RT Smith

Form 873 Standard

Proper Handling of Locomotives in Switching

GOOD SWITCHING PRACTICES

(For Guidance of Train, Engine and Yardmen)

The Atchison, Topeka and Santa Fe Railway System

Issued August 1st, 1923
Revised August, 1927
Revised August, 1930
Revised ——————
Revised September, 1945

Hall 9 45 20M Bks. 1385

PROPER HANDLING OF LOCOMOTIVES AND ABUSES OF LOCOMOTIVE BRAKES IN SWITCHING

1. In analyzing the subject of rough handling of cars in switching it is found that the main cause contributing to loss and damage, is that produced from shocks brought about by allowing cars to collide at too high a rate of speed, or of collisions between cars and locomotives.

2. It is not to be expected in the ordinary handling of freight equipment during switching movements, that the impact when coupling can be controlled to a degree which will not produce perceptible shock. At the same time it is possible, practicable and beneficial to regulate the speed of cars and locomotives so as to avoid heavy shocks, which in their very nature make it difficult or impossible to properly load or brace the lading to withstand same.

3. Not all the shocks producing damage to lading and equipment is produced by allowing cars to strike each other in coupling. Considerable damage may be and is done through improper methods of handling the locomotive. Consider for a moment a heavy locomotive coupled to some 50 or 60 cars, with the slack stretched; a signal is given which necessitates pushing the cars. There may be 50 or 60 feet of slack in such a train. If the throttle is opened suddenly and heavily, the locomotive may attain a speed of 3 or 4 miles per hour before the other end of the train begins to move. The last few cars to move are suddenly thrust forward, while those cars in the middle of the train are being crushed through the energy being produced by the locomotive and

cars close to it, and the cars at the extreme end of the train which are required to suddenly assume a speed of from 3 to 4 miles per hour.

4. If, under these conditions, the movement is reversed, the slack is suddenly pulled out of the train, which results in the cars at the extreme end being jerked off their feet, so to speak. Shocks are produced under such methods of such magnitude that the equipment is unable to withstand it. This results in damaging the entire structure of the car, its lading or complete failure of the draft gear. No loss of time would result from moderately bunching or stretching the slack under these conditions, before opening the throttle heavily.

5. Another practice which results in heavy damage is that of shoving in on certain tracks with a number of cars, where such tracks already contain a large number of cars; signals are given which require stretching the slack in those cars being handled by the locomotive, in order that the rate of speed will be comparatively low when the coupling is made. When within a few feet of coupling, signals are given to "shove in." If the throttle is opened suddenly and heavily, violent shocks are produced between the point of coupling and the locomotive, the idea being, of course, to strike the standing cars with sufficient force to start their movement to prevent stalling. Ordinarily the engineer realizes or knows what is taking place under these conditions, and should remember that he has the slack stretched and what the results will be from suddenly opening the throttle wide.

6. With heavy locomotives, in making ordinary couplings, shocks of from 100,000 to 155,000

pounds have been recorded. The speed at time of coupling being about 5 miles per hour. It is difficult to properly brace the lading in cars, or provide equipment to withstand such shocks continuously.

7. In ordinary short switching the engineer knows almost without exception from the character of signals given, the move which is to be made, and also has some idea from the previous movement whether the slack is bunched or stretched, which should permit him to bunch or stretch the slack moderately. The practice of jerking the throttle open wide with heavy locomotives is entirely unnecessary under such conditions, or fully applying the brake suddenly. Cases have been observed wherein the brake is fully applied and the locomotive reversed at the same moment to augment the power of the brakes. If the slack is to be stretched under such conditions, even with 20 or 25 cars, at low speed, the locomotive is standing still before any reduction of speed takes place at the other end of the cut. This results in violent jerking of the last few cars, or if the slack is to be bunched under such conditions, a collision is produced between the last few cars in making stops.

8. Many train and yardmen practice advising the engineman in advance, the direction of the next movement, by giving signals for a reverse movement following a stop signal. Do not confuse such signals as indicating impatience on his part, the stop signal permits bunching or stretching the slack until the stop is completed, while the next signal permits quick and careful handling. Remember in making a stop you

have the slack bunched or stretched, and if a reverse movement is to be made do not practice coming to a stop and then losing time reversing the locomotive and releasing the brake. While you are doing this the slack is again settling in the train and more time must be lost in adjusting it. Arrange for the steam locomotives to be reversed and the brakes released at the moment of stopping. The throttle may then be opened heavily and a prompt start made without any shock whatever.

9. Knowing the movement which is being made, the engineman can, and should open the throttle lightly to moderately bunch or stretch the slack, or at least a greater part of it; after which the throttle may be opened as wide as desired. In operating the locomotive brake, the brake should be applied quickly, but not heavily, (10 lbs. to 15 lbs. brake cylinder pressure is sufficient) in order to bunch or stretch the slack moderately; after which the brake may be applied as heavily and quickly as desired. The slack should be taken as promptly as possible in order to facilitate the work. Prolonging the time of taking the slack leads to the practice of giving violent signals. Do not contribute to this unnecessarily.

10. It is possible in ordinary switching to adjust the slack moderately without loss of time by handling the throttle and brakes as outlined above. The use of the automatic brake valve in short switching is slower than necessary, while the proper use of the independent brake will produce the desired results. Its proper use is outlined in the preceding paragraph, which refers to short switching movements, when

only the locomotive brake is being used. When handling a large number of cars with the air coupled and working through such cars follow the suggestions contained in next paragraph with reference to road switching.

11. So far as road work is concerned, everything that has been said with regard to switching in yards will apply, with this exception. Ordinarily in road work when switching is being done, any number of cars may be handled with the air coupled and working through such cuts. Trainmen must understand that the time required for applying brakes in slowing down or stopping is slightly prolonged, if the use of emergency is to be avoided, and the emergency brake should not be used except in case of emergency under such conditions. When handling a large number of cars, caution signals must be given in advance. When switching passenger equipment with Diesel power where the slack is bunched or stretched and the locomotive has stalled, such as stretching the train after making a coupling, or reversing the movement, etc., the locomotive brake should be applied as the Diesel throttle is closed to prevent the locomotive moving back into or away from the train with such force as to cause annoying slack action.

12. A great many enginemen and trainmen practice the methods outlined herein. The subject matter of the suggestions were therefore taken from these methods. There is, however, a big field of opportunity for improvement in present methods employed by many enginemen and the suggestions are offered with the hope that improvement can be effected where the need for such is apparent.

GOOD SWITCHING PRACTICES

No. 1. Violent signals must not be given, except in cases of extreme emergency, or to avoid accident. Move locomotives and cars in switching so violent signals will not be necessary.

No. 2. Use caution, or car length, signals when it is desired to reduce speed, also when shoving to a coupling, or to end of tracks, and spotting cars, etc.

No. 3. Switch with as few cars as practicable.

No. 4. Shove or ride to rest all cars containing live stock, cars carded fragile, and open cars loaded with tractors, vehicles, etc., when being placed in occupied tracks with insufficient room to hold without striking other cars. Also protect in same manner, all other cars being placed against them. Explosive rules to cover handling of explosives. Automatic air should be cut in when switching cars in loading or unloading live stock at stock yards, and when handling cuts of cars loaded with live stock between train yards, interchange tracks and stock yards.

No. 5. Engineman while switching must not make heavy application of brakes until the slack in cars being handled is adjusted, unless when necessary to avoid accident.