

NATIONAL TRANSPORTATION SAFETY BOARD

Safety Research Division

Washington, DC 20594

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DATA REPORT:

“Use of Switch”- Related Rail Accidents in the U.S. (2013-2017) in Support of the Investigation of RRD18MR003 (Cayce, SC, Feb. 4, 2018)

Specialist’s Data Report

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1. DATA REQUEST

- **Objective:** Determine the prevalence of rail accidents, fatalities, and injured persons related to the use of rail switches, particularly those that occur on the main track.

2. DATA SOURCES

- **FRA Rail Equipment Accident/Incident Database for years 2013-2017** (based on FRA form 6180.54). According to FRA, the database contains, “reported cases of collisions, derailments, fires, explosions, acts of God, or other events involving the operation of railroad on-track equipment and involving damages exceeding the reporting threshold for the year reported.”
- **Rail Equipment Accident/Incident Form FRA F 6180.54 Data File Structure and Field Input Specifications (coding manual)**

3. METHODOLOGY AND DATA LIMITATIONS

- Created unique accident identifier using “SELECT DISTINCT” for the following codes: rr3, incdtno3, year, imo.
- Cases where CAUSE (Primary cause of incident) or CAUSE2 (Contributing cause of incident) is equal to one of the following “Use of Switches” codes:
 - H701 Spring Switch not cleared before reversing
 - H702 Switch improperly lined
 - H703 Switch not latched or locked
 - H704 Switch previously run through
 - H705 Moveable point switch frog improperly lined
 - H706 Switch improperly lined, radio controlled
 - H707 Radio controlled switch not locked effectively
 - H799 Use of switches, other
- TYPTRK (Type of track) 1=Main; 2=Yard; 3=Siding; 4=Industry
- CASKLD (Total killed for all RR’s involved-calculated from Form F6180.55a’s submitted)

- CASINJ (Total injured for all RR’s involved-calculated from Form F6180-55a’s submitted)
- Sql code for Table 1:

```
SELECT year, count(*) AS Accidents
FROM (SELECT DISTINCT rr3, incdtno3, year, imo FROM RailEquipmentAccidents
WHERE cause='H701' OR cause='H702' OR cause='H703' OR cause='H704' OR
cause='H705' OR cause='H706'OR cause='H707' OR cause='H799' OR cause2='H701'
OR cause2='H702' OR cause2='H703' OR cause2='H704' OR cause2='H705' OR
cause2='H706'OR cause2='H707' OR cause2='H799') AS Q1
GROUP BY year
ORDER BY year;
```
- Sql code for Table 2:

```
TRANSFORM count(*)
SELECT year
FROM (SELECT DISTINCT rr3, incdtno3, year, imo, typtrk FROM
RailEquipmentAccidents WHERE cause='H701' OR cause='H702' OR cause='H703' OR
cause='H704' OR cause='H705' OR cause='H706'OR cause='H707' OR cause='H799'
OR cause2='H701' OR cause2='H702' OR cause2='H703' OR cause2='H704' OR
cause2='H705' OR cause2='H706'OR cause2='H707' OR cause2='H799') AS Q1
GROUP BY year
PIVOT typtrk;
```
- Sql code for fatality and injury counts

```
SELECT Q1.Year, Sum(Q1.caskld) AS SumOfcaskld, Sum(Q1.casinj) AS SumOfcasinj
FROM (SELECT DISTINCT rr3, incdtno3, year, imo, caskld, casinj FROM
RailEquipmentAccidents WHERE cause='H701' OR cause='H702' OR cause='H703' OR
cause='H704' OR cause='H705' OR cause='H706'OR cause='H707' OR cause='H799'
OR cause2='H701' OR cause2='H702' OR cause2='H703' OR cause2='H704' OR
cause2='H705' OR cause2='H706'OR cause2='H707' OR cause2='H799') AS Q1
GROUP BY Q1.Year;
```

4. OBSERVATIONS AND SUMMARY

Table 1 shows the number of accidents between 2013 and 2017 in which either the primary as a contributing cause included one of the “Use of Switches” codes. The average number of accidents per year over the 5-year period was about 208 accidents per year.

Table 1: Accidents per year in which a “Use of Switches” code was listed as a primary or contributing cause.

Year	Accidents
2013	182
2014	221
2015	222
2016	203
2017	211

Table 2 shows the same accidents (that is, where a “Use of Switches” code was the primary or contributing cause) by year and type of track. The table shows that most (75.6 percent) of such accidents occurred in the yard. About 11.8 percent of

improperly switch-related accidents occurred on main track. During the 5-year period observed, about 25 accidents per year involving Use of Switches occurred on main track.

Table 2: Accidents in which a “Use of Switches” code was listed as a primary or contributing cause by year and type of track.¹

	Main	Yard	Siding	Industry
2013	27	128	7	20
2014	22	172	5	22
2015	24	179	8	12
2016	23	151	8	21
2017	27	158	7	21

During the 5-year period reviewed, there was one person who died and 65 people injured as a result of accidents where ‘Use of Switches’ was coded as a primary or contributing cause.

¹ Note that, on a few occasions, accidents involved more than one type of track.