

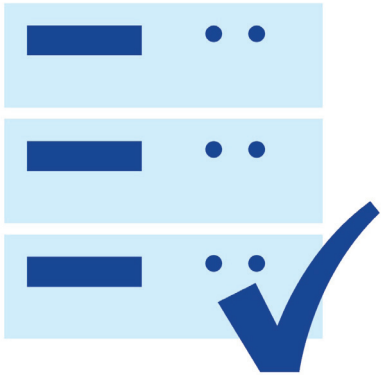

True Lifecycle Testing

Weighbridge Module Masher

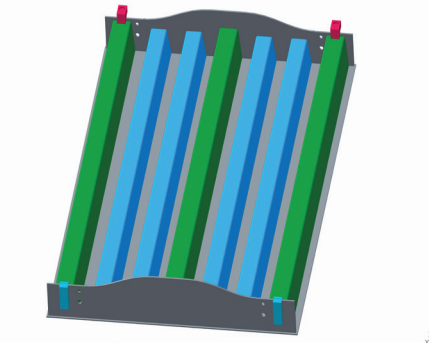
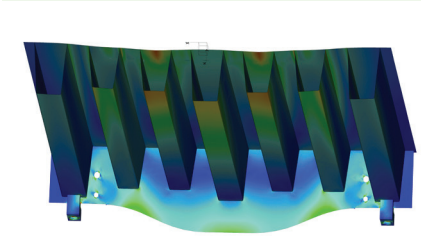
METTLER TOLEDO

A weighbridge represents a huge investment for your company that should last you 20 years or more. At METTLER TOLEDO we believe that for a vehicle scale to be able to withstand its demanding role, it must be manufactured and tested to the highest standards.

We take the design and testing process for our weighbridge modules above and beyond the industry norm. Many manufacturers make longevity claims based solely on calculations and are only concerned with meeting regulatory requirements. We go one step further by conducting **true lifecycle testing** on all of our new weighbridge designs, ensuring the product you receive is engineered to last.



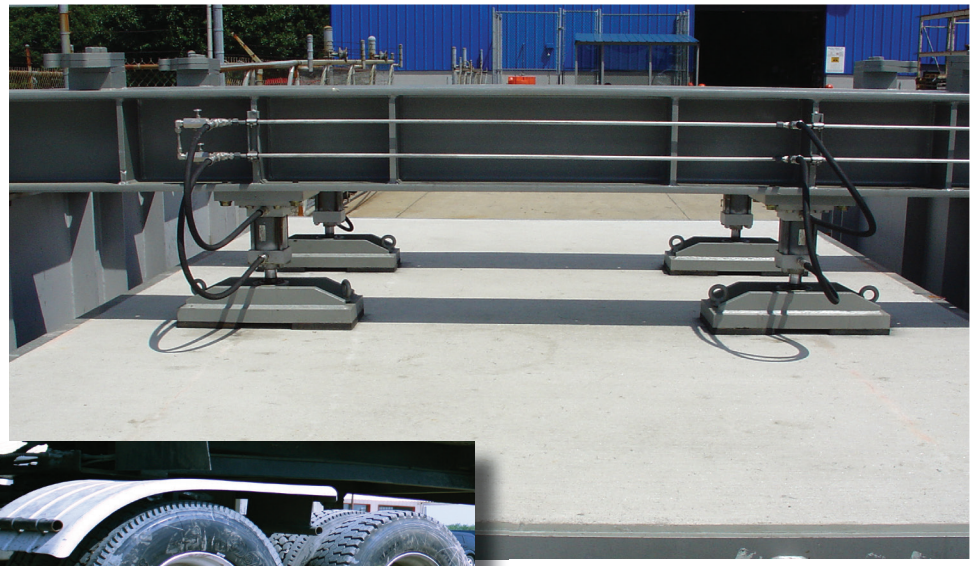
Our Development Process vs. The Competition

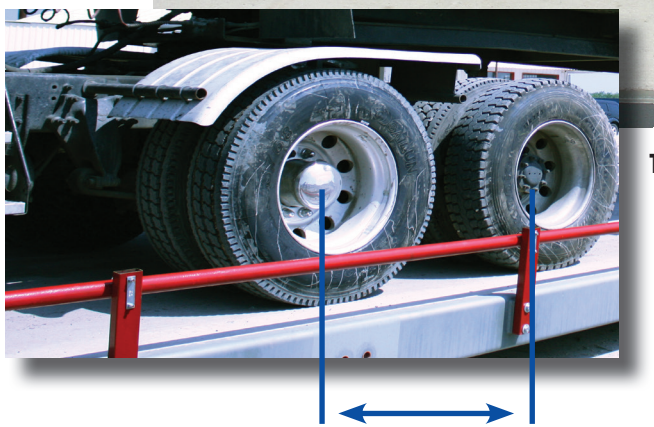
	METTLER TOLEDO	Other Vehicle Scale Manufacturer's
Design Modeling	 Model is created using three-dimensional computer aided design (CAD).	
Finite Element Analysis (FEA)	 Design is virtually tested to determine stress areas, showing how it would theoretically perform under various loading conditions.	
Regulatory Testing	 90% of the concentrated load capacity (CLC) is loaded onto the weighbridge twice.	
Lifecycle Testing	 100% of the CLC is applied to the module up to 2 million times. Any design flaws that occur will be adjusted and the new design will continue through the full testing process.	

What is the Module Masher

For over 20 years, METTLER TOLEDO has utilized lifecycle testing to ensure that our weighbridges are built to last – providing the highest quality vehicle scales with the lowest total cost of ownership.

The Module Masher performs accelerated lifecycle testing on all new weighbridge module designs. The test simulates about 20 years of heavy truck traffic in just a few months, providing performance data that would not normally be available to a scale manufacturer.





The Module Masher simulates the loading pattern of dual-tandem axle truck tires

Features of the Module Masher Include:

- Two overhead beams anchored by a steel I-beam base
- Four hydraulic cylinders – each applying 30,000 lbs. (13,600 kg) of force
- Steel feet with rubber pads attached to each cylinder that are positioned 4 ft. (1.2 m) apart – simulating the load applied by a dual tandem axle truck

Two Million Cycles = 15-10 Year Life

Steps of Lifecycle Testing

- Individual modules are first placed at the base of the Masher
- Module is supported at four points, mirroring how it would rest on load cells

- Masher's pads replicate truck tires and repeatedly apply force equal to 100% of the concentrated load capacity (CLC), which is the maximum stress a truck scale should potentially be subjected to

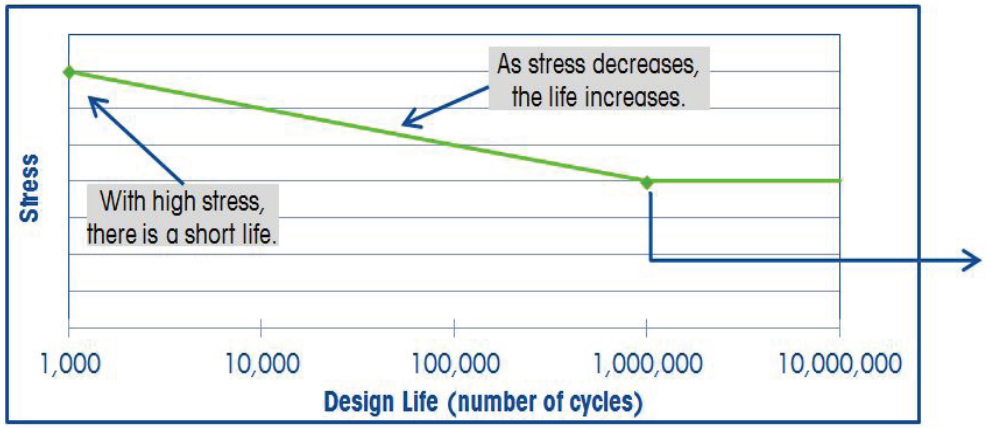
- Each test consists of **1 million cycles**
- Each module is tested **twice**, once in the middle of the module and once at the end plate

See Our Real Lifecycle Testing

Our vehicle scales are held to the highest reliability standards throughout the entire design and testing process, ensuring years of trouble-free performance. To see the Module Masher in action, watch our video at:

www.mt.com/WeighbridgeTesting

Why 1 Million?

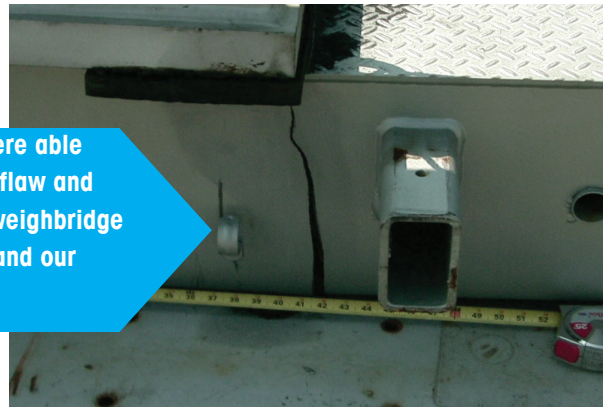


"Knee": Represents transition between (higher) stress levels where the structure will fail after a certain number of cycles and (lower) stress levels where it has an essentially infinite life. If no failures due to fatigue occur at the end of the test, there should never be any failures caused by the design itself.

Finding Problems Before Our Customers

By going one step further in our development process, we uncover design issues with our weighbridges before the product is introduced to the market. This means saving you time and money down the road on potential repairs.

While stress level testing through FEA or other manual engineering calculations can give a relatively accurate depiction of scale life, only true lifecycle testing shows how the weighbridge will handle the most demanding of applications. Below you can see a design problem that occurred after going through the Module Masher, but was not identified during finite element analysis. Thanks to physical testing, this weighbridge module design never reached the field.



Our team of engineers were able to learn from this design flaw and correct it, resulting in a weighbridge module that could withstand our proven lifecycle test.

While some may say our testing procedures are excessive, with weighbridges still operating today after **30 years of use** – we do not plan on changing our methods any time soon. It will always be our mission to provide you with the **highest quality scales that will last a lifetime**.

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