

CLOSING THE GAPS FOR

LONGER TRUCK FRAME LIFE

HOW CATERPILLAR TRUCK BODY DESIGN AND INTEGRATION HELPS TO MAXIMIZE THE WORKING LIFE OF YOUR TRUCK FLEET

When markets are tight and cost control is vital, it can be tempting to cut corners. But what seems like a smart move in the short run can lead to expensive long-term problems. In this report, we'll examine the effects of using third-party truck bodies on Cat® truck frames.

A SYSTEM APPROACH

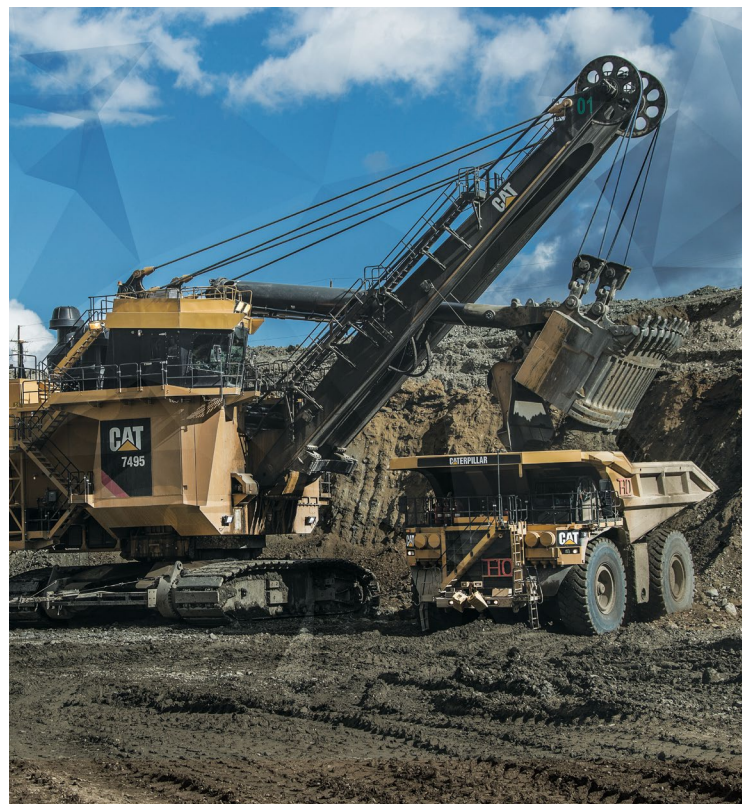
Mining truck bodies are very important to the success of surface mining operations. The truck body affects the ability to reliably reach payload, which in turn directly affects the overall production of the mine. To get the most from your Cat Mining Trucks, you need to understand how the truck body interacts with the truck frame under day-to-day haul road conditions. Bottom line, truck body-to-chassis integration plays a key role in determining the working life of the truck frame.

A genuine Cat truck body and a Cat chassis are designed and built to work together as a complete system. No third-party body supplier has that capability.

By using a “system-based” approach, Caterpillar is able to minimize stress on the frame during haul road cycles. Cat trucks are built to provide supports for the key contact points, and to optimize the load paths through those supports from the body to frame. This allows the truck body and truck frame to manage impact and torsional stresses together in unison.

In addition, Caterpillar is the only body supplier that can perform virtual and in-iron analysis on the truck and body together. This in-depth analysis is conducted “in the dirt” at our proving grounds in Tucson, AZ, and is performed by trained professionals using proprietary software.

Caterpillar also has a robust procedure for installing the truck body onto the chassis. It involves shimming to close all gaps on the main frame rails and the front wall “rocker” supports. This ensures that the load is properly transferred through the body supports and into the frame.



FRONT WALL SUPPORT

It's easy to see the differences that make a Cat truck body superior. The robust front wall support system not only strengthens the body against haul road stresses, it provides carefully engineered points of contact.

These images show the front wall area of a body from a third party supplier and one from Caterpillar.



Third-Party Truck Body

Shows little or no structure on the front wall to support the truck body during operation.



Cat Truck Body

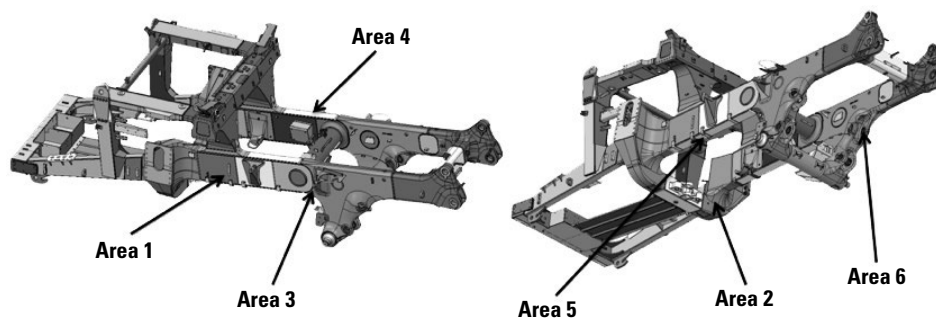
A robust front wall structure supports the truck body and transfers load to the frame during operation.



Third-Party Truck Body On A Cat Chassis

From this angle, the lack of front wall supports is obvious. This design results in a “worst-case” scenario for truck frame stresses.

Here are the virtual haul road stress results based on a body with no supports on the front wall. This design resulted in a 28% to 66% increase in stresses on various parts of the frame, compared with those measured when using the Cat body. As a result, all areas showed dramatic reductions in projected life—from 34% all the way to a 78% reduction.

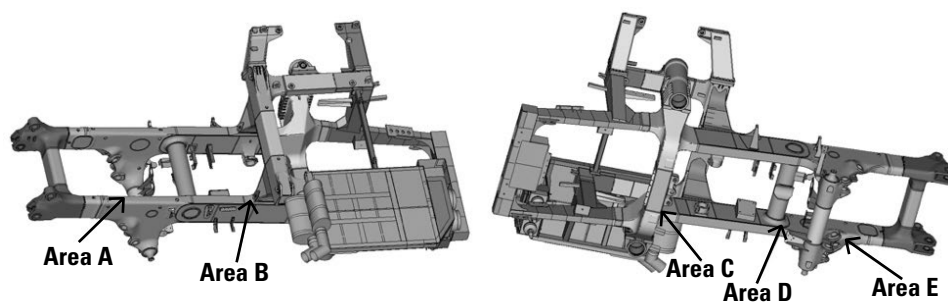


VM STRESS, MPa*	AREA 1	AREA 2	AREA 3	AREA 4	AREA 5	AREA 6
Cat Body	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
Competitive Body Stress Increase	+34%	+66%	+48%	+40%	+28%	+38%
Estimated Frame Life Change	-38%	-78%	-69%	-64%	-52%	-62%

*Results based on 793F analysis

SHIMMING

Some competitive body suppliers specify a 10mm gap between the rocker pads and body front wall supports. Gaps like this are not endorsed by Caterpillar because they result in unnecessary stresses on the truck frame. Those stresses are illustrated in the following analysis results, which compare the Cat body with the Caterpillar shimming procedure vs. the competitive body using the competitive shimming procedure. Both load cases were simulated using the same composite work cycle.



VM STRESS, MPa*	AREA A	AREA B	AREA C	AREA D	AREA E
Cat Body	Baseline	Baseline	Baseline	Baseline	Baseline
Competitive Body Stress Increase	+24%	+16%	+11%	+27%	+31%
Estimated Frame Life Change	-47%	-36%	-27%	-51%	-56%

*Results based on 793F analysis

As you can see, the competitive body—shimmed according to manufacturer recommended actions—caused life reductions across the truck frame (up to 56% reduction in area E). These findings demonstrate that proper shimming facilitates appropriate load transfer through the front rocker supports, which has a direct correlation with frame life.

REDUCE RISKS WITH CAT TRUCK BODIES

These results point to one conclusion: The risks of using an improperly designed third-party truck body on a Cat machine are real and measurable.

While using a competitive body may seem like a good solution in the short term, it is important to fully understand the long-term impact that a non-integrated body can have on the truck as a whole. The best option for optimizing frame life is to use a Cat truck body with the correct shimming procedure that properly transfers the load through the rocker supports.

Learn more about Cat Mining Trucks [here](#).
Contact your [local Cat dealer](#).