sit squarely on the trucks.
- 5.1.6. All wheel sets on the same truck shall be aligned with each other to maintain the same center as the kingpin in keeping with the [NMRA RP-24](#) (*Trucks*) and with [RP-24.1](#) (*Journals*), [RP-24.2](#) (*Wheelsets*), and [RP-24.3](#) (*Axles*) specifications. The tolerances specified by RP-24 shall apply to diesel trucks as well as to car trucks.

5.2. Couplers:

- 5.2.1. Couplers shall be metal and compatible with Kadee couplers.
- 5.2.2. Couplers shall be mounted in insulated draft gear boxes.
- 5.2.3. Draft gear boxes shall not rotate and shall not allow the coupler to rotate beyond the uncoupled position.
- 5.2.4. Couplers shall be on the vertical center-plane of the carriage.
- 5.2.5. Couplers shall be at a height that shall match top and bottom with a coupler on the Kadee Coupler Gauge.
- 5.2.6. If the coupler has a "Glad Hand" (the Kadee term is "trip lever") then that Glad Hand shall clear the gauge for the magnet uncoupler gauge portion of the Kadee Coupler Gauge.
- 5.2.7. Coupler shall re-center freely from any lateral position.

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5.2.8. Coupler shall couple and uncouple with the coupler of any other certified locomotive or car when over a magnetic uncoupling ramp.

5.2.9. Draft gear boxes shall be fastened securely.

6. Locomotive Standards:

6.1. *Drive Wheels, Trucks, and Gears:*

In addition to those Standards stated in Section 5.1, the following shall also apply for Locomotive wheels and trucks and gears:

6.1.1. Locomotive drives shall be lightly but adequately lubricated and locomotives shall be inspected to verify that they do not drip lubrication. Locomotive wheels shall not be lubricated.

6.1.2. Locomotives shall be inspected to verify that mechanical assemblies in the gears, side-rods, or any other drive assemblies or animated portion of any locomotive operate freely without binding.

6.1.3. Diesel and other locomotives with two or three axle trucks shall have balanced trucks and bolsters that roll straight on straight track and do not attempt to turn to one side or to pick switch points or to climb the outside rail on a curve.

6.2. *Couplers:*

In addition to those Standards stated in Section 5.2, the following shall also apply for Locomotive couplers:

6.2.1. Unless it is a model of a specific standalone motive power, each locomotive shall have a working rear coupler.

6.2.2. Locomotives that are permanently connected together as a single articulated grouping, for example as in a "calf-cow" or an A-B-B-A grouping, shall be equipped with couplers at the "external" ends. All external couplers shall meet the specifications of Section 5.2. Within an articulated grouping, a prototypical practice can be followed for the "internal" connections.

6.3. *Locomotive Performance:*

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6.3.1. Any locomotive on the Show-and-Go layout shall be capable of:

- ..1. Negotiating the minimum 39 inch radius.
- ..2. Run for at least two hours without overheating.

6.3.2. Any locomotive on the large layout shall be capable of:

- ..1. Pulling itself up the two percent grade from the east end of the lower hidden yard along the back wall to the Interchange at Summit.
- ..2. Negotiating number six turnout crossovers without binding, shorting, derailing, or needing the help of a finger.
- ..3. Unless the locomotive in question is a power car or other stand alone motive power, it shall repeat the last two tests while pulling a string of cars.
 - ..3.1. Freight locomotives shall be tested with freight cars.
 - ..3.2. High speed locomotives shall be tested with passenger cars.
 - ..3.3. Locomotives may be tested with all passenger cars and with all freight cars.
 - ..3.4. The number of cars for each type of car that a locomotive can pull during these tests shall define the maximum load for that locomotive on the mainline. If, for any reason, the maximum number of cars pulled is zero, then the maximum load for that locomotive is zero cars.

6.3.3. After a locomotive has undergone a maintenance procedure, the Maintenance Department or the owner may request that one or more specific tests defined in Section 6.3.1 or 6.3.2 be repeated.

6.4. Restrictions:

- 6.4.1. No Smoke fluid or Smoke tablets are allowed on the Club layouts.
- 6.4.2. Any pilot of a locomotive shall clear the railhead under all conditions.
- 6.4.3. Locomotive that are not equipped with an operating DCC decoder shall be restricted from the main layout.
- 6.4.4. Before a DCC locomotive is allowed to run on the mainline and related sidings, it shall be tested to verify that it does not damage the layout or scenery or other equipment on the layout and that it does not exceed the limits imposed by our mainline minimum radius and number six turnouts and crossovers.

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..1. For the purposes of this discussion, the track from Newcastle to the intermodal yards at Redbluff and the yards at Redbluff on the main layout are considered as “mainline,” but Rockport tracks are considered as “industrial.”

6.4.5. Before a DCC locomotive is allowed to run on the industrial siding tracks, it shall meet the requirements of Section 6.4.4 and be tested to verify that it does not exceed the limits imposed by our industrial siding minimum radius.

6.4.6. Before a DCC locomotive is allowed to run on the mining and/or logging tracks, it shall meet the requirements of Sections 6.4.4 and 6.4.5 and be tested to verify that it does not exceed the limits imposed by our mining and/or logging minimum radius.

7. Car Standards:

7.1. *Wheels and Trucks:*

In addition to those Standards stated in Section 5.1, the following shall also apply for Car wheels and trucks:

7.1.1. In all possible configurations, a car shall not conduct electricity from one rail to the other in excess of the minimal current needed either for interior lighting or for layouts with occupancy detection.

..1. The current through each car with interior lighting shall be no more than 100 milliamps.

..2. The resistance between rails for each unlighted car shall be at least 4.7 K ohms.

..3. Any truck that can spin 180 degrees while off the track offers multiple configurations and in no case shall conduct current in excess of the limits imposed in Paragraph 7.1.1.

..4. There shall be **NO EXCEPTIONS**, not even temporary exceptions.

7.2. *Couplers:*

In addition to those Standards stated in Section 5.2, the following shall also apply for Car couplers:

7.2.1. Cars shall be equipped with couplers at both ends.

..1. A car that is the lead tender and permanently connected to a locomotive shall only be required to have a rear coupler.

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7.2.2. Cars that are connected together as a single articulated grouping shall be equipped with couplers at the “external” ends. Those external couplers shall meet the specifications of Section 5.2. Within an articulated grouping, a prototypical practice can be followed for the “internal” connections.

7.3. *Weight:*

7.3.1. Each car shall conform to [NMRA RP-20.1](#) (*Car Weight*) for HO cars as a minimum. The applicable car weight for an HO car is specified as one ounce plus an additional half ounce for each one inch of car body length.

7.3.2. The weight shall be firmly affixed to the carriage.

7.3.3. The car’s center of gravity shall be kept as low as is feasible.

7.3.4. The total car weight shall not exceed the RP-20.1 specification by more than 30%.

7.4. *Car Performance:*

7.4.1. Each car shall start and roll “freely” down a Club provided straight test track with a 2% grade. One car at a time shall be pushed up to within an inch or two from the top by hand and then let go.

7.4.2. A car shall not wobble or crab or lurch on flat straight track.

7.5. *Restrictions:*

7.5.1. Before a car is allowed to run on the mainline and related sidings, it shall be tested to verify that it does not damage the layout or scenery or other equipment on the layout and that it does not exceed the limits imposed by our mainline minimum radius and number six turnouts and crossovers.

..1. For the purposes of this discussion, the track from Newcastle to the intermodal yards at Redbluff and the yards at Redbluff on the main layout are considered as “mainline,” but Rockport tracks are considered as “industrial.”

7.5.2. Before a car is allowed to run on industrial siding tracks, it shall meet the requirements of Section 7.5.1 and be tested to verify that it does not exceed the limits imposed by our industrial sidings minimum radius.

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7.5.3. Before a car is allowed to run on mining and/or logging tracks, it shall meet the requirements of Sections 7.5.1 and 7.5.2 and be tested to verify that it does not exceed the limits imposed by our mining and/or logging minimum radius.