



DUMP TRAILER TIP-OVER PREVENTION PROGRAM



I. Dump Trailer Tip-Overs - Contributing Factors & Suggested Best Practices

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REASON FOR PROGRAM DEVELOPMENT:

Steel Dynamics has experienced several dump trailer tip-over incidents over the last year ([See Attachment A](#)), averaging more than one tip-over incident per month. Although, fortunately these recent tip-over incidents have all resulted in near misses, property damage or minor injuries, we understand and appreciate that many, if not all of these incidents could have resulted in serious injury or fatality. As a result, this document has been developed in order to provide identified stakeholders with information to assist in preventing dump trailer tip-overs.

The following information is provided in order to communicate various factors that have been identified to contribute to dump trailer tip-overs. For each contributing factor, suggested best practices have been identified to assist in mitigation or prevention.

➤ **Contributing Factor:**

- Drivers taking known and unnecessary risks
 - Attempting to dump a load, despite having some concern about the condition of their trailer/container, ground conditions, arrangement of material in the trailer/container, overweight load, attempting to release wedged material by jerking trailer when elevated, attempting to dump with tractor not properly aligned with the trailer, etc.

➤ **Suggested Best Practice:**

- Trailers should be weighed upon arrival to an SDI facility and drivers are expected to ensure that any dump trailer that is overweight is not dumped. Drivers should request assistance with the offloading of material, rather than attempting to dump an overweight load.
- Drivers are expected to inspect their load prior to dumping in order to ensure that the material didn't shift during transit and is safe to dump.

➤ **Contributing Factor:**

- Uneven surfaces / soft or unstable ground / downward slope

➤ **Suggested Best Practice:**

- Prior to dumping, ensure that all ground surfaces are level and solid. Drivers should not attempt to dump with the tractor facing down a steep slope, as the trailer may not raise high enough to allow material to flow/dump effectively.
- Certain SDI facilities have signs located in certain areas, warning drivers of the risks associated with dumping on soft or uneven surfaces. ([See Attachment B](#))

SDI IS OFFERING THESE SUGGESTED BEST PRACTICE TIPS IN THE HOPE THAT BY FOCUSING ON SAFETY CONCERNS AND FOLLOWING SUCH BEST PRACTICES, INCIDENTS OF DUMP TRAILER TIP-OVERS WILL BE REDUCED OR ELIMINATED. SDI DOES NOT, HOWEVER, WARRANT THAT SUCH BEST PRACTICES WILL, IN FACT, ACHIEVE SUCH RESULTS, OR WILL PREVENT A DUMP TRAILER TIP-OVER. THESE SUGGESTIONS ARE NOT ALL INCLUSIVE AND IT IS WISE TO HAVE MULTIPLE PEOPLE EXAMINE A LOAD OF MATERIAL BEFORE DUMPING TO CONSIDER ALL SAFETY CONCERNS PRESENT WITH EACH LOAD. THE CHOICE OF WHETHER TO FOLLOW SUCH BEST PRACTICES SHALL BE ENTIRELY THAT OF THE OWNER/OPERATOR OF THE DUMP TRAILER AND SDI DISCLAIMS ANY AND ALL RESPONSIBILITY OR LIABILITY FOR PERSONAL INJURY OR PROPERTY DAMAGE THAT MAY OCCUR AS THE RESULT OF A DUMP TRAILER TIP-OVER.

➤ **Contributing Factor:**

- Poorly maintained equipment

➤ **Suggested Best Practice:**

- Carriers and Suppliers are expected to ensure that all delivery trailers/containers are properly maintained. Certain preventive maintenance-related best practices are provided within Attachment C, which we believe to be necessary in order to ensure optimal condition of trailers/containers. ([See Attachment C](#))

➤ **Contributing Factor:**

- Improperly loaded material
 - Unevenly distributed material can cause a dump trailer to be unstable. Trailers that are loaded with a loader can be loaded heavy to one side and material can shift in transit, causing uneven distribution. Additionally, certain loads can contain a variety of materials and if heavier/more dense items are loaded to one side, the load will be unstable when attempting to dump.

➤ **Suggested Best Practice:**

- Drivers are expected to inspect their loads prior to dumping in order to ensure that the material didn't shift during transit and is safe to dump.
- Certain SDI facilities have signs located in certain areas, warning drivers of the risks associated with dumping loads that are unevenly distributed or have shifted in transit. ([See Attachment B](#))
- Suppliers are responsible for properly loading material into dump trailers in order to ensure that it can be dumped safely upon arrival at an SDI facility. Attachment D contains certain suggested best practices for loading material in dump trailers/containers to minimize the potential for material to be loaded unevenly or heavy to one side. ([See Attachment D](#))

➤ **Contributing Factor:**

- Frozen loads

➤ **Suggested Best Practice:**

- Same day deliveries are required during the winter months in order to minimize the opportunity for material to freeze within trailer/container
- Suppliers/Carriers should consider the use of an appropriate releasing agent, which can be applied to trailers/containers prior to loading in order to prevent or minimize the potential for material to freeze to the floor/walls of trailer/container (calcium chloride, salt, plum juice) - ***consult your SDI representative for suggestions on an acceptable releasing agent that will not cause material quality or other complications.***

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➤ **Contributing Factor:**

- High wind

➤ **Suggested Best Practice:**

- Drivers should not attempt to dump material during inclement weather conditions.

Additional factors to consider:

- Drivers should remain in the cab and wear their seatbelt when dumping, unless the dump trailer/container requires the use of outside-the-cab controls
- Drivers should ensure a safe distance is maintained as trucks are performing dumping activities – establish an appropriate distance between trailers to create a safe zone. In the event of a tip-over incident, this will prevent other personnel or equipment in the area from being affected.
- Carriers/Suppliers/Drivers should avoid using “flip gate-style” dump trailers to dump scrap metal. Material may not flow efficiently, as the flip gate is likely to cause material to get hung up. Once hung up, material is likely to shift or get wedged causing the load to become imbalanced.

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Attachment A

SAFETY ALERTS

Recent Dump Trailer Tip-Overs

Equipment Damage

Incident Title: Outside Carrier Trailer Tip Over

Incident Date:

4/13/2016

Incident Description

An outside carrier entered the facility with a load of cast iron borings and proceeded to the correct pile for unloading. The driver set up on a flat, firm spot at the pile and the material appeared to be level in the trailer from the perspective of the inspector on the ground. As the driver raised the trailer up to dump the material, the trailer shifted toward the passenger side and rolled over, coming to rest on an adjacent pile of material. The tractor stayed upright and the trailer remained engaged at the fifth wheel. The trailer sustained significant damage but there were no injuries.

Root-Cause

While it cannot be confirmed with certainty, it is believed that the wetness of the material caused some of it to get hung up in the trailer as the dumping process was initiated. This likely created the instability that caused the trailer to go over.

Photos



Safety Alert

Near Miss

Incident Title:

Trucking Incident

Incident Date:

6/21/16

Incident Description

While unloading material from a customer's flatbed roll-off, the load's weight became unevenly distributed and caused the roll-off to shift to one side. The sudden shift caused several packages of material to fall off the trailer onto the ground. Fortunately, no one was injured during this incident. Had an employee been standing near the truck, a serious injury or fatality could have occurred.

Root-Cause

The customer's trucking equipment was outdated. His roll-off was not properly secured with roll-off lockdown clamps.

Photos



Safety Alert

Commercial Driver Injury

Incident Title:

Dump Trailer Tip-Over

Incident Date:

7/1/2016

Incident Description

While a commercial driver was dumping heavy scrap, it is believed the scrap at the top of the trailer became wedged, causing a top-heavy trailer to tip over. The commercial driver received a few minor abrasions to his right forearm as a result of the tipped truck. The ground underneath the truck/trailer appeared level. Wind didn't appear to be a contributing factor.

Root-Cause

Scrap wedged at the top of the dump trailer



Safety Alert

Near Miss

Incident Title:

Property Damage to Box and Trailer

Incident Date:

7-26-16

Incident Description

A driver was attempting to unload a box of sheet iron and while the box was raised to dump they noticed the material was stuck in the box. The driver lowered the box and a crane operator attempted to dig out the material. The load was so packed into the box that when the crane tried to dig it out the crane lifted the box off of the trailer tracks. When the crane operator tried to replace the box onto the tracks, the box tipped, and fell over, damaging the trailer and box.

Root-Cause

The box was too fully packed to be emptied when on the trailer.

Photos



Safety Alert

Property/Equipment Damage

Incident Title: Compactor Container Roll Over

Incident Date:

Incident Description

Driver was closing door to compactor container when the container rolled off the trailer.

Root-Cause

Design of container does not appear to be able to support the weight of the door when extended fully to the side.



Property/Equipment Damage

Incident Title:

Tractor-Trailer Roll Over

Incident Date:

08-02-16

Incident Description

The scrap truck driver pulled up parallel to a scrap pile. He began to dump the load and when he reached the 3rd stage of the hydraulic cylinder, the truck started to lean towards the passenger side. The driver immediately began to lower the load, but unfortunately the trailers leaning momentum continued until the entire truck fell over.

Potential Contributing Factors

1. Uneven grading: elevation slightly lower on west side.
2. Weight distribution: possibly heavier on passenger side of trailer.
3. Rear passenger tire appeared a little low.

Photos



Safety Alert

Safety Alert

Incident Title:

Truck tip over

Incident Date:

8-11-2016

Incident Description

An outside contractor went to dump his loose load of Aluminum wire. He made it to the second stage when he felt the truck start to go. The driver tried to lower the dump back down but was unsuccessful. After speaking with the driver he felt that the load might have been loaded heavy on one side. The driver was setting on level ground and did not have his seat belt on when the truck went over. All personnel were standing back at a safe distance while the load was being dumped. The driver sustained a small cut on his right arm.

Root-Cause

- Truck loaded heavy on one side
- To much weight up front.

Photos



Safety Alert

Property/Equipment Damage

Incident Title:

Truck Tip Over

Incident Date:

08/12/16

Incident Description

Driver was raising trailer rails to roll container to back of the trailer. The material shifted to one side due to the uneven surface forcing the tractor and trailer to turn over.

Root-Cause

- Raising the rails with the trailer on an uneven surface.



Property/Equipment Damage

Incident Title:

Tractor-Trailer Roll Over

Incident Date:

09-19-16

Incident Description

The scrap truck driver backed in parallel to a scrap bundle pile and began to dump the load. Once the 2nd stage of the hydraulic cylinder was reached, the driver heard a loud bang. The truck then began to lean towards the passenger side. The driver immediately began to lower the load, but unfortunately the trailer's leaning momentum continued until the entire truck fell over. Upon further investigation it was found that the ground was level and the trailer had no visible mechanical failure that led to the tip over.

Potential Contributing Factors

1. Weight distribution: possibly heavier on passenger side of trailer.
2. Bundles shifting to drivers side while dumping.

Photos



Safety Alert

Customer Damage

Title of Incident: Truck Tip-Over **Date of Incident:** 09/23/2016

Short Description

A driver was attempting to dump a load. The trailer was 4 stages on level ground when the trailer fell over. It appears that the first stage cylinder broke free from the holding pin causing the load to dump over.

Root-Cause

- Equipment failure

Photos



Safety Alert

Customer Damage

Title of Incident:

Dump Trailer Overturn

Date of Incident:

09/26/2016

Short Description

A Scrap Metal driver was attempting to dump a load. The load was spread evenly across the trailer. The trailer was 4 stages on level ground when the trailer fell over. It appears that the driver, who was with a trainee (1st day on the job) raised the load without checking to see if the material was dumping on the ground. Once the driver noticed that no material was on the ground, he reached to start lowering the load, but it was too late and the dump overturned. The truck was on fairly level ground (maybe 4 to 6inch fall and a slight wind) and no soft tires were found.

Root-Cause

- Driver's inattention to load due to training new driver.
- Slightly un-level ground

Photos



Safety Alert

Property/Equipment Damage

Incident Title: Truck Tip Over **Incident Date:** 12/21/16

Incident Description

Contract Hauler was attempting to dump a load when the trailer flipped over. The material pushed a portion of the barriers over damaging the material handler that was waiting to stack the material up in the bin.

Root-Cause

- The weather had been in the low 20's allowing the material to freeze and stick to the dump trailer. A portion of the load came out making the trailer unstable and heavy to one side.



3rd Party Injury

Incident Title:

Scrap Truck Tip Over

Incident Date:

3/18/17

Incident Description

The driver was sent to drop his scrap in pile #635. He had been told each time he delivered to pull up even with the rail tracks then back up to the pile to ensure that his truck was on level surface. When he began lifting his load, up to about the 3rd stick on the cylinder, his truck began to lean and fell over. The driver was attended to by the scrap crew and medical responders and driven to the scrap scale where the ambulance picked him up and took him to the hospital.

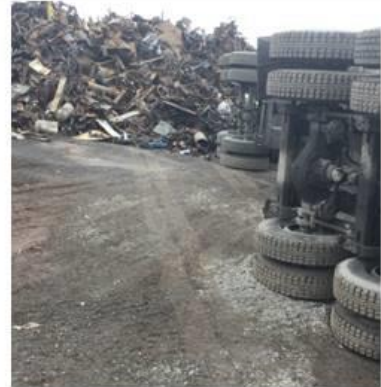
Root-Cause

Root Cause: As we could tell, by the tracks left in the dirt, it seems as if the driver did not pull up to the tracks and back up evenly, causing him to not be as level as he could've been.

Contributing Factors:

- It looked as if about half the load was wedged into the front part of the trailer, therefore once the trailer was elevated, there was a lot more weight sitting in front of the trailer, making it easier to tip.
- Driver was not wearing his seat belt, therefore as the trailer and truck tipped, he was thrown from one side of the cab to the other.

Photos



Safety Alert

3rd Party Injury

Incident Title:

Truck Tip Over

Incident Date:

3/28/17

Incident Description

When the driver began lifting his load, the truck began to lean and fell over. It was determined that the reason for the tip over was due to the material being loaded to one side.

Root-Cause

Root Cause:

- Material being load to one side
- Driver not aware of load
- Load not being inspected prior to being dumped

Photos

Note* the moisture only on one side of the trailer



Safety Alert

Attachment B

EXAMPLE SIGN

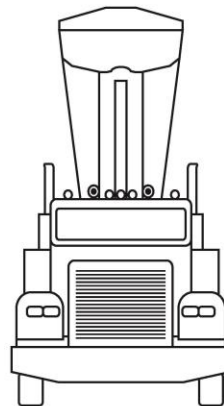
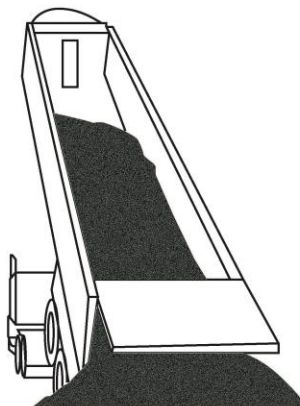
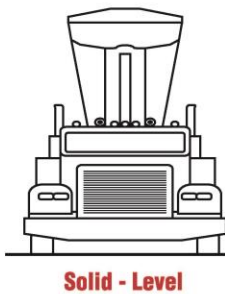
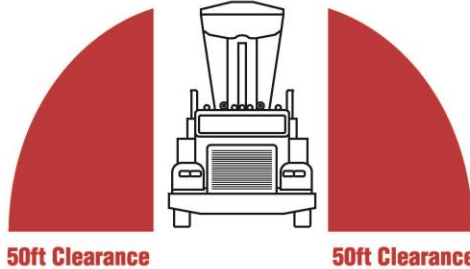
Dump Trailer Tip-Over Prevention



Steel Dynamics, Inc.®

Iron Dynamics Division

DUMP TRAILER TURN OVER PREVENTION
NO EXCEPTIONS ZERO TOLERANCE



Before dumping verify that the load has not shifted in transit.

Do not dump or raise the trailer for any reason with high gusty winds.

Attachment C

SUGGESTED PREVENTIVE MAINTENANCE BEST PRACTICES

Dump Trailer Tip-Over Prevention

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Dump Trailer Tip-Over Prevention Program

Suggested Preventive Maintenance Best Practices



Dumping Equipment Safety

Critical Inspection Points – Roll-Off Trailers & Dump Trailers

Trailer/Container Door Condition

- Check all welds for breaks and/or corrosion
- **Maintain (grease) and inspect all hinges**
- **Maintain (grease) and inspect all chains/binders**



Dumping Equipment Safety

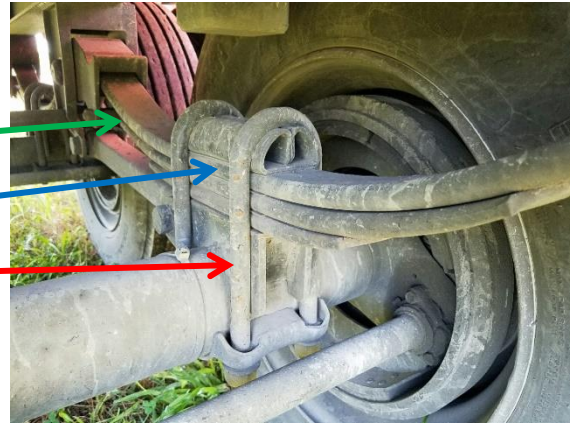
Critical Inspection Points – Roll-Off Trailers & Dump Trailers

Rear Suspension / Trailer Frame:

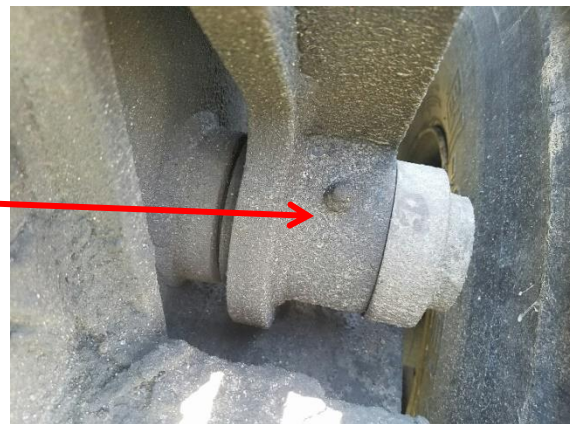
- Check all airbags for proper inflation (free of leaks).
- Ensure all mounting brackets are free of corrosion.
- Ensure all lines to airbags are in good condition (free of chafing or leaks)



- Ensure there are no broken:
 - Springs
 - Spring Center Bolts
 - Shackle Bolts



- Ensure all hinge/dump pins are maintained, lubricated and in good condition (free of cracks and/or excessive wear)



Dumping Equipment Safety

Critical Inspection Points – Roll-Off Trailers & Dump Trailers

Rear Suspension / Trailer Frame - Continued:

- Ensure tires are properly inflated. Ensure rims/wheels are free of cracks, breaks and missing/broken lugnuts.
- Ensure the frame of the dump trailer or roll-off container has no breaks in the frame. Ensure all bolts and welds are in good condition and properly securing the trailer or roll-off frame to the chassis of the trailer.



Dumping Equipment Safety

Critical Inspection Points – Roll-Off Trailers & Dump Trailers

Dump Tub / Trailer Frame:

- Inspect and maintain dump tub properly to ensure it's free of breaks, cracks, broken welds and broken mounting brackets.
- Ensure all cylinder mounts are properly lubricated and free of cracks or breaks.
- Ensure all cylinder pins are visibly in place and not working their way out of their mounts.

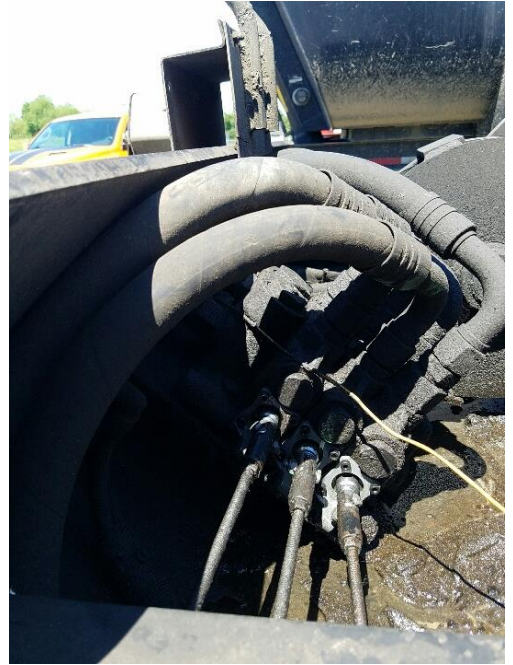


Dumping Equipment Safety

Critical Inspection Points – Roll-Off Trailers & Dump Trailers

Dump Tub / Trailer Frame - *continued*:

- Inspect all hydraulic cylinders, fittings, hoses and valves for blown, bulging or leaking seals.



- Ensure all rollers on a roll-off trailer have a retaining bolt or cotter key present in order to prevent the loss of a roller.



Dumping Equipment Safety

Critical Inspection Points – Roll-Off Trailers & Dump Trailers

Landing Gear & Fifth Wheel Area:

- Inspect all landing gear bolts, brackets and welds for excessive wear and/or corrosion. Ensure all bolts are tight, not allowing the landing gear to move while in use.
- Ensure fifth wheel plate is free of cracks and that the fifth wheel pin is secure and in good condition.
- Check hydraulic fittings for cracks, leaks or missing parts.



Attachment D

SUGGESTED MATERIAL LOADING BEST PRACTICES

Dump Trailer Tip-Over Prevention

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Suggested Material Loading Practices

Scrap metal bundles should be loaded with a grapple or magnet in order to ensure even distribution of material.

Evenly Loaded Trailer – **Best Practice**



Unevenly loaded trailer – **Tip over Risk**



Suggested Material Loading Practices

Plate & Structural-type material should be loaded with a grapple or magnet in order to ensure even distribution of material.

Evenly Loaded Trailer – **Best Practice**



Unevenly Loaded Trailer – **Tip Over Risk**

Unnecessary Void



Suggested Material Loading Practices

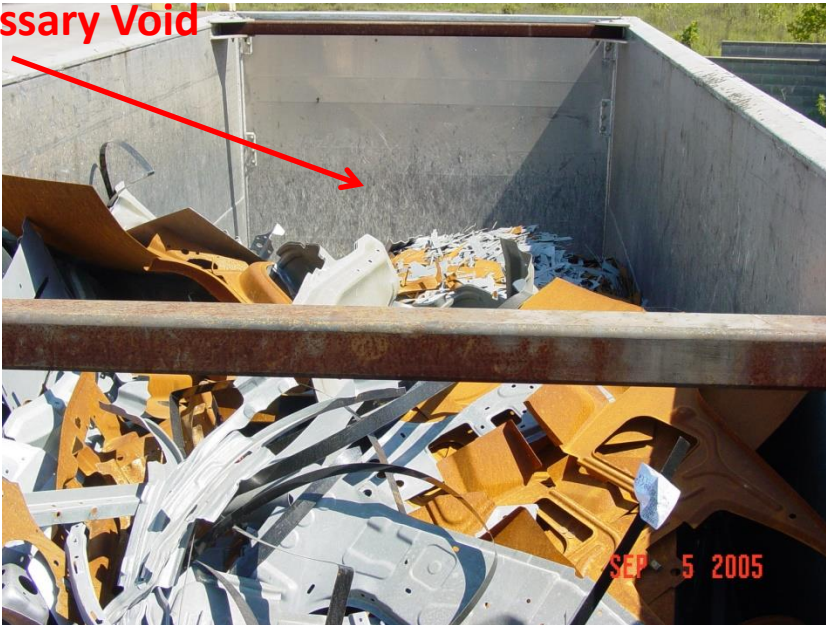
Busheling-type material should be loaded with a grapple, magnet or conveyor in order to ensure even distribution of material.

Evenly Loaded Trailer – Best Practice



Unevenly loaded trailer – Tip over Risk

Unnecessary Void



Suggested Material Loading Practices

Turnings and Borings should be loaded with a conveyor, magnet or loader in order to ensure even distribution of material.

Evenly Loaded Trailer – Best Practice



Unevenly loaded trailer – Tip over Risk



Suggested Material Loading Practices

Shredded scrap should be loaded with a magnet or loader in order to ensure even distribution of material.

Evenly Loaded Trailer

Best Practice



Unevenly Loaded Trailer

Tip over Risk

