Caldwell Model Railroad Club and Historical Society Standards and Processes

V1.10

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Note: The official standards document is maintained by the CMRCHS Standards Committee in printed and electronic format. Recent changes to that document may not immediately be reflected by this print out or web site.

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General

ADMINISTRATION

1. The Chief Clerk duties are to maintain Club Registries of equipment and lead the car department.
2. The Show\Open House Chair shall have responsibility for setup and coordination of Shows and Open Houses
3. The Operations Chair shall have responsibility for leading the operations department
4. The Standards Chair is charged with leading the standard committee and maintaining the Club Standards in written form and offering revisions as needed. In addition, the committee is to monitor all track, electronic and scenery work for adherence to club standards and report to the club board and committee chairs.
5. The Scenery Chair shall have responsibility for leading the Scenery department, and approval of all layout scenes on club layout with the scenery committee per the scene process outlined in the CMRC Scene Process document.
6. The Chief Electrician shall be responsible for leading the Electrical department and maintain the circuit book.
7. The Track chief shall be responsible for leading the track department.
8. All Chiefs and Chairs shall be responsible for establishing and publishing the standard operating procedures (SOP) for their department, with approval by the board of director.
9. Types of operation:
    a. Open Run (Normal Run Days) (non-standard allowed)
    b. Open House\Show (Club standards only)
    c. Operations (Club standards only)
    d. Personal Equipment left on layout per guidelines outlined in this document (Club standards only)

SCOPE

1. The Standards of the Club shall be those of the NMRA except as modified herein. This set of standards applies to both the HO and N scale stationary layouts, except as noted in this specification.

SCALE

1. The primary scales of the club shall be HO scale and N Scale.

EQUIPMENT ON LAYOUT

1. All equipment running on and scenery attached to the layout shall be HO or N scale (per the layout) with the exception of certain applications for special scenic effects, as approved by the scenery department.
2. British OO scale equipment may be operated on the club layout provided it meets the requirements set forth in the following paragraphs, as applicable.
3. Non-standard is defined as cars, locomotives and streetcars that do not meet club Standards. Non-standard equipment can only be used during formal club operation and show\open house sessions with the express permission of the Club Board Representative. Non-standard equipment is not to be left on the layout overnight except when specifically authorized by the Show or Operations Chairman.
4. All personal equipment left on the layout per these standards is available for use by all club members (exception to this rule are for Open House and Operations staging, as defined by the open house and operations

coordinators). When equipment is damaged, the member causing the damage is to notify the owner. The owner may choose either repairs or replacement and the member causing the damage is to honor the request. When a guest damages equipment, the host member is responsible. Damage to scenery is to be reported to the Club Board Representative. Damage caused by a visitor during an open house or operations session shall become the club's responsibility.

Resources

NMRA Standard and Recommended Practices

CARS AND LOCOMOTIVES

GENERAL, CARS

1. All members are invited to supply cars for the layout in accordance with club Standards and the Member Car Limit. Reporting marks and car numbers are assigned on a first come basis and duplication of existing numbers is not allowed.
2. The owner is responsible for maintenance and repair. The Car Dept. with car owner's permission, will make certain "running repairs" as time, manpower and supplies allow. The running repairs are defined as coupler height adjustment, centering spring and knuckle spring replacements and wheel cleaning.
3. New or repaired cars are to be placed on the standards bench and tagged, for inspection by the Car Department prior to being placed on the layout.
4. Cars and Locomotives are to have owner identification via the member's club mark displayed on the underside. To aid in quick identification the following 0.numbers 01 thru 09 are to be two digit and 10,16,18,19,60,61,66,68,81,86,89,90, 91, 96, 99, 161, and 191 are to be underlined, do not use the letter i or o.
5. All cars shall have insulated couplers, draft gear, and trucks, except when electrical pickup is needed.
6. The Member Car Limit is to be determined by the board. The car limit is to be reviewed periodically and adjusted to reflect current needs as the Club. The Car Department will provide a physical count when requested. The current Member Car Limit will be posted in the Car Department.
    a. The Board of Directors may authorize members to exceed the set Member Car Limit for a specific period of time. A copy of the Authorization is to be posted in the Car Department.
    b. The member car count is the aggregate of freight and passenger cars, cabooses, maintenance of way and individual platforms of articulated cars.
7. The Car Department has an area set aside for cars that need to be "Home Shopped for Repairs" and periodically the Car Department will post a list of names of car owners who have cars which need that special attention only a car owner can give. The car will be tagged with inspectors name, date and problem.

GENERAL, LOCOMOTIVES

1. Locomotives are to have their owner's membership mark on the underside.
    a. (See General, Cars Section Item 4 for standard)
2. Responsibility for maintenance and repair is the owner.

3. Powered and non-powered (dummy) locomotive sets with their associated equipment, such as tenders, are to have insulated couplers and draft gear on the rear end of the set and on the front end when practical. Non-standard couplers and or drawbars may be used for Internal coupling of locomotive sets.
4. Locomotives to be lead qualified must have a working headlight.
5. Special lighting (mars, strobe lights, marker lights, number boards, step lights etc.) is encouraged.
6. All Trains and locomotives shall operate at prototypical scale speed on the layouts at all times. The club will provide periodic training on estimating speed.

COUPLERS

1. The Kadee delayed action magnetic coupler is the club preferred coupler.
    a. Couplers shall be maintained at the correct height from the rail as measured by the height gage maintained by the Car Department. (NOTE: This gauge conforms to the Kadee # 205 Multipurpose Coupler Height Gauge.)
    b. Magnetic couplers are required.
    c. Dummy (non-operating) couplers are allowed only on locomotives and rolling stock that is intended to run as a set as in unit and passenger trains. The external couplers are to be fully functional.
2. Working couplers on both ends of equipment are not required when deemed not practical.
3. Truck mounted couplers are not acceptable, except as approved by the car department (i.e. Passenger cars, n scale model, etc..).
4. The N Scale layout is exempt from the above Coupler requirements.

Resources

NMRA Standards - Coupler Contour RP 21.1
NMRA Standards - Coupler Pocket RP 22

Kadee Conversion Charts
Kadee Conversion Instructions

TRUCKS AND WHEELS

1. All cars to be left on the layout and/or used during show shall have:
    a. Wheels which conform to the NMRA MARK II Standards gauge (RP-25). Metal wheels are required; exception may be granted by the car department for difficult to upgrade pieces, such as dummy locomotives.
    b. The N Scale layout is exempt from the above wheel requirement, due to difficulties in upgrading some rolling stock, it is highly encouraged that members get metal wheel when buying new rolling stock, and required that any rolling stock purchased by the club have metal wheels.

Resources

NMRA Standards - Wheels S-4.2
NMRA Standards - Standards Gauge RP-2
NMRA Standards - Bolsters RP-23
NMRA Standards - Trucks RP-24

NMRA Standards - Journals RP-24.1
NMRA Standards - Wheel Sets RP-24.2
NMRA Standards - Axles RP-24.3
NMRA Standards - Wheel Contour RP-25

Kadee HO Trucks and Wheelsets

LOADS

1. Small particle loads, such as coal, are to be loaded only in cars designed for that purpose. Care should be taken the cars are not overloaded.
2. Containers and flat car loads, are to be secured in such a way as to insure their staying on the car in normal operation.
3. All loads loose or fixed, are to meet NMRA clearance requirements.
4. Log cars (skeleton, disconnect and open types) with unsecured loads are prohibited from operating on the mainlines in interchange service. High rack log cars meeting weight requirements may interchange with and operate on the mainline.

Resources

NMRA Standards - Clearances S-7

WEIGHT

1. All cars and dummy (non-powered) locomotives shall be weighted according to the attached charts. (The charts are based on the NMRA Recommended Practice - RP20.1.) EXCEPTION: Open log cars, cabooses, transient, and special equipment approved by the car department (keep in writing in log book).
2. Double stack and container/TOFC cars must meet weight requirements when empty, if loads are removable.
3. The club-owned scale shall be used to weight the cars.
4. At the judicious discretion of the Car Department chairman, certain cars may be exempt from the maximum weight requirement.

Resources

NMRA Standards - Car Weight - RP20.1

APPEARANCE

1. Cars left on the layout, or used in show, shall not be “toy like” in appearance. Toy like assessments made by the Car Department, may be appealed to the Car Department chairman or the Club Board Representative.
2. Car weights are not to be visible in normal operation.
3. Ice-bunker reefers are to have hatch covers and boxcars are to have doors. Boxcars that are in veneer service may be used without doors.
4. Damaged cars that reveal raw plastic, wood or metal are to be removed from the layout until repaired.
5. Weathering is strongly encouraged but reporting marks must be readable if the car is to be registered.
6. Undecorated equipment (cars and locomotives lacking finish paint or numbers) and unfinished equipment (cars and locomotives lacking significant parts) are not to be left on the layout overnight or used during show without the express permission of the show chairman or Club Board Representative.

Resources

FREE ROLLING

1. All cars (except those equipped for electrical pickup) left on the layout and/or used in show operations will start rolling on their own on a 2% grade.

Resources

NOISE

1. Wheel squeak and other objectionable sounds are to be eliminated on all equipment that is left on the layout or used in show operations. Decisions made by the Car Department Chairman may be appealed to the Club Board Representative.

Resources

TRAIN DETECTION (Enforced upon implementation of detection system)

1. The ends of all trains must be detectable by the club electrical block occupancy system.
2. For most powered locomotives and self-propelled cars, the motor will provide sufficient resistance.
3. A resistance of 7,000 to 10,000 OHMS (10,000 preferred) across the rails is required via a pickup wheelset to activate the club electrical block occupancy system. It is recommended that there be one resistor per car.
4. Cabooses and FRED equipped cars should have detection on their rear axle.

Resources

LIGHTING

1. For maximum impact during low light operations lighting systems installed in cabooses, passenger and camp cars is strongly encouraged. The lighting system used can be either track or battery powered and is subject to resistance requirements discussed above.
2. End of Train devices (EOT) or FREDS are recommend for use on freight trains that are running without a caboose. Power may be supplied either from battery or track and is subject to the resistance requirements discussed above.

Resources

REGISTRIES, GENERAL

REGISTRY

1. The Car Department will keep a register of all types of revenue and non-revenue equipment. The Equipment Register Book is to be stored in the Car Department. The chief clerk is responsible for keeping the Equipment Register book and the database up to date. The Chief Clerk will also maintain backup files.
    a. Should a member resign or upon termination of membership (per the bylaws and the board of directors) not remove his/her equipment, the Car Department will change the car ownership to reflect the club orange dot and begin maintenance procedures in accordance with other cars designated as club property except as follows:
        i. Board of Directors informs Car Department Chairmen of desire to have said equipment stored out of service
        ii. BOD directs Car Department Chairman to send equipment to former member (or former members' family if member is deceased) and delete car from Club Equipment Register. In addition the Car Department is to post vacated numbers as they become available.
    b. The dates of car Maintenance Inspections and the presence of a track block occupancy detection system is to be recorded by the Chief Clerk. All new cars and cars returning to the layout are subject to a Maintenance Inspection before being placed on the Club layout.
    c. The purpose of the equipment register database is to keep track of what type and total of cars are on the layout by member number. This list is to be printed when directed by the Car Department Chairman or the BOD.
    d. The definition of a Unit Train, is a train which is composed of resident and/ or transient equipment. A Unit Train is comprised of a single type of car, i.e. coal, wood chip, covered hoppers, flats with special loads (Thomas, Military equipment), circus trains, passenger (Pioneer, Starlight) special purpose cars (MOW), and special purpose trains. Unit trains may have non-standard couplers, but must have Kadee couplers on each end. Unit trains are not to be broken up during show or in an operating session without the permission of the owner, show chairman or the officer in charge of the session. Detection is required in the middle and on the last car of the unit train. Unit Trains are exempt from meeting the Club Standards in regard to coupler height. The Unit Trains are subject to appearance and electrical

standards as set forth elsewhere. In addition all Unit Trains are required to make 2 complete trips over the entire layout without a derailment or uncoupling to qualify for show operation.

TRACK / RIGHT OF WAY

TRACKWORK CONFORMANCE

1. All track work shall conform to NMRA Standards and Recommended Practices.
2. All bench work and sub roadbed shall conform to generally accepted carpentry practices using screws as fasteners.
3. Prior to submittal of a track work request, all rolling stock and locomotives having issues shall be check for standards.

Resources

NMRA Standards - Standards and Recommended Practices

CLEARANCES

1. Buildings, trees, poles, etc., located near curves must have a sufficient distance from the right of way to clear the boiler swing of articulated locomotives.
2. Multiple track centers on curves must be sufficient to allow articulated locomotives traveling in either direction to clear trains on adjacent tracks.
3. Tunnel portals on curves must be sufficiently wide to clear an articulated locomotive boiler swing to the outside and 85 foot car overhang to the inside of the curve.
4. Vertical and Horizontal clearances are to be to the NMRA Standards gauge (New NMRA clearance gauge add-on to Mark IVb or Mark V).

Resources

NMRA Standards - Clearances S-7
NMRA Standards - Standards Gauge RP-2

RAIL

1. Nickel-silver rail shall be used throughout the layout.
2. Standard gauge rail size: HO: CODE 100; N : Code 80.
3. Logging and dual gauge rail size:
    a. HO: CODE 100 mainline throughout and 83 on some sidings.
    b. N: CODE 80 mainline throughout and code 55 where desired for sidings.

4. All rail shall be blackened, weathered, or colored in some manner to give a prototype appearance. Weathered track is not necessary in tunnels.
5. Prefabricated track sections (Atlas flex track, etc.) with non-fiber ties shall be used throughout the layout. EXCEPTION: at the discretion of the Track Committee, hand laid rail on individual stained wood ties and PC board ties may be used.
6. Where spiking of rail is required, small head spikes shall be used. All track shall be nailed, such that the nail head does not deform the tie, glue will not be used to lay track.
7. Ties of appropriate size and color shall be placed (properly spaced) at all points under the rail, wherever the original tie has been removed.

Resources

NMRA Standards - Trackwork S-3.2
NMRA Standards - Track Centers S-8
NMRA Standards - Trackwork General RP-10
NMRA Standards - Rail RP 15.1

RAIL JOINTS

1. All rail joints shall be securely connected. Power feeders are soldered every three feet to the track to insure a good electrical connection.
2. All track repair will use new rail joiners and not reuse joiners.

Resources

TURNOUTS

1. Turnout standard shall apply to new construction, the track team will make any decision to upgrade any track work not meeting standards, that was installed before the standards were in place.
2. All turnouts shall be equipped with positive electrical contacts for carrying track power through the points.
3. Size by location
    a. NO. 8 minimum - Mainline to mainline.
    b. NO. 8 minimum - Secondary mainline tracks, steam engine facilities, passenger yards, piggyback yards and arrival and departure yards.
    c. NO 6 minimum - Freight yards, diesel engine servicing, and storage yards.
    d. NO. 4 minimum - Industrial switching areas and logging line.
4. When turnouts are constructed using printed circuit board ties, the spaces between these PC ties must be filled in with appropriately colored wood or plastic ties of correct length and spacing. Unsightly gaps of rail support and poor workmanship is to be avoided.

Resources

NMRA Recommended Practices - Turnout Dimensions - HO Scale RP-12.31, RP12.32, RP12.35, RP12.36
NMRA Recommended Practices - Guard Rail & Frog Relationship RP-13.5
NMRA Recommended Practices - Guard Rails RP-13.6
NMRA Recommended Practices - Frog & Wing Rails RP-13.7
NMRA Recommended Practices - Flangway Flares RP-13.8

BALLAST

1. All roadbed shall be ballasted with scale ballast in scenic areas that matches the location and era.
2. Ballast must blend in with adjacent ballasted areas and the color must be appropriate for the surrounding scenery.
3. All ballast must meet electrical conductivity tests acceptable to the electronics committee.

Resources

TOOLS

1. The following tools share be provided by the club.

Xuron track 3 tool set	MM	# 84366
Truck Tuner	MM	#80337
Micro size wire stripper	MM	#14221
De-soldering braid	MM	#85289
Track Inspection car	MM	#82414
Drawbar meter	MM	#84708
Digital grade meter	MM	#84519
HO track laying set	MM	#84114
Scratch brush	MM	#82466A
RRampMeter IV	DCC Spec	
Speedometer	TBD by Track Department	

MM = Micro Mark

ELECTRICAL / ELECTRONICS

TERMINAL STRIPS

1. All devices requiring electrical control shall be wired to a terminal strip which is to be adequately identified in accordance with Club electrical standards.
2. All wiring feeders from the track shall terminate at terminal strips located under or beside the roadbed. Each terminal strip shall be marked as to the switch or block it serves.

Resources

CIRCUIT BOOKS

1. A wire carrying an electrical circuit from, or to, any terminal strip shall be recorded in a circuit book.
2. The circuit book shall be duplicated, with the duplicate being kept in a separate location from the original. (Suggesting 1 in Layout Room and 1 in Library)
3. Both books shall be kept up to date.
4. The electronics committee is to maintain the computer database/master list to generate circuit books.

Resources

WIRING CABLE

1. Wiring cables shall be separated into seven (7) main groups and shall be kept separated from each other. They are as follows:
    a. Track power.
    b. Detection/signal system.
    c. Turnout power.
    d. Structure lighting.
    e. Layout lighting system.
    f. Loconet
    g. Accessories\animation
2. Whenever any replacement wire is installed, the replaced wiring must be removed.

Resources

SCENERY

MATERIALS

1. All materials shall be approved by the scenery department or scene lead.
    a. Flock and ground covering

b. Trees

Resources

BUILDINGS & VEHICLES

1. No cheap toy-like buildings or vehicles, like Tyco, Plasticville, hot wheels or vehicles with no underside shall be placed on the layout, as determined by the scenery department.
2. Vehicles will be to scale, except when use for perspective.
3. Scratch built, craftsman kit and quality plastic kit are recommended.
4. All bare plastic on building, vehicles share be painted, dull coated or weathered.
5. All Building shall be weathered and detailed.

Resources

SCENERY TECHNIQUES

1. All scenery techniques will be prototyped (diorama, etc.) off layout or shown on another part of the layout and approved by the scenery committee before work on layout starts. This includes the following:
    a. Terrain structure.
    b. Trees.
    c. Rock casting.
    d. Casting staining and painting.
2. The scenery department will work with scene leads to ensure all scenes blend to adjacent scenes. The scenery department will ensure all scene details (colors, vehicles, buildings and terrain) are per the scene era, location and season.
3. The scenery department will ensure that all items place in a scene are aligned with the location and time frame of the scene. The Scenery department can grant exception in writing and attached to the scene proposal

Resources

WATER

1. No real water will be uses on the layout.
2. All water techniques shall be demonstrated off layout and approved by the scenery committee before construction.

Resources