SOFA Switching Fatality and Severe Injury Update – 2016 First Quarter

PLEASE POST IMMEDIATELY

Annual switching fatality counts are lower since 2011…from 1992 through 2010, annual fatality counts averaged 9.8; from 2011 through 2015, counts averaged 2.6. (see page 8) Continue to stress the Five SOFA Safety Advisories which are based on reasons why switching fatalities occur:

1. **Inexperience**
2. **Close/no clearance**
3. **Industrial hazards**
4. **Job briefing**
5. **Struck by mainline train**

One switching fatality in 2016 through April 05

- **March 26 – CP – St. Paul, MN: An engineer was struck by a freight train while crossing tracks in a yard at 12:30 am. [based on preliminary information with circumstances subject to change pending investigation]**

Three switching fatalities in 2015

- **July 25 – CN – Homewood, IL: A yard conductor with 26 months service suffered fatal injuries while working within Markham Yard. Conductor may have fallen and possibly his head made contact with the fuel tank of a passing locomotive while he was on the ground. [based on preliminary information with circumstances subject to change pending investigation]**

- **August 12 – NS – Hattiesburg, MS: A trainee with three weeks service suffered fatal injuries while working within a local propane industry. The preliminary investigation revealed that the trainee was found coupled between the twenty-fourth (24th), the last car of the cut they were shoving, and the cars they intended to pick up within the industry. [based on preliminary information with circumstances subject to change pending investigation]**

- **September 29 – UP – Kansas City, KS: A RCO operator appears to have been struck by a shoving movement of another RCO assignment in a yard. [based on preliminary information with circumstances subject to change pending investigation]**

Switching Operations Fatality Analysis (SOFA)

- **A voluntary, non-regulatory, railroad-safety partnership comprised of representatives from AAR, ASLRRA, BLET, FRA, and UTU**
- **Seeks to prevent switching Fatalities through education based on facts about causes**
- **SOFA is not part of a rulemaking or regulatory process**
- **Recognizes that all have responsibility for switching safety: employees, managers, and regulators**
- **SOFA's goal is Zero Switching Fatalities achieved through education and non-punitive interactions among stakeholders**
- **Find SOFA reports and information at: http://www.fra.dot.gov/SOFA [accessed March 01, 2016]**

Continue to Stress the Five SOFA Safety Advisories

…based on reasons why switching fatalities occur

The SOFA Working Group (SWG) developed Five Safety Advisories to make switching safer. The following pages contain summary information about each Advisory. For a complete discussion of each Advisory see the *2011 SOFA Report,* March 2011. http://www.fra.dot.gov/SOFA [accessed March 01, 2016]

- **Inexperienced Employees (SOFA first addressed this issue with Lifesaver/Recommendation 5)**

SOFA essentially classifies as *inexperienced* those fatality events where the deceased had 1.5 years of craft experience or less

- **Close Clearances**

Close and no clearances can be permanent or temporary (like cars left afoul)

- **Industrial Track Hazards**

Industrial track hazards occur when a structure, vehicle, temporary obstruction, or other hazards (such as close/no clearances) presents risk on industrial track

- **Job Briefings (SOFA first addressed this issue with Lifesaver/Recommendation 3)**

A job briefing is specific to upcoming work, and its interrelated and independent tasks

- **Struck by Mainline Trains**

Darkness and winter months are associated with this fatality type. Also, mainline inspections (as locomotive, roll-by, and hotbox) can involve risks.

Inexperienced Employees

SOFA first addressed this issue with Lifesaver/Recommendation 5
Consult the *2011 SOFA Report* for complete Advisory

- SOFA essentially classifies as *inexperienced* those fatality events where the deceased had 1.5 years of craft experience or less.
- But *inexperienced* has a broader meaning in fatality events. Such as whether employee (s) had sufficient and recent familiarity with a location to perform work safely.
- Inexperience may be a growing concern as hiring waves replace retiring employees. And crew size dwindles.
- Productivity expectations should adjust to employee experience.
- Crew composition should pair an inexperienced employee with experienced employees when possible. Excess risk may exist for crews with one or more inexperienced employees.
- Training should always seek improvement. Sharing of best practices is essential.
- Crafting an effective behavioral rule, practice, or procedure that can be assessed for inexperienced employee compliance is difficult. Thus, in training going beyond a rulebook approach is necessary. Developing metrics to assess training quality presents challenges.
- Principles of Crew Resource Management should be included in new employee training.
- Classroom training should be balanced with on-the-job training (OJT). OJT should nature, providing positive instruction and feedback on inadequacies. Concerns of inexperienced employees should be considered.
- Mentoring can be challenging. It is not always possible to pair experienced with inexperienced employees, as in smaller operations. Just having experience does not necessarily translate into good mentoring. Criteria for mentors should be established. Mentors should be good listeners, and provide positive and reinforcing feedback on inadequacies. Inexperienced employees have responsibility to learn from mentors.
- Shove moves may be particularly challenging to inexperienced employees.

Close Clearances

Consult the 2011 *SOFA Report* for complete Advisory

- Close and no clearances involve insufficient space:
  - No Clearance: Insufficient space to avoid being struck if passing or being passed by an object, structure, or equipment.
  - Close Clearance: Insufficient space to take evasive action to avoid being struck by moving equipment that derails into an object, structure, or other equipment.
- Close and no clearances can be permanent or temporary:
  - Permanent Close/No Clearance: A fixed structure that remains in the same location from day to day, such as a building, loading dock, fence, post, beam, or other permanent structure, that an employee passes.
  - Temporary Close/No Clearance: A movable object, including equipment on or near one track fouling another track, rolling stock on an adjacent track, stacks of cross ties, construction materials, and doors or gates left open, that passes by an employee or an employee passes.
- Remedies include:
  - Eliminate when possible. This is the favorable approach.
  - Sign with standardize signage, at an appropriate distance (not too close or far) and on the same side, with instructions on how to act.
  - Improve lighting.
  - Indentify through maps, job briefings, transference of knowledge from experienced to inexperienced employees, inspection before action is taken, reporting with follow up, and reporting of close calls.
  - When operating look for close/no clearances, ride away from these hazards or dismount as appropriate, plan for possibility of a derailment with an escape strategy, and avoid distractions (unnecessary conversation, doing paperwork, or cellphone use).

Industrial Track Hazards

Consult the *2011 SOFA Report* for complete Advisory

- Industrial track hazards occur when a structure, vehicle, temporary obstruction, or other hazards (such as close/no clearances) presents risk on industrial track. Industrial plant employers and employees, and truck drivers, can create these hazards. Periodic inspections should be made of industrial conditions. Any hazards should be reported immediately.
- These hazards can include, or result from:
  - **Industrial Track Agreements**: These agreements may not be current, require notification of a change in conditions, and/or may allow conditions to become unsafe due to changes over time. Systematic review of agreements is inconsistent across the railroad industry. Shippers/receivers utilizing the same industrial lead may have different industry track agreements.
    - ❖ Remedies include, but our not limited to, removing close/no clearances; ice and snow; and objects and debris fouling track. Performing needs assessment for lighting installation and maintenance. Marking private crossing clearly. Separation of train right-of-ways and motor vehicle roads. Separation of railroad and non-railroad employees. Empowering employees to stop work in the presence of hazards. Safety should take precedence over work completion.
  - **Inconsistent training and updating of plant circumstances:** Training in plant characteristics may be inconsistent. An employee who is unfamiliar with an industrial property may not be aware of the industrial hazards. Job aids such as maps usually do not exist.
    - ❖ Remedies include providing job aids (as maps), including hazard identifications and knowledge exchange between experience and less experienced employees in job briefings, inspecting site before switching, and sharing close-call episodes among employees.
  - **Collision with motor vehicles during shoving:** Fatalities have resulted from employees riding railroad equipment while shoving across an industrial grade crossing.
    - ❖ Remedies include advising non-railroad employees on separation of their activities and roadways from those of railroading, and installing and maintaining lighting.

Job Briefings

SOFA first addressed this issue with Lifesaver/Recommendation 3
Consult the 2011 *SOFA Report* for complete Advisory

- A job briefing is specific to upcoming work, and its interrelated and independent tasks. A safety briefing is more general, often occurring at the beginning of a shift. Specific types of fatalities are not associated with job briefings.
- A job briefing is important in planning before work begins. And in continuing monitoring of work-in-progress for anomalies.
- At a minimum, a job briefing is needed when the nature of work changes. Or there are safety concerns
- Recognize when the nature of work changes. Think about risks that could occur when work is not being done as originally anticipated or planned.
- A job briefing involves all crew members. Everyone should understand the exact nature of work to be performed.
- All crew members should be empowered to stop work and request a job briefing. All crew members regardless of seniority should participate and be heard. Work should not begin again until safety issues are resolved.
- A job briefing cannot be standardized, generalized, or simply rule based. Switching acts can be unique to circumstances and location. A briefing must be adequate, specific to the acts. Fatalities have resulted even after a job briefing because the briefing was not adequate.
- At a minimum, a job briefing should include:

  - ❖ Who will act
  - ❖ What act is to be done
  - ❖ Where act will occur
  - ❖ When act will occur
  - ❖ Why act is being done

Struck by Mainline Trains

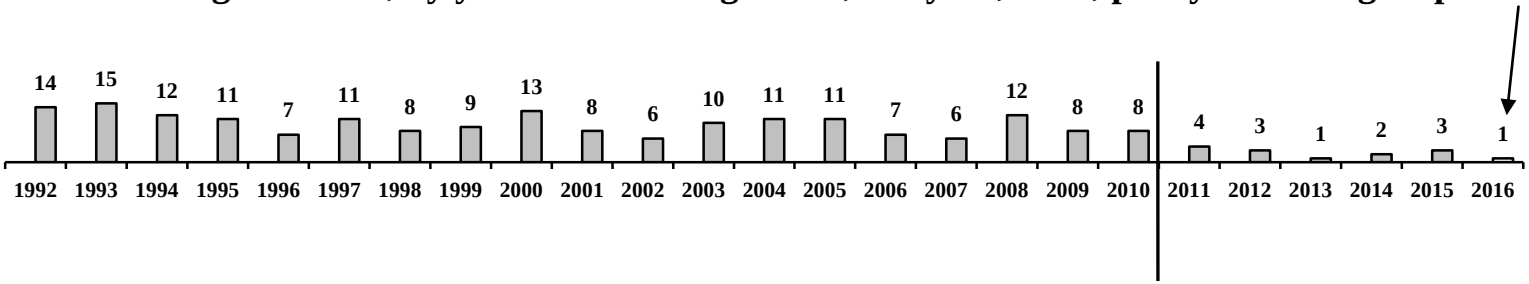
Consult the new *2011 SOFA Report* for complete Advisory

- Darkness and winter months are associated with this fatality type. Awareness may be compromised and degraded. Darkness may impair depth perception. Use multiple warning methods (as radio, horn, bell, and headlight), both visual and auditory. A single warning from one device can be misconstrued or forgotten. Reflective clothing, and clothing that does not impair hearing and peripheral vision, are desirable.
- Mainline inspections (as locomotive, roll-by, and hotbox) can involve risks. Employees should exercise discretion about the location and timing. A job briefing should be conducted before any member exits the cab. At a minimum, a this job briefing should include:
  - Determination of a safe location to stop.
  - If inspection can be performed from the safe field side.
  - If not, can dismounting be from the field side.
  - If not, there must be awareness of all approaching movements, consideration of time to dismount, avoidance of fouling track, recognition that warnings may not be adequate, and planning of a worst-case scenario that includes an escape route.
- Communication may not be adequate when work is performed along a mainline. Effective communication must exist among crew, between crews, dispatchers, and yardmasters. Effective communication includes:
  - Utilizing established programs like Crew Resource Management.
  - Not exiting the cab without verbalizing intentions.
  - Contact with, and providing warnings, for crew members outside the cab.
  - Establishing a safe zone outside the cab for communication with the crew, other crews and movements, dispatcher, and yardmaster.

DATA SECTION – 2016 First Quarter Update

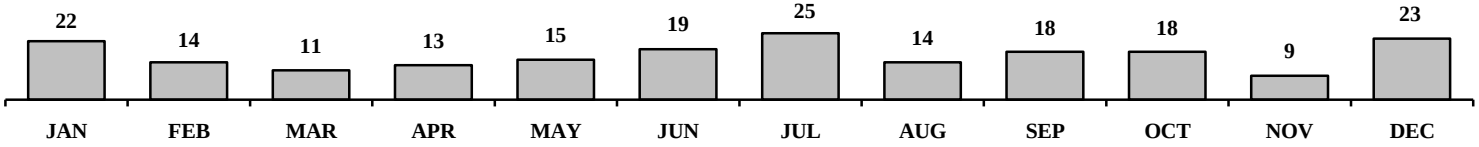
Annual switching fatality counts are lower since 2011…from 1992 through 2010, annual fatality counts averaged 9.8; from 2011 through 2015, counts averaged 2.6

201 Switching Fatalities, by year: 1992 through 2015, full year; 2016, part year through April 05

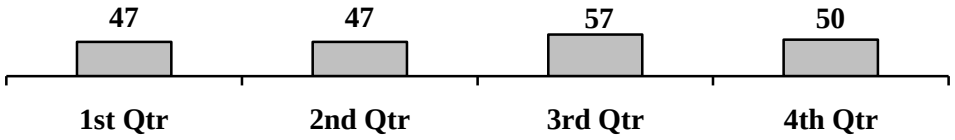


201 Switching Fatalities, by month: January 01, 1992 through April 05, 2016

Switching Fatalities occur in every month…always be alert



201 Switching Fatalities, by quarter: January 01, 1992 through April 05, 2016



22 Recent Switching Fatality Cases, January 01, 2010 through April 05, 2016

- **These 22 fatality cases occurred subsequent to the 179 cases (1992 through 2009) which formed the basis of the *2011 SOFA Report*. The purpose in displaying this information is to identify possible emerging risks in switching:**

- **Fourteen of the 22 cases (64 percent) involve three SOFA Lifesavers/Advisories: Close/No Clearance, Going between Rolling Equipment, and Inexperience**
  - **six cases involve Close/No Clearance. Five of these six cases involve the temporary hazard of cars left afoul**
  - **five cases involve Going between Rolling Equipment (SOFA Lifesaver 1; and FRA Safety Advisories 2011-02 and 2013-03)**
  - **four cases involve Inexperience**

(Note: one case (Kenmare, ND) involves two SOFA Lifesavers/Advisories so the number of cases is one less than the number of SOFA Lifesavers/Advisories)

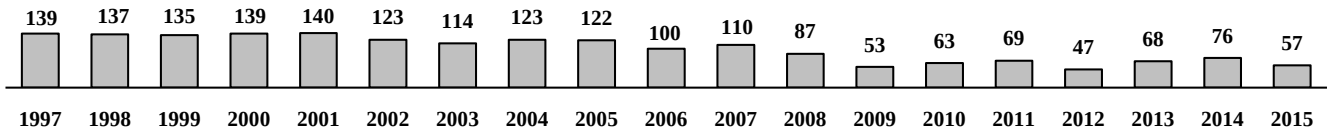
Year	Count	Date	City	State	Reviewed or Preliminary	Fatality Reasons: brief description Risks other than those listed are often involved. Cases marked 'preliminary' are subject to revision of event reasons
2010	1	04/23/10	Riverdale	IL	reviewed	Lack or Inadequate Job Safety Briefing
	2	05/31/10	Kearny	NJ	reviewed	Close/ No Clearance (fueling structure)
	3	06/10/10	Doswell	VA	reviewed	Struck by Mainline Train; and Drugs and Alcohol
	4	07/01/10	Meridian	MS	reviewed	Employee Tripping, Slipping, or Falling
	5	07/13/10	East Deerfield	MA	reviewed	Going between Rolling Equipment
	6	09/02/10	Bridgeport	NJ	reviewed	Close/ No Clearance (cars left afoul)
	7	09/04/10	Mobile	AL	reviewed	Industrial Hazard; and Miscellaneous Causes
	8	10/11/10	Orange	TX	reviewed	Inexperience; and Employee Tripping Slipping, or Falling
2011	9	02/08/11	Kankakee	IL	reviewed	Close/ No Clearance (cars left afoul)
	10	07/25/11	Bedford Park	IL	reviewed	Going between Rolling Equipment; and Unsecured Cars
	11	08/15/11	Kansas City	KS	reviewed	Going between Rolling Equipment; and Miscellaneous Causes
	12	09/08/11	Botkins	OH	reviewed	Going between Rolling Equipment; and Unexpected Movement of Railcars
2012	13	01/30/12	Gary	IN	reviewed	Close/ No Clearance (cars left afoul); and Environment; and Industrial Hazard
	14	05/28/12	Kenmare	ND	reviewed	Close/ No Clearance (cars left afoul); and Inexperience; and Failure to Confirm Route of Movement
	15	07/31/12	Mason City	IA	reviewed	Going between Rolling Equipment; and Lack or Inadequate Job Safety Briefing; and Unexpected Movement of Railcars; and Unsecured Cars
2013	16	02/16/13	Cleveland	OH	reviewed	Inexperience; and Drugs and Alcohol; and Employee Tripping, Slipping, or Falling
2014	17	06/24/14	Birmingham	AL	preliminary	Derailment
	18	10/08/14	Colorado Springs	CO	preliminary	Close/ No Clearance (cars left afoul)
2015	19	07/25/15	Homewood	IL	preliminary	Came in contact with a shove movement
	20	08/12/15	Hattiesburg	MS	preliminary	Inexperience
	21	09/29/15	Kansas City	KS	preliminary	Struck by equipment being operated by RCO
2016	22	03/26/16	St. Paul	MN	preliminary	Struck by passing train

SOFA-defined Severe Injury Update

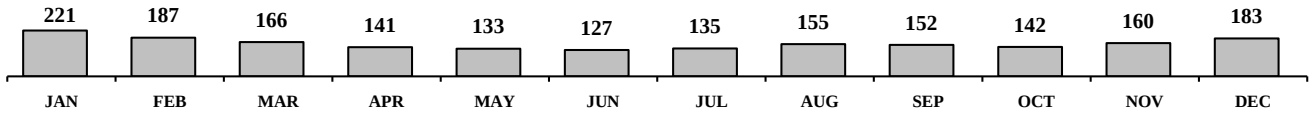
Definition: Based on its interests (i.e., potentially involving the same factors as fatalities), *Severe Injuries* are defined by the SOFA Working Group as (1) potentially life threatening; (2) having a high likelihood of permanent loss of function, permanent occupational limitation, or other permanent disability; (3) likely to result in significant work restrictions; and (4) resulting from a high-energy impact to the human body. 'Severe Injuries' include amputation, dislocation of the neck, loss of eye, electric shock or burn, and fracture to any bone except the lower arm, fingers, foot, and toes. 1997 is the first year these Injuries to train and engine service employees can be determined as defined by the interest of the SOFA Working Group. For more information, see *Severe Injuries to Train and Engine Service Employees: Data Description and Injury Characteristics*. July 2001.

Note: The definition of SOFA-*defined Severe Injuries* is not to suggest that other injuries and illnesses resulting from operations are not also 'severe' and/or cause hardship to employees.

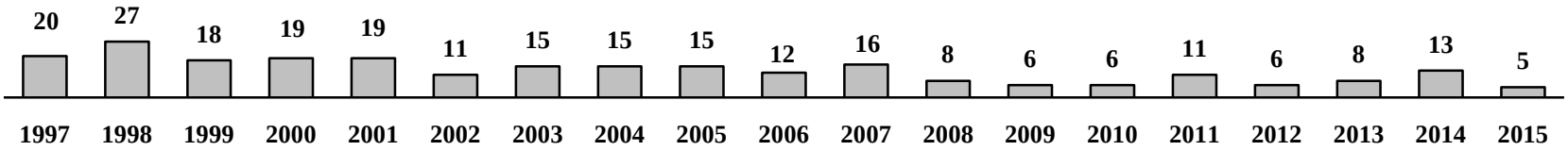
1,902 SOFA-defined Severe Injuries, by year: 1997 through 2015



1,902 SOFA-defined Severe Injuries, by month: January 1997 through December 2015



250 Amputations (counts are included in Severe Injuries), by year: 1997 through 2015



SOFA-defined Severe Injuries
January 1997 through December 2015

Among *SOFA Updates*, counts previously presented may change based on revisions to FRA data. The latest month available from the FRA lags the calendar month of this *Update* by three months. Information used in this table was extracted on March 01, 2016, from FRA's publically available data.

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	totals	average
JAN	11	13	16	15	21	12	11	11	20	10	14	13	6	6	8	9	8	6	11	**221**	**11.6**
FEB	17	15	9	9	9	13	17	14	10	6	15	12	4	7	9	2	5	10	4	**187**	**9.8**
MAR	14	12	17	11	10	10	13	10	9	9	11	5	5	4	5	6	3	5	7	**166**	**8.7**
APR	8	10	6	10	12	6	9	13	10	7	8	9	5	7	5	2	4	6	4	**141**	**7.4**
MAY	6	12	8	8	12	14	9	6	6	8	3	7	1	7	8	4	5	7	2	**133**	**7.0**
JUN	9	10	8	11	8	5	10	9	7	11	5	3	6	4	2	6	2	6	5	**127**	**6.7**
JUL	9	14	10	8	10	7	6	10	5	12	8	1	4	4	5	3	7	5	7	**135**	**7.1**
AUG	13	10	11	14	8	10	7	14	10	10	13	5	4	5	5	1	5	7	3	**155**	**8.2**
SEP	10	11	15	10	20	12	5	4	9	6	10	12	5	3	4	5	4	3	4	**152**	**8.0**
OCT	12	12	16	10	5	11	9	7	11	5	11	4	2	4	4	1	6	9	3	**142**	**7.5**
NOV	12	9	12	11	13	14	10	10	13	8	6	8	3	6	9	3	5	7	1	**160**	**8.4**
DEC	18	9	7	22	12	9	8	15	12	8	6	8	8	6	5	5	14	5	6	**183**	**9.6**
totals	**139**	**137**	**135**	**139**	**140**	**123**	**114**	**123**	**122**	**100**	**110**	**87**	**53**	**63**	**69**	**47**	**68**	**76**	**57**	**1,902**	**100.1**

Amputations (a type of Severe Injury)
January 1997 through December 2015

A type of SOFA-defined Severe Injury, Amputations are displayed separately because of the extreme trauma to employees engaged in switching, and the likelihood of permanent occupational and lifestyle limitations. Counts for Amputations are contained in the counts of SOFA-defined Severe Injuries (shown on previous page). Information used in this table was extracted on March 01, 2016, from FRA's publically available data.

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	totals	average
JAN	1	0	2	1	0	0	2	2	2	0	1	1	1	0	2	0	0	0	1	**16**	**0.8**
FEB	0	1	0	1	0	2	1	2	0	2	1	0	0	1	2	0	1	1	1	**16**	**0.8**
MAR	3	4	3	2	1	1	3	1	2	1	0	1	1	0	0	1	0	1	0	**25**	**1.3**
APR	1	2	0	1	2	0	1	1	2	2	3	3	1	0	1	0	0	0	1	**21**	**1.1**
MAY	1	2	3	0	2	2	2	0	0	1	1	0	0	1	2	0	2	2	0	**21**	**1.1**
JUN	2	1	1	0	1	0	0	1	0	0	1	1	0	0	1	0	0	1	1	**11**	**0.6**
JUL	1	5	1	0	4	0	1	2	1	2	2	0	1	1	0	0	1	2	0	**24**	**1.3**
AUG	1	0	1	4	0	1	0	2	2	0	3	0	1	1	0	0	1	1	0	**18**	**0.9**
SEP	2	4	3	2	5	4	0	0	3	1	1	2	0	1	0	2	0	1	1	**32**	**1.7**
OCT	2	5	2	2	0	0	2	2	0	0	2	0	0	1	1	1	2	2	0	**24**	**1.3**
NOV	2	2	2	2	3	0	1	1	2	3	1	0	0	0	1	0	0	2	0	**22**	**1.2**
DEC	4	1	0	4	1	1	2	1	1	0	0	0	1	0	1	2	1	0	0	**20**	**1.1**
totals	**20**	**27**	**18**	**19**	**19**	**11**	**15**	**15**	**15**	**12**	**16**	**8**	**6**	**6**	**11**	**6**	**8**	**13**	**5**	**250**	**13.2**

Switching Fatalities, SOFA-defined Severe Injuries, and Other Reportable Events

***Source*: Switching fatalities from SOFA Database; all other information used in this table was extracted on March 01, 2016, from FRA's publically available data. *Note*: Among *SOFA Updates*, counts previously presented may change based on revisions to FRA data**

Year	SOFA Switching Fatalities	SOFA-defined Severe Injuries	Amputations (counts are included in SOFA-defined Severe Injuries)	All Employee On-duty Fatalities less SOFA Switching Fatalities	T&E Employee On-duty Fatalities less SOFA Switching Fatalities	All Reportable Employee Casualty to T&E Employees (includes Fatalities and Severe Injuries)	All Accidents	Human Factor Accidents	Highway-Rail Crossing Incidents	Trespasser Incidents (not at crossings)
1992	14	*	*	20	6	6,648	2,359	864	4,910	1,049
1993	15	*	*	32	16	5,649	2,611	865	4,892	1,032
1994	12	*	*	19	9	5,026	2,504	911	4,979	981
1995	11	*	*	23	10	4,215	2,459	944	4,633	955
1996	7	*	*	26	15	3,726	2,443	783	4,257	945
1997	11	139	20	26	10	3,489	2,397	855	3,865	**1,049
1998	8	137	27	19	8	3,642	2,575	971	3,508	**1,049
1999	9	135	18	22	12	3,835	2,768	1,031	3,489	924
2000	13	139	19	11	2	3,893	2,983	1,147	3,502	877
2001	8	140	19	14	6	3,561	3,023	1,035	3,237	915
2002	6	123	11	14	3	3,022	2,738	1,050	3,077	935
2003	10	114	15	9	3	2,935	3,019	1,230	2,977	896
2004	11	123	15	14	9	2,910	3,385	1,353	3,085	**878
2005	11	122	15	14	7	2,817	3,266	1,270	3,066	**878
2006	7	100	12	9	0	2,483	2,998	1,068	2,942	992
2007	6	110	16	11	4	2,520	2,693	1,047	2,778	877
2008	12	87	8	14	4	2,217	2,481	910	2,429	889
2009	8	53	6	8	2	1,972	1,912	656	1,933	760
2010	8	63	6	12	5	1,883	1,902	650	2,052	830
2011	4	69	11	17	11	1,734	2,028	751	2,062	766
2012	3	47	6	13	4	1,551	1,765	666	1,985	821
2013	1	68	8	13	2	1,772	1,848	**709	2,102	858
2014	2	76	13	8	2	1,911	1,820	**709	2,291	891
2015	3	57	5	8	1	1,671	1,856	731	2,059	909
Change: 2014 to 2015	1	-19	-8	0	-1	-12.5%	2.0%	3.1%	-10.1%	2.0%

***SOFA-defined Severe Injuries are defined only back to 1997** ****Counts happened to be identical for these successive years**