

# Dump Bodies 101:

## How to Build a Better Dump Truck

If you pass a dump truck on the road today, chances are it will be the same rectangular-box-on-a-chassis design that has existed for 40 years. Despite advancements in manufacturing and materials during the last several decades, we've seen very little applied to dump bodies. One might assume that this absence of innovation is due to lack of necessity. If it ain't broke, don't fix it. Well, it is broke and it does need fixing and here's the way to do it.

The ultimate dump body must deliver the best of all worlds: it must carry the maximum payload per trip (to maximize the customer's profit) without compromising strength or durability.

**There are four main factors to focus on if you want to be sure you are getting the best dump truck out there.**

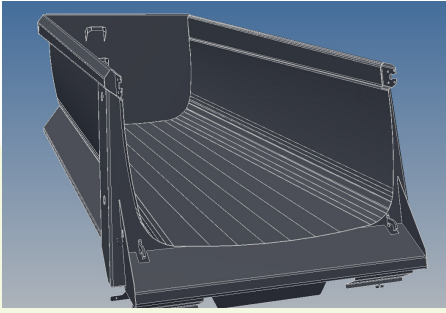
**1. Material:** Use as much of the ultra-high-strength Swedish steel as possible. Avoid common, off-the-shelf structural shapes, such as box tubing, I-beam, and C-channel. These are always mild steel; however, if they are manufactured from high tensile steel they can be one-fourth the weight and have more strength. Be certain to use computer-aided design tools such as finite element analysis (FEA) to determine precisely where to put thicker material to cope with shocks, scrapes, jolts, and impacts, and where to apply lighter material to minimize weight. This often requires a single part being broken up into multiple parts, or specific parts redesigned to reduce weight. For example, if a component has areas of high stress you only increase thickness and strength in those areas and not in the entire part. When this technique is used throughout the design it may result in

twice the number of parts but will reduce the dump body weight considerably. Taken to its limits, a bed can be designed to be half the weight and still be stronger. This results in a body that's truly engineered to be lighter than any other, but still tough as nails.



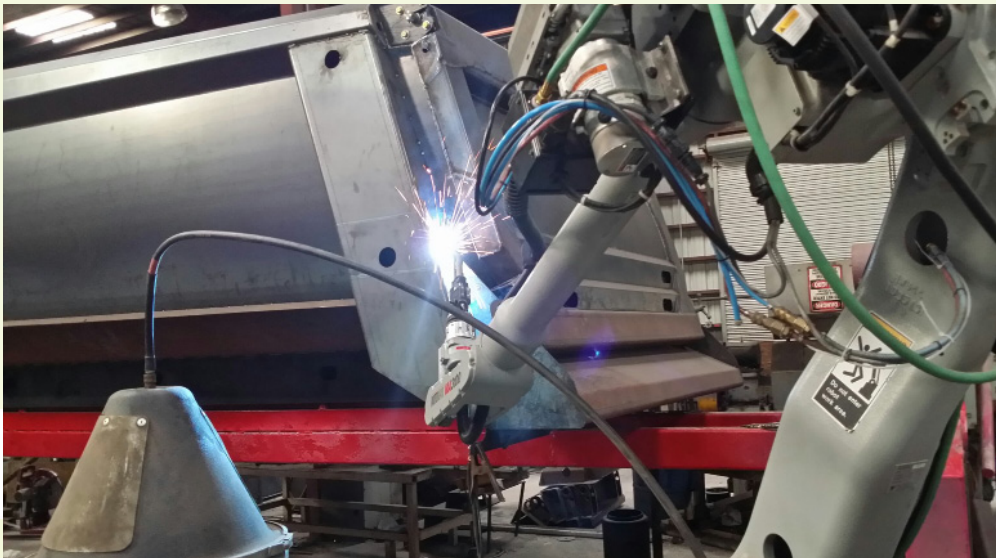
***Hoist Saddle: Designed using high strength materials, combined with the perfection of robotic welding, doubled the strength of this part while cutting its weight in half.***

**2. Bed Shape:** Forget the rectangular box. The most efficient bed shape is a "truncated cone." It starts out elliptical near the cab, and toward the rear of the bed the floor becomes flatter and wider for spreading. The tapered, conical sidewalls also become wider to reduce wear. This shape allows the payload to loosen up as it's being dumped, similar to dumping out of the top end of a funnel. In addition, the driver doesn't have to raise the hoist as high to get the load to break, which is safer. This design enables the material to exit the bed in a more controlled manner, and in some cases this can speed up paving operations. This bed shape is a structural member in itself, eliminating the need for much of the heavy reinforcement like fence-style posts.



***Examples of truncated cone beds. It's like dumping out of the top end of a funnel.***

**3. Manufacturing:** Although not very common in dump bed manufacturing, robotic welding machines produce consistent and uniform welds that cannot be achieved manually. This can be imperative in some locations when using ultra high strength steel. Other important innovations include advanced stress-relief techniques such as spot heat-treating to eliminate distortion in the side walls, and shot peening which further hardens the metal and increases its wear resistance.



***Robotic welding, rare in dump body manufacturing.***



***When working with sheet metal, applying heat in the correct amount and location to eliminate distortion is easier said than done.***

**4. Aesthetics:** The ultimate dump bed has to look good. Powder-coat outperforms paint in resisting acids, solvents, impact, UV light, and abrasions. Powder coating is up to ten times as chip resistant as liquid paint. The customer gets a “just-off-the-line” appearance for a long time and color choices to match whatever he has in mind.



**Powder coating is 10x as chip resistant as liquid paint.**

A dump truck’s job is simple: haul maximum material and dump it. But there are too many trucks out there with bodies that do an inadequate job. You should expect and demand more. Be certain to select an experienced company with a proven track record building this type of body. There are many pitfalls that can be avoided only through experience.

Whether you’re hauling asphalt, aggregates, concrete products, or broken concrete and rip rap, your dump bed can help you maximize payload, productivity, and of course, profit. One ton of weight savings can, over time, mean profits of over four times the price of the body. If your choice of dump body helps you haul a ton more than the next guy, you’re going to be more profitable. What could be better than more profitable, better looking, and built to last? That is the way to build a better dump truck.



***This Simple 16, built using these techniques, hauls 23 tons under the Federal Bridge Law.***