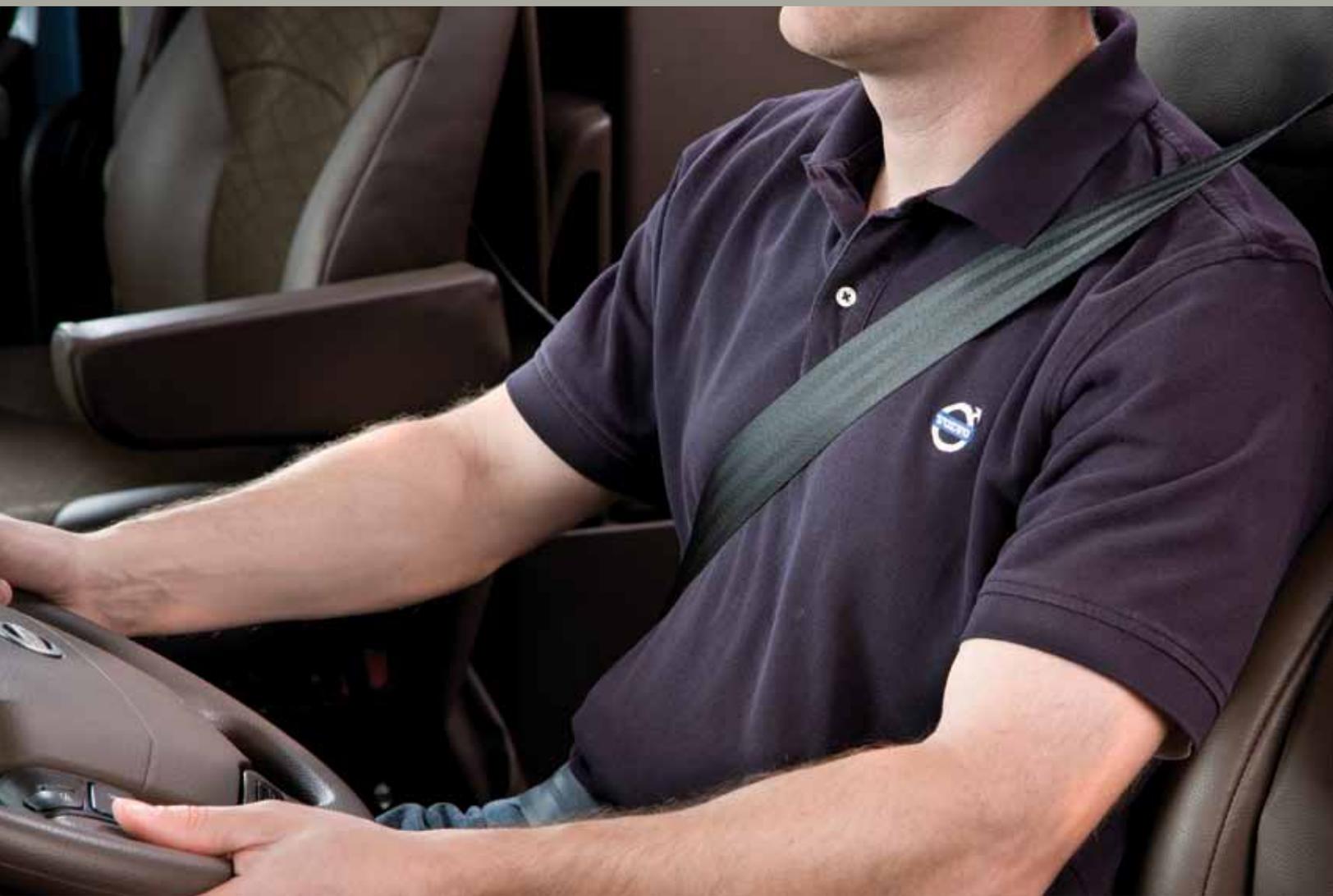


VOLVO TRUCKS SAFETY



SETTING STANDARDS FOR THE INDUSTRY



VOLVO VNL 670



VOLVO SAFETY FEATURES CAN SAVE MORE THAN \$100,000 A YEAR BY MITIGATING JUST 20% OF CRASH POTENTIALS.

Safety is difficult to equate until you talk with fleets that have experienced even a minor crash. Industry statistics indicate a customer will experience 2.2 crashes per million miles traveled at an average cost of \$172,292² per crash.

Fifty trucks traveling 125,000 miles per year would travel 6,250,000 miles a year. The average number of crashes for the same time frame could cost more than \$2,300,000 a year based on those statistics.

If this fleet can mitigate 20% of non injury, 5% injury, and 2% fatality crashes, it could save a total of \$100,419.46 or \$2,008 per truck, per year.

	Crashes ¹ per 6.25 Million Miles	Cost per Crash ²	Total Cost	Mitigation Percent	Mitigated Cost
Non-injury Crashes	10.66	\$12,248	\$130,563.68	20 %	\$26,112.74
Injury Crashes	3.07	\$334,892	\$1,028,118.44	5 %	\$51,405.92
Fatality Crashes	0.15	\$7,633,600	\$1,145,040.00	2 %	\$22,900.80
TOTALS			\$2,303,722.12		\$100,419.46

¹ FMCSA – Large Truck and Bus Crash Facts 2009: Early Release (Oct. 2010)

² Current FMCSA Crash Cost Figures (Dec. 2008)

ACTIVE SAFETY

A core priority at Volvo is to provide designs that not only address ACTIVE safety – those safety features that help AVOID a crash – but also PASSIVE safety, those features that PROTECT the occupants in a crash.

VOLVO ENHANCED STABILITY TECHNOLOGY

One of the most visible examples of Volvo's leadership in active safety is VEST, or Volvo Enhanced Stability Technology. This system mitigates many jackknives and rollovers through advanced sensing of multiple vehicle parameters and conditions, and automatically selectively applies tractor and trailer brakes to control the vehicle before an incident occurs. Volvo leads the industry in stability technology development for class 8 trucks and is the only manufacturer in North America to make it standard. Volvo has delivered more than 100,000 trucks with the technology, which accounts for more than half of all of the class 8 trucks equipped with stability technology.

VOLVO ENHANCED CRUISE

Volvo trucks feature the proprietary Volvo Enhanced Cruise (VEC), a system that works with the truck's cruise control to maintain a safe following distance between vehicles. VEC also has the capability to automatically slow the truck with the engine and foundation brakes to maintain a set following distance, while at the same time alerting the driver to potential danger. Using a radar sensor mounted in the front bumper, VEC monitors vehicles moving in the same direction as the truck. It can detect up to 32 objects within approximately 500 feet in front of the truck.

Proactive braking means the truck will slow down without driver intervention when necessary. If the vehicle in front slows down below the truck's cruise control set speed, VEC will sequentially reduce throttle to the engine, apply the engine brake and apply the foundation brakes to try to maintain the set following distance. The system applies about one-third of the foundation brake's capacity, meaning the driver always has full braking capability if needed.

If the vehicle in front speeds up and moves away, VEC will automatically increase vehicle speed to the cruise control set speed. VEC automatically intervenes only if the cruise control is on and the speed is set by the driver. VEC also warns drivers if the truck is too close to vehicles ahead. A beeping alert warns drivers if they are closing the distance. An uninterrupted modulating tone warns drivers to immediately apply the brakes or take evasive action if the distance is too short and closing speed is too high for VEC to maintain safe following distance, for example when another vehicle cuts in front of the truck or slows too sharply.



Volvo trucks with VEC do not need to be in cruise to initiate active braking. When traveling above 20 MPH the driver warnings will be given and the system will reduce engine speed, apply the engine brake and apply the foundation brakes.

Stationary object warnings are also a part of VEC.



Volvo Trucks' Lane Departure/Driver Alertness Warning System (LDWS) alerts the driver when it senses an unintentional movement out of the driving lane. An alert is also given when drowsy driver characteristics are observed using a windshield mounted one-piece camera and sophisticated vision software. The system fully integrates camera, optics, processor, and power supply into a compact and robust unit. The SafeTRAC system is used as the basis with adaptations unique to Volvo Trucks.

The main application is for long haul, on-highway applications where the truck may be driven in monotonous environments. Drivers in these applications can be more prone to fatigue, distraction or lack of attention. In these situations, unintentional lane deviations can cause the driver to run off the road or to over correct resulting in serious crashes.

The system also works on narrow roads, but will naturally give frequent warnings as the truck is likely to cross the markings due to the small distance between truck and road markings. To accommodate this situation and others, such as driving through construction zones, a switch is provided to deactivate the LDWS for 10 minutes. The system will automatically reactivate after 10 minutes, or the driver can reactivate it by using the same momentary switch.

FEWER DISTRACTIONS

Another important active safety feature is Volvo's I-Shift automated transmission. With automated shifting, drivers can keep their eyes on the road and both hands on the steering wheel. There's no distraction of trying to find the right gear. Drivers are less fatigued and more alert, which helps reduce accident rates and lower operating costs. And thanks to the two-pedal system, I-Shift makes it easier to train new drivers and retain older, more experienced drivers.



CAB INGRESS AND EGRESS

Volvo believes that safety should start even before you're seated behind the wheel. That's why the door is 36.5" wide 51.5" high, and opens with two distinct detent positions to 70°. The door opening includes full-length left and right-hand grab handles mounted inside the cab and out of the weather.

The self-cleaning, anti-slip steps are designed for safety, too. The first step is approximately 18" from the ground; the second is 18" from the first, and the final step into the cab is another 14". The steps are arranged in a staircase that moves progressively closer to the cab, assuring that each step is fully visible. This configuration, in combination with the full-length grab handles, ensures three contact points when entering and leaving the cab.



INTERIOR SUNVISORS

Volvo uses a patented off-set sunvisor system that completely covers the top of the windshield. The driver's side is protected by an independent sliding visor; the combination gives complete coverage in the front and driver's side.



HOOD-MOUNTED MIRROR

The redesigned, hood-mounted mirrors are rectangular in shape and mounted forward on the hood. The position and design provides the driver with a much better left-to-right image than the industry's typical 10" round mirror.

BACK-OF-CAB ACCESS

On many trucks, accessing the back-of-cab can be a tricky path and a tight squeeze, especially with chassis fairings in place. Not on a Volvo. With a Volvo truck, you'll have safe and easy back-of-cab access, even with full chassis fairings. There's plenty of room to maneuver, and self-cleaning, anti-slip steps and continuous deck plates provide safe footing.

STEPS

With full chassis fairings there are conveniently placed steps and grab handles on both sides of the vehicle to allow safe, easy, back-of-cab access.



DECK PLATE

Volvo Trucks provides a continuous deck from fairing to fairing—mounted flush and level all the way across—for safe access to trailer connections.





IN-SET WHEEL

The front wheels on a Volvo truck are set inside the fender edge to contain road splash. Because the wheels are located inside the fender, a Volvo truck typically has far less road splash at the front axle than competitors' trucks.

SPLASH SHIELDS

Road splash on a Volvo truck is further contained through splash shields. They cover the interior of the wheel openings. Their design also helps improve aerodynamics by limiting drag from air coming from the engine compartment.



PASSIVE SAFETY

At Volvo Trucks, safety isn't an option. It's standard. In fact, safety is one of our core values. We've been recognized as the industry's leading safety innovator for more than 85 years. And our competitors repeatedly benchmark our vehicles as the standard in commercial vehicle safety.

Maintaining a safe and risk-free fleet is essential to operating a successful transportation business. That's why Volvo uses High Strength Steel in our cabs. It's why we always meet and exceed the world's toughest impact tests. It's what makes a Volvo one of the safest trucks on the road.

IMPACT STANDARDS

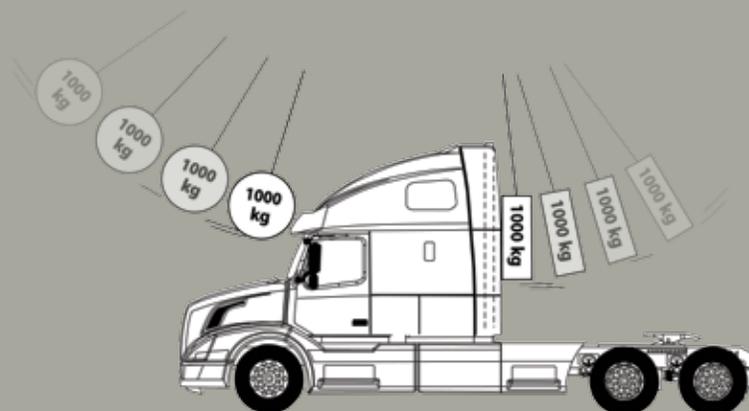
The rugged design is a direct result of our extensive program of crash testing. In fact, every Volvo meets and exceeds the grueling standards of the Swedish Cab Impact Test—the toughest test in the world that simulates a collision. This tests the cab's front corner to simulate a rollover, the rear of the cab to simulate the payload impact, and the roof of the cab to simulate the vehicle coming to rest on its roof. Doors should not open during the test, but must be able to be opened after the test.

Our crash test standards also include Volvo's 30-mph Offset Barrier Test, designed to replicate running into the back of a stopped trailer at 50 mph, with impact occurring above the frame rails. In this test, most of the energy is absorbed by the cooling package, engine, and cab. If a Volvo is in a frontal impact, the engine and transmission are designed to break free from their mounts and drop down below the cab floor—protecting the driver space along the cab floor and helping to prevent entrapment of the driver's feet.

HIGH STRENGTH STEEL CAB

Each Volvo truck is built for protection. Volvo is the only truck manufacturer with an integral cab and sleeper constructed exclusively of High Strength Steel (HSS), including the sleeper compartment. High Strength Steel has the highest strength-to-weight ratio in the industry, which allows us to build a stronger cab while reducing weight. We also use double-sided galvanized steel that's welded for greater durability and corrosion protection.

Volvo offers a system of safety measures that work together to protect the driver in a collision. A driver-side airbag is standard in every Volvo truck. The engine mounts are designed to release during a frontal impact, pushing the engine and transmission down under the chassis rather than into the cab. And during an accident the energy-absorbing steering column collapses away from the driver.



The cabinet doors are designed to remain closed during a crash, reducing the potential for flying objects in the cab. Although they can be pushed closed, they use a latching system that completely surrounds the closing pin and are only released when the handle is completely activated.



DASH AND INSTRUMENT PANEL

Each Volvo truck has a wrap-around instrument panel that's engineered for functionality and safety. Switches are rounded—rather than squared and sharp—and designed to release into the dash when impacted during a crash.

The ignition key is located on the steering column, away from potential impact locations that could cause knee injury.



The lower instrument panel is built to catch the driver's knees and release energy slowly, reducing the likelihood of injury in a crash. Upon impact, the steering wheel absorbs energy regardless of the spoke rotation, and the steering column moves forward to reduce injury to the driver.



VOLVO

Driving Success.

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