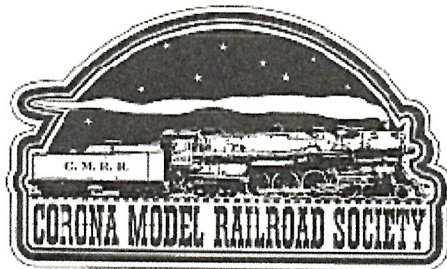


# **CORONA MODEL RAILROAD SOCIETY**



## **EQUIPMENT STANDARDS AND PROCEDURES**

# EQUIPMENT STANDARDS AND PROCEDURES

## I. PURPOSE

A. The purpose of these standards and procedures is:

1. To provide members of the CMRS with specific guidelines which can be used in construction, maintenance and operation of their equipment, and which will encourage them to adopt and maintain high equipment standards.
2. To ensure that equipment operated on the CMRS is of the highest quality achievable in HO-scale so that the operation and appearance of that equipment is trouble-free and prototypically correct.

## II. DEFINITIONS

A. As used in this instruction, the term "Motive Power" is defined as any equipment which is prototypically self-propelled.

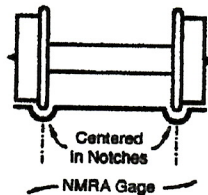
1. Examples of motive power include steam, steam-turbine, diesel, diesel-electric and diesel-hydraulic locomotives, rail diesel cars, gas-electric cars, cranes, etc.
2. Model railroading equipment which represents motive power will be considered as such even though it may be unpowered (dummy) unit.
3. Auxiliary equipment such as tenders, fuel/water cars and slugs which are prototypically associated with a given unit of motive power shall be considered a part of the basic motive power equipment for modeling purposes.

B. As used in this instruction, the term "Rolling Stock" is defined as any equipment which is not motive power, and which prototypically requires separate motive power to move it over the rails.

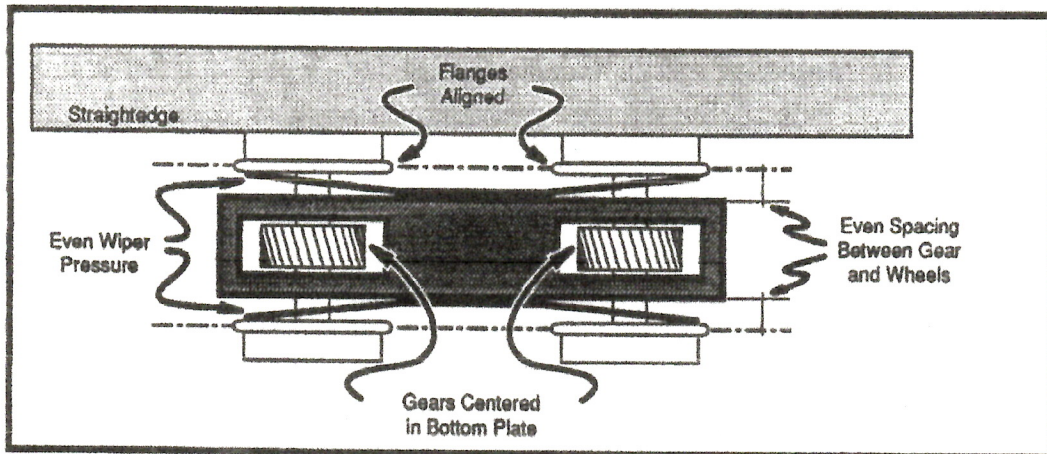
## III. EQUIPMENT STANDARDS

A. General

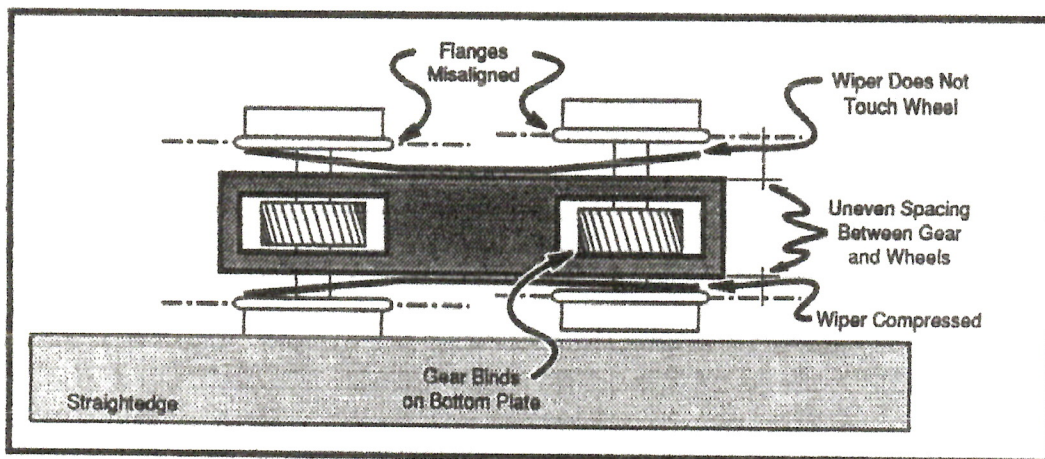
1. All equipment must be painted or lettered for some railroad or owner.
2. Wheels must be clean, concentric and wobble-free.
3. The gage of all wheels shall conform to NMRA MK IV standards gage. Conformance is defined as the centerline of the wheel flanges centered in the gage notches.



4. The underbody of all equipment shall be securely attached to the chassis.
5. All equipment should track smoothly through the test track turnout in both directions.
6. Because the layout is not properly equipped, operation of electric, trolley or traction equipment is not permitted on the CMRS.
7. Motive Power.
  - a. Operation should be smooth. Starting and running speed under normal train loads should closely simulate the operating characteristics of their prototypes; e.g., a switcher should have a low starting speed and a low top speed with a load of 1-3 cars.
  - b. The speed of multiple power lash-ups should be compatible.
  - c. In addition to proper wheel gauging, the flanges of geared wheel sets shall be longitudinally aligned, when checked with a straight edge against the wheel sets as shown below.



**CORRECT**



**INCORRECT**

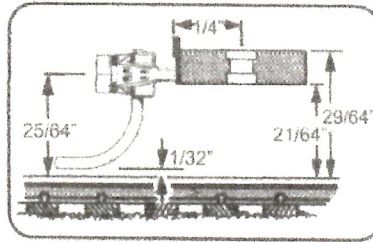


8. Rolling Stock

- a. Wheels must be metal.
- b. Wheels must rotate freely.
- c. Must roll freely and unaided down a 3% grade on test track. (Except those cars equipped with restraining springs which are designated as last-car-in-train units by owner).
- d. Shall weight no less than 1 ounce.

B. Member-owned Equipment

1. All equipment shall be marked with member's personal identification mark.
2. Except for approved passenger/unit-trains, all equipment shall be equipped with functional Kadee –compatible couplers.
  - a. Couplers may be body-mounted or truck mounted.
  - b. Coupler height must conform to Kadee coupler gauge.
  - c. Trip pins shall be adjusted to  $1/32$  inches above the rail top. This is the thickness of the NMRA standards gage. Pins should be adjusted by bending and never pushed or pulled through the couple knuckle. The pin should fit snugly in the knuckle so that it cannot drop. Trip pin should be flush with the top of the coupler.



- d. Couplers shall operate as described in Kadee installation instructions, and to the satisfaction of an authorized Equipment Standards Inspector.
3. Functional couplers are not required for steam locomotive pilots but must be installed on the tender for that locomotive.
4. Coupling between diesel units is at the member's discretion. Diesel locomotive ends which couple to rolling stock must be equipped with functional Kadee or **Kadee-compatible** couplers.

C. Club-owned Equipment

1. This equipment will be used only during Museum exhibit operations where reliability during continuous running operations is of primary importance. Members shall not run this equipment during their own operating sessions. The club train shall be parked in a siding or isolated in the loop trackage while members are operating the layout.
2. Equipment will be selected by the Equipment Standards Committee and approved for exhibit operations only after preparation, upgrading and inspection prove it suitable. The Equipment Standards Committee and Roadmaster shall control the consist of the train and verify that wheels and gears are clean and the train is operating efficiently.



D. Recommended Practices

1. The following practices are recommended but not required:
  - a. **Functional Kadec or Kadec-compatible couplers on steam locomotive pilots.**
  - b. Functional locomotive headlights (**directional if possible**).
  - c. Functional details such as FREDs, marker lights, etc.
  - d. Different reporting numbers for identical units.
  - e. Weathering.
  - f. Restraining springs in last car of train.
  - g. Recommended weights for rolling stock are the NMRA standards.

E. Other Standards

1. Any standards not specifically stated in this document should conform to the latest edition of the NMRA Standards and Guidelines.

IV. EQUIPMENT INSPECTION AND BAD ORDER PROCEDURES

A. Equipment Inspections

1. All equipment must be inspected and approved by authorized equipment inspectors before it can be operated on the CMRS Layout.
2. Members of the Equipment Standards Committee, plus those Club members recommended by the Committee and approved by the Board of Directors, shall be designated as Authorized Equipment Inspectors. A current list of inspectors shall be posted on the Club bulletin board.
3. An inspection schedule will be posted in the Club area. Inspections will normally be scheduled one week in advance, but can be arranged on an individual basis. Members who desire to have their equipment inspected should make scheduling arrangements in advance.
4. Equipment submitted for inspection should be accompanied by Motive Power and Rolling Stock forms (enclosure 1), with the applicable sections on the left-hand side completed by the equipment owner using the listed manufacturer codes (encl 2).
5. Inspectors will not handle any equipment unless authorized to do so by the owner. Authorization is by signature on the forms. If only specific items are not to be handled, mark them with an asterisk (\*).
6. No inspector will inspect his/her own equipment.
7. Using a Standards Inspection Guide (encl 3) as a guide, authorized inspectors shall conduct a visual and mechanical inspection of submitted equipment to ensure that it complies with established standards.
8. Following the inspection, inspectors will complete the applicable sections on the right-hand side of the Motive Power and Rolling Stock forms (encl 1).

B. Bad Order Procedures

1. Equipment which fails to pass a standards inspection will be Bad-Ordered by the inspector by affixing a removable sticker to the underside of the equipment. The sticker and 'reason' column of the Motive Power and Rolling Stock form (encl 1) will be marked with a number, using the Bad Order codes listed on enclosure 4.
2. If equipment malfunctions while operating on the CMRS layout, its owner will be given two (2) opportunities to correct the problem. Equipment which malfunctions a third time shall automatically be removed from the layout and Bad-Ordered. All members are expected to abide by this code. In addition, during operation sessions, the assigned dispatcher is authorized to request that malfunctioning equipment be Bad-Ordered and removed. That part of the equipment which failed must be re-inspected to clear the Bad-Order.

3. Once equipment is Bad-Ordered, it shall not be operated on the Club layout until it is re-inspected and approved for use.
4. A supply of removable Bad-Order stickers will be maintained in the Club area. As a reminder to the owner, a number sticker should be affixed to any Bad-Ordered equipment.
5. Bad-Ordered equipment owned by the Museum will be paced in the Bad-Order section of the equipment cabinet.

Your name  
Total number of pages for both  
Motive Power and Rolling Stock

<b>MOTIVE POWER</b>		OWNER: _____				PAGE: _____	
		Authorizes handling of equipment except those with an asterisk				OF: _____	
PLEASE PRINT LEGIBLY						Date _____	
To be filled in by Owner				To be filled in by Inspector			
Road Name	TYPE (GP7, 4-4-2 Pacific, etc.)	Road No.	Power or Dummy	PASS	FAIL	REASON	INITIAL
* S.F.	SD 40	1508	P			DO NOT FILL IN THIS SIDE	
S. F.	4-6-2 Pacific K-4	3420	P				

Asterisk means owner wants to handle this unit during test.      As numbered on engine

Your name  
Total number of pages for both  
Motive Power and Rolling Stock

<b>ROLLING STOCK</b>		OWNER: _____				PAGE: _____	
		Authorizes handling of equipment except those with an asterisk				OF: _____	
PLEASE PRINT LEGIBLY						Date _____	
To be filled in by Owner				To be filled in by Inspector			
Road Name	TYPE (Box, Gondola, Tank, etc.)	Road No.	Scale Length Actual Weight	PASS	FAIL	REASON	INITIAL
S.F.	Tank	9005	39' 3.68			DO NOT FILL IN THIS SIDE	
S.F.	Caboose with restraining springs	999821	39' 3.68				

Note special features      In Scale Feet.  
As numbered on unit.      Use postal scale to get close.

<b>MOTIVE POWER</b>	<b>OWNER:</b>	<b>PAGE:</b>
	Authorizes handling of equipment except those with an asterisk	<b>OF:</b>

<b>PLEASE PRINT LEGIBLY</b>	Date
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To be filled in by Owner				To be filled in by Inspector			
Road Name	TYPE (GP7, 4-4-2 Pacific, etc.)	Road No.	Powered or Dummy	PASS	FAIL	REASON	INITIAL



<b>ROLLING STOCK</b>	<b>OWNER:</b> Authorizes handling of equipment except those with an asterisk	<b>PAGE:</b>  <b>OF:</b>
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<b>PLEASE PRINT LEGIBLY</b>	Date
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<b>To be filled in by Owner</b>	<b>To be filled in by Inspector</b>
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Road Name	TYPE (Box, Gondola, Tank, etc.)	Road No.	Scale Length ----- Actual Weight	PASS	FAIL	REASON	INITIAL

# STANDARDS INSPECTION GUIDE

1. Check form for owner's entries.
2. OK to handle equipment?
3. Body mounted securely to chassis.
4. Painted and lettered.
5. Place unit in cradle and check:
  - a. Owner's mark.
  - b. Wheels metal.
  - c. Wheels clean / concentric / rotate freely.
  - d. Wheels in gage.
6. Place on scale and weigh:
  - a. Rolling stock minimum 1 ounce.
  - b. Dummy units.
7. Place on test track and check:
  - a. Coupler height, both ends (use Kadee coupler gage #205)
  - b. Trip pin height, both ends (use Kadee coupler gage #205)
  - c. Coupler operations over magnet (use test locomotive / car)
  - d. Track OK through turnout (both legs).
  - e. Wobble free.
8. For motive power check:
  - a. Starting.
  - b. Slow speed.
  - c. Running smoothness.
  - d. Shorts / stalling.
9. For rolling stock, perform rolling test down 3% grade.
10. Put stickers on Bad-Order Units.
11. Complete form entries.
12. Be nice!!!

# BAD ORDER CODES

Code	Description	Code	Description
.01	Non-metal wheels.	27.	“Jack rabbit” starts.
.02	Wheel gage too narrow.	28.	Minimum speed to high.
.03	Wheel gage too wide.	29.	Poor electrical contact or short.
.04	Wheels dirty.	30.	Jerky or intermittent operation.
.05	Wheels wobble.	31.	Polarity reversed.
.06	Wheels drag or do not rotate freely.	32.	Insulated wheel(s) installed backwards.
.07	Wheels fail 3% grade test.	33.	Dead locomotive or power motive unit.
.08	Bent axle/s.	34.	Stalls / requires a tap or push to start.
.09	Wheels contact chassis or body.	35.	Runs only one direction / won’t reverse.
10	Flanges on geared axles not longitudinally aligned.	36.	Component (other than wheels) touching rails.
11.	Traction tire missing or loose.	37.	Missing or damaged wheel wiper(s).
12.	Driver not quartered.	38.	Unit less than minimum weight (1 ounce).
13.	Coupler component broken or missing	39.	Not painted or lettered.
14.	Coupler too high.	40.	No owner I.D. Mark.
15.	Coupler too low.	41.	Upper body not securely fastened to body.
16.	Coupler will not deflect over magnet.	42.	Excessive oil or lubrication.
17.	Coupler deflects wrong way over magnet.	43.	Loose or missing bolster pin.
18.	Coupler will not fully open to ‘delayed’ position over magnet.	44.	Loose / missing valve gear or side rod(s).
19.	Coupler will not center.	45.	Car body not level or vertical.
20.	Coupler frozen or painted shut.	46.	Frequent derailments.
21.	Random uncoupling.	47.	Truck, side-frame, draft gear contact chassis or body.
22.	Trip pin missing.	48.	OTHER (specify)
23.	Trip pin loose in knuckle.		
24.	Trip pin too high (over 1/32”)		
25.	Trip pin too low (below 1/32”)		
26.	Trip pin out of lateral adjustment.		