



**WHITE PAPER TO THE TRUCKING INDUSTRY**

**WHAT CAN FLEET OWNERS DO TO  
MITIGATE UNDERBODY CORROSION?**

**A STUDY ON REDUCING COMPONENT  
FAILURES AND RELATED COSTS**

BY:

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Since 1941 roadways exposed to freezing precipitation have been treated with salt. Originally, salt was composed pretty much of sodium chloride granules only. As time and technology have progressed, our North American roadways are now subject to the assault of sodium chloride, magnesium chloride, calcium chloride crystals (primarily) or a mix thereof in a water solution we affectionately call **BRINE**.

In Winter months freezing precipitation is unavoidable and unstoppable. Freezing roadways are responsible for traffic accidents, traffic tie-ups, traffic stoppages, and related freight delivery delays. Were it not for the salt and/or brine used to treat freezing roadways, our movement of freight in North America from Point A to Point B would be extremely difficult if not impossible in winter months.

One would tend to believe slick roads and winter weather would be the largest contributing factor leading to vehicle and component replacement and cost as a result of accidents. Below is an interesting table of statistics of all recorded fatal crashes showing weather conditions at the time of crash involving big rig trucks from 2015-2017. Overwhelmingly the largest number of fatal accidents occurred in clear weather conditions. Slick roads account for minimal fatal roadway accidents.

Analysis Division, Federal Motor Carrier Safety Administration  
 Large Truck and Bus Crash Facts 2017  
 FMCSA-RRA-18-018  
 May 2019

**Crashes Table 19. Fatal Crashes Involving Large Trucks by Weather Conditions, 2015-2017**

Weather Conditions	2015		2016		2017	
	Number	Percent	Number	Percent	Number	Percent
Clear	2,510	69.3%	2,761	70.9%	2,799	66.1%
Cloudy	631	17.4%	569	14.6%	619	14.6%
Rain	276	7.6%	240	6.2%	344	8.1%
Sleet, Hail	17	0.5%	12	0.3%	10	0.2%
Snow	65	1.8%	58	1.5%	67	1.6%
Fog, Smog, Smoke	83	2.3%	54	1.4%	77	1.8%
Severe Crosswinds	3	0.1%	8	0.2%	16	0.4%
Blowing Sand, Soil, Dirt	8	0.2%	4	0.1%	5	0.1%
Blowing Snow	8	0.2%	2	0.1%	6	0.1%
Freezing Rain or Drizzle	3	0.1%	2	0.1%	4	0.1%
Other	8	0.2%	4	0.1%	4	0.1%
Unknown	10	0.3%	182	4.7%	286	6.8%
<b>Total</b>	<b>3,622</b>	<b>100.0%</b>	<b>3,896</b>	<b>100.0%</b>	<b>4,237</b>	<b>100.0%</b>

Note: A large truck is defined as a truck with a gross vehicle weight rating (GVWR) greater than 10,000 pounds.

Source: National Highway Traffic Safety Administration, Fatality Analysis Reporting System (FARS).



**This brings me to Point #1:**

- **WINTER WEATHER EQUIPMENT DAMAGE AND RELATED COSTS ARE LARGELY A RESULT OF CORROSION RESULTING FROM TREATED ROADWAYS AS OPPOSED TO COLLISION DAMAGE.**

In the November 2018 issue of Transport Topics, it was stated the “Estimated cost of corrosion related component failures/replacement to the Transportation Industry is in excess of **\$1 Trillion Dollars.**” This is an astounding number! If hypothetically applied solely to the Transport Topics Top 100 for hire and/or dedicated fleet list the average cost borne by the Top 100 is 87% or \$870,000,000,000 (billion) dollars of the total \$1Trillion dollar cost. This would average to \$87,000,000 per fleet. Of course, larger fleets with more pieces of equipment pay a larger burden and vice versa yet nonetheless, regardless of the overall total cost to each fleet (if known), the message is:

**UNDERBODY OR VEHICLE CORROSION IS EXPENSIVE!**

**Point #2:**

- **HOW DO WE AS AN INDUSTRY REDUCE OR MITIGATE OR LESSEN THE \$1 TRILLION DOLLAR NUMBER OR THE ACTUAL COSTS TO EACH FLEET?**

It is a known fact that the components on tractor and trailer surfaces that are most conducive to treated-road related corrosion are forward facing parts such as: Electronic components, braking systems, leaf springs, and related super-structure exposed to the “Splash Zone”. Corrosion occurs on metallic and non-metallic surfaces. Interestingly enough the top costs to operate a fleet as estimated by Transport Topics is as follows:

1. Fuel
2. Drivers
3. Tires
4. Corrosion Related Component Replacements

New brine solutions which are largely a mix of sodium and magnesium chloride stay wet longer and splash or stick into tiny crevices many of which are unseen. This is a large portion of our dilemma. **How do we mitigate corrosion we cannot visibly see?** If unmitigated corrosion is left untreated it will grow/expand **at a ferocious rate** particularly if a non-washed vehicle is turned around with new freight and heads back to the roadway cycle after cycle without being washed.



According to the November 2018 Transport Topics article referenced previously, **“Frequent washing of vehicles – at least after each salting event – is the MOST important anti-corrosion maintenance procedure, experts agreed.”**

“An important fact to address and remember is chlorides not dealt with **reactivate** in humidity or moisture. The best washing systems target tractor and trailer undersides as well as vehicle sides and tops”. **Transport Topics March 2016**

With vehicles becoming ever more complex requiring more and more wiring it is imperative that we as an Industry become more aggressive in dealing with salt/chloride induced corrosion.

**Point #3:**

- **WHAT OPTIONS EXIST TO HELP FLEETS MITIGATE UNDERBODY OR TREATED ROAD RELATED CORROSION?**
1. Underbody coatings typically sprayed onto tractor and/or trailer underbody surfaces on or off terminal location. This would break down into two major sub-categories of:
    - Rustproofing – Least Expensive – Avg Est. Cost/Vehicle = \$400-\$700
    - Undercoating – Most Expensive – Avg. Est. Cost/Vehicle = \$500-\$1200
    - Underbody coatings of this type are durable 6 months to 1 year of service
  2. Aftermarket aerosol spray coatings can be used to treat/coat specific areas impacted by underbody corrosion on a case-by-case basis in the terminal shop.
  3. “Chassis Saver” type paint. High solids, low VOC coating used to paint over and provide a permanent stop to specific underbody corrosion. Requires frequent re-application and is expensive.
  4. “NH Oil” undercoating systems. Uses a proprietary oil-based coating that is purported to prevent underbody corrosion and last longer than traditional asphalt based undercoating films. Not yet tested for fleet to our knowledge.



5. Underbody or Undercarriage truck wash systems that are added as additional components to existing truck wash systems or constructed as stand-alone systems. Undercarriage wash/treatment systems spray high pressure water (and chemical) that is intended to spray all areas of the underbody using technology that:

- Sprays undercarriage areas of tractor/trailer with **water only.**
- Sprays undercarriage areas of tractor/trailer with **water and a temporary rust inhibitor.**
- Sprays undercarriage areas of tractor/trailer with **water and a temporary rust inhibiting wax.**
- Sprays undercarriage areas with an aqueous solution of **Rushing SN-250 rust neutralizing product available from Rushing Enterprises, Inc.**
- **This product will effectively neutralize all road salt chlorides and modify the chloride crystals such that corrosion creepage is vastly reduced.**
- **SN-250 will provide temporary underbody corrosion resistance and vastly reduce replacement component cost if used each wash cycle or following each salting or brining event.**
- Cost per wash to treat tractor and trailer underbody areas with **SN-250** ranges from **\$1.45 - \$1.50/unit.**

Which treatment method fleet owners choose of course is entirely a matter of prerogative. Yet, to interrupt, remove, temporarily or permanently prevent underbody corrosion seems a matter of priority as opposed to choice given the risk of component failure or equipment downtime potentials.

We, as an Industry, working together must do a better job of understanding OEM suppliers manufacturing processes as they relate to surface treatment and subsequent metal coatings. We can ask OEM suppliers for records of process control that enhance levels of trust and confidence that their manufacturing practices are actually best-practices. We can continue to request and count on our OEM suppliers to aggressively target underbody corrosion as one of their top research and development priorities until such time as underbody components are better protected from the factory.

To attack and lessen the incredibly high and rising costs of treated-road related underbody component corrosion, we all must work together to improve our awareness and actionable solutions we provide to our Transportation Industry customers.