

Rules for Loading and Handling Railroad Cars with Explosives and Other Dangerous Articles

Excerpts from Regulations for the Transportation of Explosives and Other Dangerous Articles by Freight and Express and in Baggage Service Including Specifications for Shipping Containers, issued by the Interstate Commerce Commission, effective October 1, 1930.

The following sections are taken from the rules for loading and handling of explosives and dangerous articles from 1930, the most recent available to me. I have excerpted those parts that are likely to be of pertinence to model railroaders, either for models themselves or for realistic operations. Comments are added in square brackets [thus]. Section numbers are from the original document. The full text of each paragraph is not given in all cases to save space. Most of the missing text has to do with specifications for containers, for loading these articles within cars, and for administrative tasks, such as billing, all of which are irrelevant for modelers.

Prepared June, 2002, by David R. Soderblom. Although this material is not copyrighted, being based on a government document, appropriate credit is appreciated. This document may be copied for personal use.

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PRACTICAL SUMMARY FOR MODELERS

Cars carrying explosives, especially “dangerous explosives” (dynamite and military ammunition for anything larger than a rifle) must be in top condition so sparks from the locomotive or brakes cannot enter. This suggests that newer all-steel cars are more likely to be used for this service.

Cars with hazardous materials must have placards on both sides and both ends. The placards must conform to the government standards.

Cars with explosives should ordinarily be placed near the middle of a train. Model trains are generally much shorter than on the prototype, so the specific rules about distance from engine or caboose do not matter, but at least one car must separate the car from an engine or caboose.

Cars with explosives must not be placed in a passenger train. They may be placed in a mixed train if necessary, but not next to a car carrying passengers.

Cars with explosives may not be placed next to loaded tank cars, wooden-frame flat or gondola cars, carloads of pipe, lumber, poles, iron, steel, or similar cargoes that could break through the end of the car with explosives if it received rough handling. They may also not be next to refrigerator cars with heaters.

Cars with explosives must not be placed next to cars with “Inflammable” or “Corrosive Liquid” placards when it is possible to avoid it.

A car with explosives must be switched with another car between it and the engine. Cars with explosives must not be cut off in motion. Shocks to the car must be avoided.

SHIPPING NAMES FOR EXPLOSIVES

620. The following are the names which must be used on shipping order and bills of lading by shippers of explosives. Abbreviations must not be used.

(a) Dangerous explosives:

- Ammunition for cannon with explosive projectiles.
- Ammunition for cannon with gas projectiles.
- Ammunition for cannon with smoke projectiles.
- Ammunition for cannon with incendiary projectiles.
- Black powder.
- (Number) blasting caps (in quantity exceeding 1,000).
- Boosters (explosive).
- Detonating fuzes.
- Explosive bombs.
- Explosive mines.
- Explosive projectiles.
- Explosive torpedoes.
- Hand grenades.
- High explosives. [i.e., TNT or dynamite]
- Low explosives.
- Rifle grenades.
- Wet fulminate of mercury.

(b) Less dangerous explosives:

- Ammunition for cannon with empty projectiles.
- Ammunition for cannon with sand-loaded projectiles.
- Ammunition for cannon with solid projectiles.
- Ammunition for cannon without projectiles.
- Fireworks.
- Smokeless powder for cannon.
- Smokeless powder for small arms.

(c) Relatively safe explosives:

- (Number) blasting caps (in quantity no more than 1,000).
- Cannon primers.
- Combination fuzes.
- Combination primers.
- Cordeau detonant.
- Delay electric igniters.
- Electric squibs.
- Empty cartridge bags—black-powder igniters.
- Empty cartridge shells, primed.
- Fuse igniters.
- Fuse lighters.
- Instantaneous fuse.
- Percussion caps.
- Percussion fuzes.
- Safety squibs.

Small-arms ammunition.
Small-arms primers.
Time fuzes.
Tracer fuzes.

621. Explosives and other dangerous articles, when offered for shipment, must be in proper condition for transportation and must be packed, marked, labeled, described, certified, loaded, stayed, and handled while in transit in accordance with these regulations.

CARS FOR DANGEROUS EXPLOSIVES

630. For the transportation of any dangerous explosives included in list paragraph 620 (a), only closed cars, certified and placarded "Explosives," may be used.

CAR MAGAZINES

637. When specially authorized by the carrier, explosives in quantities not exceeding 150 pounds may be carried in construction or repair cars when the packages of explosives are placed in a "magazine" box made of sound lumber not less than 1 inch thick, covered on the exterior with metal, and provided with strong handles. This box must be plainly stenciled on the top, sides, and ends, in letters not less than 2 inches high, "EXPLOSIVES—DANGEROUS—HANDLE CAREFULLY." The box must be provided with strong hinges and with a lock for keeping it securely closed. Vacant space in the box must be filled with a cushioning material such as sawdust or excelsior, and the box must be properly stayed to prevent movement within the car. The car, when not occupied by a responsible employee, must be placarded "EXPLOSIVES."

CARS FOR LESS DANGEROUS EXPLOSIVES

638. Shipments of less dangerous explosives included in list paragraph 620 (b) may be loaded in any closed car which is in good condition, into which sparks can not enter, and with roof not in danger of taking fire through unprotected decayed wood. Fireworks may also be transported in container cars in good condition. These cars do not require the car certificate, but must have attached to both sides and both ends the "Inflammable" placard prescribed by paragraph 641 (a), and the doors if not tight must be stripped to prevent the entrance of sparks.

CARS FOR RELATIVELY SAFE EXPLOSIVES

639. Shipments of relatively safe explosives included in the list, paragraph 620 (c), may be loaded into any closed car in good condition. With the exception of blasting caps and electric blasting caps, they may also be loaded into any container car in good condition. No placards are required.

PLACARDS

640. “Explosives” placards must be applied to certified cars containing dangerous explosives specified in paragraph 620 (a), as follows:

To each outside end and side, the lower edge not less than 4.5 feet above the car floor.

The “Explosives” placard must be of rectangular shape measuring 11 by 14 inches and must bear the wording as shown in the following cut; the printing must be in red and black as follows:

[see separate Explosives placard file explosives.pdf]

641. (a) “Inflammable” placards must be applied to cars as follows:

Cars containing one or more packages of inflammable solids, inflammable liquids, oxidizing materials, or compressed inflammable gases.

Tank cars containing inflammable liquids, inflammable solids, oxidizing materials, or compressed inflammable gases; and

Cars containing ammunition for cannon with empty, sand-loaded, or solid projectiles, or without projectiles, fireworks, smokeless powder for cannon, smokeless powder for small arms.

The “Inflammable” placard must be of diamond shape, measuring 10.75 inches on each side and must bear the wording as shown in the following cut; the word “Inflammable” must be in red and the other words in black.

[see separate Inflammable placard file inflammable.pdf]

(b) “Corrosive Liquid” placards must be applied to cars as follows:

Cars containing one or more packages bearing “Acid” or “Corrosive Liquid” labels.

Tank cars containing acids or corrosive liquids.

The “Corrosive Liquid” placard must be of diamond shape, measuring 10.75 inches on each side and must bear the wording as shown in the following cut; the printing must be in black as follows:

[see separate Corrosive Liquid placard file corrosive_liquid.pdf]

(c) “Compressed Gas” placards must be applied to cars as follows:

Tank cars containing compressed noninflammable gases.

The “Compressed Gas” placard must be of diamond shape, measuring 10.75 inches on each side and must bear the wording as shown in the following cut; the printing must be in black as follows:

[see separate Compressed Gas placard file compressed_gas.pdf]

(d) “Poison Gas” placards must be applied to cars as follows:

Cars containing one or more packages bearing the “Poison Gas” label;

Cars containing ammunition for cannon with toxic gas projectiles, or projectiles, bombs, or other containers loaded with toxic gas requiring the “Poison Gas” label; and

Cars containing poisonous gases or liquids which under these regulations also require "Explosives" placards.

The "Poison Gas" placard must be of rectangular shape, measuring 10 by 14.25 inches and must bear the wording as shown in the following cut; the printing must be in red as follows:

[see separate Poison Gas placard file [poison_gas.pdf](#)]

(e) "Poisonous" placards must be applied to cars as follows:

Cars containing poisonous liquids or solids.

The "Poisonous" placard must be of diamond shape, measuring 10.75 inches on each side and must bear the wording as shown in the following cut; the printing must be in black as follows:

[see separate Poisonous placard file [poisonous.pdf](#)]

PLACARDS MUST BE STANDARD

643. Placards must conform to standards as prescribed. Samples will be furnished by the Bureau of Explosives on request.

Tag-board placards must be printed on strong tag board, designated commercially as No. 2 tag board.

Paper placards must be printed on strong white paper.

Placards or car cards must not be used which by their shape, coloring, or printing may be readily confused with the standard placards described herein.

APPLICATION OF PLACARDS

644. Placards must be securely applied by affixing one to each end and each side of cars, as follows:

(a) By tacking tag-board placards to each end and each side of cars, or to placard boards of suitable size provided for the purpose.

Placards applied to the sides of box cars must be placed on doors, or close to left-hand side of door frames, when cars are not equipped with placard boards.

The use of capnail nails or other forms of large head tacks is required. Tacks or nails used in previous applications of placards must be removed.

(b) By insertion of tag-board or metal placards in suitable placard holders affixed to cars.

(c) By adjustment of metal reversible placards in proper position.

(d) Paper placards must be securely pasted to metal placard boards provided for the purpose. Grease or other substances, which would interfere with secure application, must be removed from metal surfaces before pasting on placards.

(e) Placards applied to cars must have the printing in horizontal position.

(f) "Explosives" placards must be applied not less than 4.5 feet above car floor.

(g) Placards applied to sides of tank cars must be placed as near the middle as possible. Side placard boards applied to tank cars near end of tank may be used until replaced by boards located near middle of tank, in accordance with requirements effective November 1, 1927.

(h) Placard holders must be so constructed as not to obstruct the wording, change the shape of the placard, or reduce the exposed surface of the placard more than three-eighths of an inch on each side.

HANDLING CARS

672. (a) A car known to require certificates and the "Explosives" placards must not be taken from a station, siding, transfer station, interchange point, siding, or yard, unless the car is properly placarded and certified as per paragraphs 636 and 640, and unless the car is in proper condition.

(b) The carrier must see that its representative in charge of a station, siding, yard, or terminal, from which cars are taken makes a thorough check and record of the cars bearing "Explosives," "Inflammable," "Corrosive Liquid," "Compressed Gas," "Poisonous," or "Poison Gas," placards with the billing, to see that all required placards and certificates are attached, that those not required are removed, and that placarded cars are placed in trains as required by these regulations.

673. The carrier must make proper provision for notifying the train and engine crew of the presence and location in the train of cars placarded "Explosives."

674. Every possible effort must be made to expedite the movement of cars placarded "Explosives" and no unnecessary delay shall be allowed to occur at initial, interchange, or transfer stations, nor in yards. It must be the duty of some designated employee to see that in case of fire or accident these cars are moved to a place of safety.

675. Cars placarded "Explosives" must be frequently inspected to see that the placards and car certificates are intact. Whenever placards become detached or lost in transit, the employee of the carrier in charge of the train must see that they are replaced on arrival at the next division terminal yard if a through freight train, or at the first station stop if a local freight train.

676. Between points where separate trains are operated for freight service only, cars containing explosives must not be handled in a train that carries passengers. Between points where only mixed-train service is operated, or where passengers are carried in the caboose car of a freight train, a car containing a freight shipment of explosives may be hauled, but it must not be placed next to a car carrying passengers; and whenever it is practicable to do so, such car or cars must be placed between cars not bearing "Inflammable," "Corrosive Liquid," "Compressed Gas," "Poisonous," or "Poison Gas,"

placards. Cars placarded "Explosives" must have air and hand brakes in service.

677. (a) Cars placarded "Explosives" must be placed in through freight trains near the middle of the trains and must not be nearer than the sixteenth car from the engine, electric locomotive, or motor car, nor the eleventh car from the caboose, if the

length of the train will permit. Where helper engines or electric locomotives are employed ahead of caboose, cars placarded "Explosives" must be separated from such helpers by at least one car.

(b) Cars placarded "Explosives" may be placed in local freight, local pickup, and local set-out trains not nearer than the second car from the engine, electric locomotive, or motor car, or caboose, when placing them near the middle of the train would require additional switching at way stations.

(c) Cars placarded "Explosives" must not be placed in through or local trains next to loaded tank cars, wooden-frame flat or gondola cars, carloads of pipe, lumber, poles, iron, steel, or similar articles liable to break through end of car placarded "Explosives" from rough handling; refrigerator cars equipped with automatic refrigeration of the gas-burning type; nor next to cars containing lighted heaters, stoves or lanterns; or cars with live stock or poultry in charge of an attendant.

(d) Cars placarded "Explosives" must not be placed in through or local trains next to box cars which bear "Inflammable" or "Corrosive Liquid" placards, unless the remainder of the train consists only of such cars, or is made up entirely of placarded cars, or cars listed in paragraph 677 (c).

(e) Placarded loaded tank cars must not be placed in trains next to cars containing lighted heaters, stoves, or lanterns; nor next to refrigerator cars equipped with automatic refrigeration of the gas-burning type; nor next to gondola or flat cars with lading such as logs, lumber, rails, or pipe, that is likely to shift; and when practicable must be placed not nearer than the sixth car from the engine, electric locomotive, or motor car, or caboose.

678. (a) When handling cars placarded "Explosives" in yards or sidings, explosives cars must be coupled to engine, electric locomotive, or motor car, protected by a car between.

(b) Cars placarded "Explosives" must not be handled in switching or in trains with doors open.

679. Cars placarded "Explosives" must not be cut off while in motion, and must be coupled carefully and all unnecessary shocks must be avoided. Other cars must not be cut off and allowed to strike a car containing explosives. Cars placarded "Explosives" must be so placed in yards or on sidings that they will be subject to as little handling as possible and be removed from all danger of fire. Such cars must not be placed on tracks under bridges and should not be placed in or alongside passenger sheds or stations; and, when avoidable, engines on parallel tracks must not be allowed to stand opposite or near them.

680. When cars protected by "Explosives," "Inflammable," "Corrosive Liquid," "Compressed Gas," "Poisonous," or "Poison Gas," placards are received or held in yards, particularly at night, the carrier must see that all necessary precautions are taken to prevent accidents. These precautions must include provision for quickly removing and isolating the cars in case of fire. When such cars are held in yards for a period longer than 12 hours, they must be placed where they will be readily accessible for prompt removal in case of fire or explosion. Separate track or tracks, when available, must be designated at terminal, classification or receiving yards for such cars, and

cars must be coupled at all times during such holding. The carrier's representative in charge must be informed at all times of the presence and location of such cars.

681. At points where trains stop and time permits, cars placarded "Explosives," and adjacent cars, must be examined to see that they are in good condition and free from hot boxes or other defects liable to cause damage. If such cars are set out short of destination for any cause, carrier must give necessary notice thereof to prevent accident.

682. Whenever a car placarded "Explosives" is opened for any purpose, and in every instance after such a car has received rough treatment, inspection must be made of the packages of explosives as soon as practicable without unnecessary disturbance of lading, to see that they are properly loaded and stayed and in good condition. Upon the discovery of leaking or broken packages they must be carefully removed to a safe place. Loose powder or other explosives must be swept up and carefully removed. If the floor is wet with nitroglycerin the car is unsafe to use, and a representative of the Bureau of Explosives should be immediately called to superintend the thorough mopping and washing of the floor with a warm, saturated solution of concentrated lye or sodium carbonate. If necessary, the car must be placed on an isolated siding and proper notice given.

683. (a) The carrier must verify the attachment of proper placards by the shipper as soon as a car requiring placards is accepted by the carrier for transportation.

(b) A daily record showing the initials and numbers of all loaded placarded cars must be kept on file at originating stations, transfer stations, and interchange points.

684. (a) Special care must be taken to avoid rough treatment and unnecessary switching of placarded cars.

(b) When an express or baggage car containing any package requiring a label prescribed by these regulations is not occupied by an express employee and is handled in a freight train, the proper placards must be attached thereto as required by the regulations for the transportation of explosives, and the regulations for the transportation of dangerous articles other than explosives, by freight.

685. A car must not be moved from a station, yard, or siding, if known to require placards, until the proper placards are attached. Placards lost from loaded cars in transit must be replaced by carrier.

686. In classification yards and in switching it must be determined by inspection and trial that a car placarded "Inflammable," "Corrosive Liquid," "Compressed Gas," "Poisonous," or "Poison Gas," has its brakes in good operating condition before a draft containing it is cut. A placarded loaded tank car must not be started down a ladder track, incline, or hump, until all preceding cars have cleared the ladder, and must, in turn, clear the ladder before any car is allowed to follow.

687. Cars bearing "Inflammable" placards and cars adjacent to them must be watched with extra care to discover hot journals.

688. Leakage of dangerous articles is often accompanied by odors characteristic of the articles, and all available opportunities for noting such odors must be utilized in

order that the source of leakage may be discovered and the leakage stopped, or the leaking package removed from the car, or the contents of tank cars transferred. If artificial light is necessary, only electric lights should be used. Leaking tank cars containing compressed gases should be switched to a location distant from habitation and proper action taken for transferring contents under competent supervision.

689. Cars containing leaking packages or leaking tank cars must be protected against ignition of liquid or vapors by flame of inspector's lanterns or torches, by burning fusees, by switchlights, by switch-thawing flames, by fires on side of track, by hot coals from locomotives, or otherwise. All unnecessary movement of a car discovered in transit in leaking condition must cease until the unsafe condition is remedied.

690. Tank cars placarded "Inflammable" that are to be offered in interchange should be inspected on the track where transfer is assembled for delivery to receiving line. If such cars are found in leaking condition they must not be offered in interchange. Where actual interchange to receiving line is distant from point of delivery by delivering line, and repair or transfer facilities are provided, if such cars develop leaks en route to the receiving-line interchange track, the receiving line should accept the cars, taking every possible precaution to prevent ignition of contents or personal contact with leakage or inhalation of vapor, and to handle the cars as indicated in paragraph 688.

TANK CAR UNLOADING PRECAUTIONS

697. In unloading tank cars of inflammable liquids, the following rules must be observed:

Unloading operations should be performed only by reliable persons properly instructed and made responsible for careful compliance with these regulations.

(a) Brakes must be set and wheels blocked on all cars being unloaded.

(b) Caution signs must be so placed on the track or car as to give necessary warning to persons approaching car from open end or ends of siding and must be left up until after car is unloaded and disconnected. Signs must be of metal, at least 12 by 15 inches in size, and bear the words, "STOP — Tank Car Connected," or "STOP — Men at Work," the word "STOP" being in letters at least 4 inches high and other words in letters at least 2 inches high. The letters must be white on a blue background.

(c) Before manhole cover is removed, tank car must be relieved of all interior pressure by cooling tank with water or venting tank by raising safety valve or opening vent valve at short intervals. If venting to relieve pressure will cause a dangerous amount of vapor to collect outside the car, venting and unloading must be deferred until pressure is reduced by allowing the car to stand overnight or otherwise cooling the contents. These precautions are not necessary when car is equipped with a manhole cover which hinges inward or with an inner manhole cover which does not have to be removed to unload the car, and when pressure is relieved by piping vapor into a condenser or storage tank.

...

(q) After tank car is unloaded, all shipping cards and “Inflammable” placards must be removed from the car, except that “Inflammable” placards may be replaced by or covered by “Dangerous—Empty” placards prescribed in paragraph 710; and railroad agent must be promptly notified that car is emptied.

INSPECTION AT INTERCHANGE

702. (a) Cars containing the more dangerous explosives named in paragraph 620 (a) which are offered by connecting lines must be carefully inspected by the receiving line on the outside, including the roof; and, if practicable, the lading must also be inspected. These cars must not be forwarded until all discovered violations have been corrected.

If the car shows evidence of, or if there is any reason to suspect that it has received, rough treatment, the lading must be inspected and placed in proper condition before the car is permitted to proceed. When interchange occurs and inspection is necessary after daylight hours, electric flash lights should be provided. Naked lights must not be used.

(b) Shipments of explosives and other dangerous articles offered by connecting lines must comply with these regulations, and the revenue waybill, freight bill, manifest of lading, card waybill, switching order, transfer slip ticket, or other billing, must bear label notation and placard indorsement.

INSPECTION OF LOADED TANK CARS

703. (a) Loaded tank cars tendered for shipment at originating and interchange points must be inspected by the carrier before acceptance to see that they are not leaking; that their manhole covers, outlet valve reducers, outlet valve caps, outlet valve cap plugs, heater coil inlet and outlet pipe caps or plugs or cocks, end plugs, and plugs or caps of other openings are securely in their proper places; that the air and hand brakes, journal boxes and trucks are in proper condition for service; and that the tank and safety valves have been tested within limits prescribed by the specifications for tanks.

REMOVAL OF PLACARDS AFTER UNLOADING

709. When the lading requiring placards is removed from cars, other than tank cars, placards must be removed by the party unloading the car.

When the lading requiring “Inflammable,” “Corrosive Liquid,” “Compressed Gas,” or “Poisonous,” placards has been removed from a tank car, the placards must be removed by the party unloading the car and the tank car forwarded without placards, or the placards must be replaced by four “Dangerous—Empty” placards as prescribed in paragraph 710.

DANGEROUS EMPTY PLACARD

710. "Dangerous—Empty" placards must measure 10.75 inches on each side. The printing must be as shown in the cut in this paragraph, in black on strong white paper, or on tag board designated commercially as No. 2 tag board, and weighing 150 pounds per ream of sheets 24 inches by 36 inches, and having a resistance of not less than 60 pounds per square inch, Mullen test; or on metal.

[see separate empty placard file empty.pdf]

HANDLING BY ELECTRIC RAILWAYS AND MOTOR CARS

711. Dangerous explosives as specified in paragraph 620 (a) must not be transported in any self-propelled car operated by electric or other motive power, if such car is carrying passengers.