# DEERFIELD AND ROUNDABOUT RAILWAY TRANSPORTATION RULE 986

Based on the Chicago and Western Indiana Railroad Co.
Rules and Regulations of the Operating Department, effective July 1, 1913.

986. Engineers must carefully read and observe the following regarding the handling of engines and economical use of coal:

a. Don't forget, before starting fire, ensure level of water above boiler crown sheet is more than adequate for the period of time before sufficient steam pressure is developed to operate injector. There must be ABSOLUTELY NO DOUBT in this matter and extra precautions must be taken to ensure water glass is indicating true level of water in boiler. If engine is equipped with boiler gauge cocks, they must also be used to ascertain if level of water in boiler is more than adequate before starting fire.

b. Don't forget, before starting fire, ensure the valves are centered, throttle tightly closed, cylinder cocks are open, ash pan is securely closed and a driving wheel is blocked to prevent forward or backward movement.

c. Don't forget to ensure designated lubricants have been furnished to all lubrication points on engine and the lubricator has been filled with cylinder oil before leaving the round house for the first time that day. Pay special attention to providing for adequate lubrication of engine and tender axle journals and lateral liners. Lubricator must be refilled with cylinder oil after each time engine has been operated for a distance of sixty scale miles.

d. Don't forget, when using the blower to raise steam from a low pressure gradually close the blower valve as the steam pressure increases in order to maintain a constant moderate draft.

e. Don't forget to ensure lowest pressure set pop, injector or injectors and engine brakes are functioning correctly before attempting to move engine under steam for the first time that day.

f. Don't forget, before attempting to move engine, to first work the water out of cylinders and steam ways as much as possible, thereby preventing possible damage to engine by hydraulic pressure.

g. Don't wait until you get the signal to pull out before you build up the fire. This should be done gradually until the proper thickness has been reached. A good fire to start with is essential to maintain the proper steam pressure while engine is working hard getting train under way. Afterwards distribute the coal evenly on the fire. Always avoid shoveling coal so far forward that it blocks the lowest boiler tubes. Do this systematically. Also keep in mind where you have placed the last shovel of coal, thus avoiding holes in fire, and preventing piling coal in one place.

h. Endeavor to keep the steam pressure uniform with the least black smoke possible. At all times the presence of black smoke should be avoided. Avoid putting in coal about the time the engine is shut off for stations or on approaching targets where a stop may be necessary. Heavy black smoke is evidence that engine personnel are not practicing economy. Keep yourself in touch as to the condition of the fire and ash pan at all times. If this is not your present practice, try it, and note the difference.

i. Don't shovel dry slack coal on fire while engine is working hard in order to avoid unnecessary waste of coal. Drench coal on tank with water if coal loaded has high slack content.

j. Don't rake or poke fire excessively, but do so in a restrained manner when necessary to break up fused masses of coal. Avoid raising ash to top of fire thereby reducing the likelihood of formation of clinkers. It is good practice to rake or poke fire only when engine is shut off and with light blower in order to minimize sparks.

k. Don't forget, when starting and stopping trains, to do so carefully, thus preventing damage to draft rigging and cars. By so doing you will save serious delay to your own as well as other trains.

l. Don't allow engine to slip. This is an unnecessary waste of coal, and generally results in serious damage to rails, tires, pins, and valve gear, and may spoil your fire.

m. Don't at any time leave the reverse lever down in the corner longer than necessary. No rule can be made to govern as to just how the throttle and reverse lever should be used. This must be determined by practice and observation as to performance of the engine.

n. Don't put an excessive quantity of fresh coal on fire at one time. Add fresh coal in smaller quantities at more frequent intervals instead in order to reduce the fluctuation of fire box temperature. Also fire as light as possible consistent with your work.

o. Don't forget that, while the fire door is open, the temperature in fire box is being rapidly reduced by the inrush of cold air above the fire. This emphasizes the importance of closing the door after each scoop of coal.

p. Don't allow steam to escape at pops unnecessarily. Frequent blowing off at pops shows improper judgment, and implies that engine personal are not practicing economy. Tests have demonstrated that (in full scale practice) 1/4 lb. of coal per second, or 15 lbs. per minute, is wasted. This amounts to about one scoop full, and in most cases may as well have been thrown out on the ground. There are only 133 scoopfuls in a ton of coal so you can see that you would only have to have your pops open (in full scale practice) 133 minutes a day to throwaway a ton of coal.

q. Don't forget to start injector if pops are about to release, although the foregoing is subordinate to not over filling boiler.

r. Don't permit the water to get so high in boiler that it is carried over into valves and cylinders.

s. Don't forget to put on the blower lightly just before engine is shut off, and then open fire box door slightly if necessary to carry off black smoke.

t. Don't blame engine or coal if engine is not steaming properly before you have ascertained whether you are doing your duty. You may know of engineers that have better success than others with the same engine and conditions. Think a little; there must be some cause for this.

u. Don't permit the steam pressure to get so low in boiler that the injector cannot be made to function to supply feed water to boiler.

v. Don't forget to review the document "Fundamentals of Steam Locomotive Boiler Water Level Management and Rules Applicable to Steam Locomotives Operated Under the Jurisdiction of the Lake Forest Live Steamers Railway Museum and Deerfield and Roundabout Railway" in order to gain a complete understanding of the subject.

w. Don't forget to anticipate the variation of the level of water above crown sheet of boiler that occurs when engine moves from level track to an increasing or decreasing track gradient or moves from one track gradient to a track gradient of opposite direction, etc., etc.

x. Don't forget to open and close the water glass blow down valve frequently to insure steam and water passages leading to the water glass are clear of obstructions and to assist, when necessary, in ascertaining the level of water in boiler.

y. Don't put more coal on tank than will lie on it securely. The coal dropped off by overloading is dangerous and wasteful. Also keep coal from falling out of gangway or off cab deck when running. This may be only a little each day. You cannot save coal by the ton; it must be in pounds, which in time make tons.

z. Don't run light engines at high speed, but in the most economical way, particularly when they are being moved backwards or to equalize power.

aa. Don't forget to make a thorough inspection of engine and tender before leaving, and after arriving at terminals; also as much as possible while going over the road. Make a complete report to the proper authorities upon arrival at round house at end of day of any defects or unusual conditions discovered while on duty.