

Best Practices: Tipping Floors

Breaking down the information needed from an owner to build a lasting tipping floor.

■ By Jeff Eriks

The Global Development Research Corporation (www.gdrc.org) defines tipping floors as “an unloading area for vehicles that are delivering MSW to a transfer station or incinerator.” While technically speaking, this is true, they are much more difficult to design and maintain than this simple description implies. There are also tipping floors that handle many different types of products beyond municipal solid waste (MSW). Many different companies out there argue that their way is the best, but, in reality, it boils down to:

- What is right for the end user or owner of the facility?
- What will serve their needs the best?
- What will meet their design and operational objectives?

Tipping floors have been a constant topic of conversations for as long as they have existed. There are probably thousands of different ideas and concepts on the “right way” to design a tipping floor to withstand the given abuse of the facility’s operations. Some people focus on the concrete mix design, some focus on the aggregate, some provide a sacrificial wear layer and some install toppings. Again, there are many ways to go about designing a transfer station tipping floor.

No transfer facility is created equal. They all need to be treated differently and the owner needs to provide information to the designers in order to ensure that all the pertinent information is being considered as a part of the tipping floor design. Not that it is an exact science, but

Figure 1: Tipping floor after replacement. Photos courtesy of Cambridge Companies.



you can impact the usable life of the floor by using the correct design for your facility. The main thing is to understand the operations of the facility. The owner, who will be dealing with the material on the floor on a daily basis, really determines how long a floor will last. This article will touch on some of the factors that must be included in the design.

The Materials

Tipping floors exist at a lot of different facilities. Anyone who takes in raw materials for processing or transferring technically has a tipping floor. For purposes of this audience we will focus on the solid waste industry, which typically have the following products on their tipping floors:

- Construction and demolition debris,
- Recycling materials,
- Municipal solid waste and
- A few others.

Some of these materials are harder on floors than others. C&D materials are typically heavy and their damage comes from being tipped out of the container and onto the floor. Recycling materials are much easier on the floor because they aren't usually heavy nor do they offer any abrasive liquids within them. MSW, while not as heavy as C&D, typically is very hard on the concrete because of the liquids inherently included in the material and the constant packing within the route truck. This liquid can be very harsh on the floor. Along with these three types of materials,

Right: Figure 2
MSW Waste bring "dumped" onto a tipping floor.

Bottom: Figure 3
Loader moving trash on tipping floor to pit.



certain facilities take on very specific products from their market place such as manufacturing byproducts, food production byproducts and a whole list of various other materials that a designer needs to understand in order to design a floor that meets the owner's needs.

The Operations

Along with the materials being tipped onto the floor, the operation of the transfer station has a significant impact on the life of the floor. The employee operating the loader has the biggest impact of anyone within the facility. If they operate the loader efficiently and correctly, they can lengthen the life of the floor no matter how you design the tipping floor. Things like not spinning the tires, always maintaining contact with all four tires on the floor, not lowering the leading edge of the bucket to the point where the front tires are off the ground. Tips like this will help to lengthen the life of your floor and keep your long term operating costs down. There are many other examples of how your equipment operator

What Else Can Your Equipment Operator Do to Save or Reduce Damage to Your Building?

- Use the right size equipment to limit the quantity of loads it requires to fill an outbound vehicle
- Use reversing cameras so equipment operators can be aware of their surroundings and not back into push walls, columns, other vehicles, etc.
- The loader operator should be "sorting" and "stacking" waste in preparation for loading out a trailer
 - Keep storage piles close to the load out area to limit the distance the loader operator has to run to get material
- Use rubber tire or rubber track equipment to lengthen the life of a concrete tipping floor
- When moving around material, try and keep "harder materials" like metals and the like up in the pile and not directly on the floor
- When loading a trailer, try and tip directly into the trailer and don't tip directly onto the deflectors or "chutes"



Figure 4
New tipping floor.



Figure 5
Drive through pit for trucks to transport MSW to landfill.

can help to save or reduce damage to your building. We also suggest that you set up designated tipping areas, efficient floor “mapping” for storage and segregation of materials, and layout of the facility to keep distances short between storage piles and the load out areas.

The Design

The design of the transfer station also plays a major role. If the tipping area and storage are on one level, it is easier to layout and plan. Facilities with surge pits require completely different designs because sometimes they use track equipment to compact the material before loading it. Push pits require slightly different designs than lift-and-load facilities.

When designing a tipping floor, we like to work with our client to discuss the intent of the material to be tipped onto the floor as well as the equipment to be used on the floor, hours of operations, total daily tons, storage capacity, pile location, type of load out, etc. Another important factor is the “useful life” the client wants for the facility. If they only want to design the transfer station to a 20-year useful life, than your tipping floor will be designed accordingly as will your push walls, site and building. If your client wants to design the facility to a 50-year useful life, again, your designs will vary and be more durable. You also want to factor in “high wear” areas in your tipping floor designs. The entire floor is never used equally. It is good to develop an operating plan so you can identify high wear areas which will get the

most usage, take in different materials or other factors that come into play. Using this information, we work to develop the correct tipping floor design for the need.

The Right Partner

What is right for one owner may not be right for another. Unless you get a firm that truly understands your operations, your materials, your short term and long-term goals, you will not get a customized solution, you will get what they want to sell you. When designing your transfer station or repairing your tipping floor, it is important to work with a company that takes the necessary time to get to know you and your business to then make recommendations so that you can make a decision.

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