4.8.11 Recommended Practices for Switch and Maintenance Grinding Applications

4.8.11.1 Scope

This section is a continuation of 4.8 Rail Grinding Best Practices. This section establishes best practices for switch and maintenance grinding applications. Turnouts, crossings and other special track work are known as design "discontinuities" in the track structure. These discontinuities are necessitated by the physical requirements for moving a rail-bound vehicle or rolling stock from one track to another, or for crossing tracks. They consist of more than two rails, usually with complex and expensive components such as switch points, frogs, guard rails, etc. Because these discontinuities generally contain changes in track geometry (often abrupt or non-uniform in nature) they result in the development of high force levels as the vehicle passes over this discontinuity. Furthermore, because the turnout "steers" the rail-bound vehicle or rolling stock as it negotiates its key components, the relationship between the wheel and rail is particularly important.

4.8.11.1.1 General

Switch and maintenance grinding applications refer to the use of abrasive grinding wheels applied to the rail head to restore rail head profile and a smooth transition throughout the entire switch area. This produces a regular and consistent running band on the crown of the rail, while controlling metal flow on the gage and field corner of the rail head. This results in increased rail and wheel life, controls rail head defects and decreases wheel – rail noise. The recommended practices addressed in this section help maintenance personnel to determine where and how to employ switch and maintenance grinding application methods, and to provide guidelines for monitoring the effectiveness.

4.8.11.2 Expected Performance

Grinding should be targeted so the highest priority switches and crossings are ground within designated tonnages. The railroad shall specify the grinding strategy to be employed at each grinding cycle.

A railroad survey should be performed to identify areas, in addition to switches and grade crossings, where switch grinders are preferable to large production grinders. The survey should identify areas where poor rail surface conditions exist and whether it is more advantageous to use switch grinders. Reasons may include: location/rail accessibility and/or economics.

Inspect and identify any additional locations for grinding, including:

- Wayside lubricators
- Failed equipment detectors
- Wheel burns or otherwise damaged rail
- Bridges

- Depot platforms with restricted side clearance
- Welded rail "plugs"
- WILD (Wheel Impact Load Detector)
- Other special trackwork

Equipment shall remove metal from the surface of the head of the rail in a uniform and consistent manner. As a result of different grinding stones, stone arrangements and/or motor configurations, some grinding limitations may exist within crossings, raised guard rails, frogs, lubricator sites, axle counters, hot box detectors, and other obstructions.

The grinding equipment must be capable of removing short wave corrugation, reducing rolling contact fatigue as defined in Section 4.2 of this chapter, and achieve the desired rail head profile. The grinding equipment's stone patterns, power and pass speeds will determine the metal removal rate and passes required.

4.8.11.3 Areas to be Ground

4.8.11.3.1 Switch and Crossing Grinding Units

Units will be defined as locations where the main line, production grinders are unable grind:

- Straight side of switch
- Turnout side of switch
- Frog/guard rail area
- Turnout curve
- Curves
- Road crossings
- Equipment defect detectors
- Railroad crossings
- Spot grinding (areas where production grinders cannot support)

Note: The turnout curve is defined as the area starting 50 feet behind the turnout frog, through the last field weld on the insulated joints governing the out bound movement from the adjacent track.

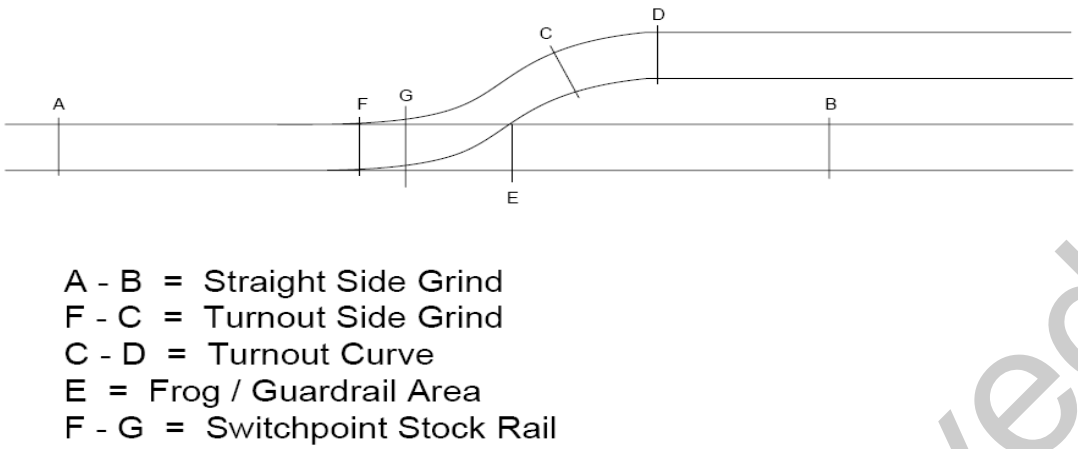

Figure 4.8.11.3.0 Showing grinding unit areas

The switch and maintenance grinder should grind far enough beyond the unit being ground to overlap the ends of the area ground by the large, production grinders. On seldom used turnout locations, reduce grinding on the turnout side. Grind only the switch point to the turnout heel block and, where required, the turnout side of the frog. Occasionally, a main line grinder may skip the turnout curve due to track work windows - this should be evaluated for grinding.

4.8.11.3.2 Grinding Program considerations:

4.8.11.3.2.1 The decision to grind into a frog is based on many factors, such as type and size. Usually the decision is to relieve short wave corrugation and improve transfer areas.

4.8.11.3.2.2 Most turnout stock rails require corrective grinding using a precision hand grinder in the transfer area prior to grinding the entire turnout. This is due to various conditions such as wheel transfer, switch condition and support. The precision grinding does not take the place of the switch grinder.

4.8.11.3.2.3 When grinding a switch point, there are areas that cannot be ground by these machines, however the finished product shall not be left outside regulatory specifications.

4.8.11.3.2.4 When grinding highway grade crossings, inspect the highway grade crossing to ensure crossing planks or other obstacles are secured to prevent damage to equipment. The amount of field side relief (rail/wheel contact relief area) that can be achieved when grinding, will be determined by the highway grade crossing type and clearance.

4.8.11.3.2.5 The time spent grinding a unit will depend on the type and size of the unit, rail condition, desired profile, grinding pass speed (mph), and length of the object. When spot grinding curves, every 225 feet will constitute a unit.

4.8.11.4 Preventive/Corrective Maintenance Grinding

Grinding speeds range from 2 mph to 5mph, depending on the type of grinding being preformed. Preventive maintenance grinding will usually require three (3) to five (5) passes per unit at speeds of 3 mph or higher. Corrective maintenance grinding will require slower speeds to profile the rail head. Usually 2 mph to 2.5 mph and may require nine (9) or more passes. Continuous bluing across the re-profiled zone on the rail head is not acceptable.

4.8.11.5 Quality Control

To ensure quality control when grinding, use a precision profile tool to monitor the grinding profile during the grinding operation. The rail profile should be ground to the desired radius. Inspect the rail head for excessive shelling, pitting, or rail head breakout. Inspect the ground rail head surface to ensure no sharp edges, blue streaks, or gouges are present and that the grinding facets are uniform and blend together.

A final walking inspection should be preformed prior to leaving the work location. Extinguish all fires that may be present. Use air or water to blow out grinding dust that might cause signal failure in the switch point/stock rail area, insulated gage plates and joints.

4.8.11.6 Planning Switch and Maintenance Grinding

Best practice switch and maintenance grinding includes rigorous planning and quality control. A good planning process includes:

- Development of a detailed grinding plan;
- Ensuring that the grinding program is strictly followed;
- Proper supervision of the grinding operation;
- Pre- and post-inspection of the quality of grinding;
- High production during available grinding time;
- Coordination of all aspects to manage a safe operation; and
- Preventing the risk of fires.