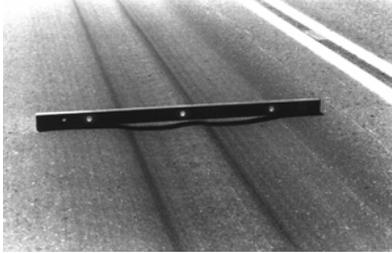


## The Link to Highway Safety

Truck weight enforcement is not only a matter of economics, but also a matter of public safety. Illegal loads not only make roads



rougher, but also create deep ruts that can fill with rainwater or ice, making driving more dangerous for everyone.

## Frequently Asked Questions

People occasionally ask whether weight restrictions could be relaxed without increasing road damage. Common questions are:

- Can trucks reduce speed rather than reduce load? This question often arises in the spring, when load restrictions are needed to protect pavements weakened by the spring thaw. Unfortunately, even though some local agencies still try to avoid load limits by reducing speed limits, this practice does not work. In fact, road damage increases significantly when heavy vehicles are driven more slowly.
- *If a truck's gross weight is legal, why do axle weights matter?* This question is sometimes raised by persons cited for overweight axle or axle group violations, even though the total (gross) weight of their vehicle did not exceed the legal limit. However, pavement damage from two axles—one light and one heavy—actually exceeds the damage from properly loaded axles. The extra damage created by the overloaded axle exceeds the reduced damage created by the lighter one.
- *If agricultural vehicles with low-inflation tires can safely carry heavy loads in fields, why can't they operate loaded on highways?* Even though vehicles like chemical applicators and grain carts can transport very heavy loads in fields, they seriously damage gravel and paved roadways when loaded beyond legal limits. The roadway surface is damaged because the vehicles' lugged tires concentrate the load into small contact areas. The pavement's underlying layers fail because they cannot withstand the total load imposed upon them. These loads also pose a serious problem for bridges, especially on county and township roads.

**The trucking industry will always be an integral mode of transportation for the City of Sioux Falls. Without trucking, every facet of our economy would suffer. Therefore, we must continue to do everything possible to achieve the greatest benefit from our investment in the transportation system. A primary way of ensuring our state highways and local roads do**

## The Need for Responsible Hauling

State and local governments' responsibility to provide mobility and safety cannot be accomplished if illegally loaded vehicles prematurely consume the life of roads and bridges. Providing a system that is economical, comfortable, and safe depends not only on the government's investment of time, effort, and money, but also on the responsible behavior of highway users.

The vast majority of haulers in South Dakota do operate legally. Of the nearly 600,000 vehicles weighed each year, only about 3,000—one half of one percent—are cited for overweight violations. Of those cited, only about 600 are severely enough overweight to be assessed civil penalties exceeding \$100.

While a small number of haulers knowingly operate illegally, their disregard for weight limits creates costly damage that other, responsible taxpayers must pay for. Controlling the irresponsible behavior of these intentional violators is impossible without effective enforcement and prosecution.

Recent efforts to control illegally overweight vehicles have clearly begun to reduce the rate of grossly overweight loads. In 2000, 8.6% of overweight vehicle citations were for loads more than 10,000 pounds over the legal limit. The rate decreased to 6.0% in 2001, and 5.9% in 2002. Overall, the incidence of grossly overweight loads has dropped by nearly a third since more stringent penalties and enforcement were enacted.

Relaxing weight regulations and enforcement would erase the progress that has been made to protect the public investment in state and local roads. In the words of Ted Eggebraaten, Brookings County Highway Superintendent, "If we lose the control we have with the new overweight laws in place, it will only add to our problems with roads and bridges. Brookings County would not be able to keep up our road system maintenance if the control is taken away." The Department of Transportation also considers sound weight enforcement essential to its mission to "provide a transportation system to satisfy the diverse mobility needs" of travelers, shippers, and haulers in South Dakota. Especially in a time of limited funding, protecting the existing highways from unnecessary damage is clearly the wisest course of action.



# SDDOT Briefing Truck Weights and Highways

Illegally overweight vehicles damage South Dakota roads, shorten road life, and increase costs to both the trucking industry and taxpayers. During the past several years, the South Dakota Legislature has enacted laws to protect state and local highways from damage caused by illegally overweight vehicles:

- In 1996, the Legislature limited the maximum weight allowed on axles (other than steering axles) to 500 pounds times the total width, in inches, of all tires mounted on the axle. This action ensured that the weight carried on axles fitted with single tires (as opposed to conventional dual tires) would not exceed pavements' load capacity.
- When the Legislature raised the state fuel tax in 1999, it also increased civil penalties for overweight trucks to safeguard the public's investment. The graduated penalty schedule discourages intentional violations that most severely damage roads and bridges, but imposes more modest fines for lesser, unintentional overweights.

Pounds Overweight	Civil Penalty per Pound
1,000-3,000	\$0.05
3,001-4,000	\$0.15
4,001-5,000	\$0.225
5,001-10,000	\$0.375
> 10,000	\$0.75

- To protect the public investment in local roads and bridges, the Legislature enacted a law requiring the Department of Transportation to monitor how diligently counties prosecute overweight violations and, if necessary, to withhold funding from counties that fail to act responsibly.

The South Dakota Department of Transportation supports all of these legislative actions, which have improved awareness and compliance with truck weight regulations. Fewer vehicles are operating seriously overweight, preventing needless damage to roads and bridges and saving taxpayers millions of dollars.

It is important for those responsible for funding, building, and maintaining highways to understand the reasons behind truck weight regulations and to be able to explain them when shippers, haulers, business contacts, and personal acquaintances inquire about them.

## South Dakota Supports Trucking

South Dakota values the trucking industry and its contribution to the economy and well being of the state. Nearly everything we own, eat, use, grow, or manufacture is carried by truck on at least part of its journey.

Because of the importance of trucking, the South Dakota Legislature and other branches of state government have historically adopted rules and procedures that help the industry to operate competitively:

- To ease regulatory burdens, the Department of Revenue has joined the International Fuel Tax Agreement and the International Registration Plan. Both enable motor carriers to register in just South Dakota but operate in all states and provinces. Efforts are underway to provide online IRP and IFTA services to the trucking industry.
- Unlike most states, South Dakota does not impose absolute gross weight limits on trucks. Instead, it allows essentially unlimited gross weight, provided the load is supported by enough tires and axles to prevent road and bridge damage.
- South Dakota grants tolerances for hauling agricultural loads. Loads from field to farm are allowed to weigh 10% more than the normal weight limit, while loads from farm to market are allowed 5% more than normal.
- To help truckers comply with weight regulations, the Highway Patrol will, without charge, weigh vehicles and instruct haulers on proper loading.
- Together with the Department of Revenue and the Highway Patrol, the Department of Transportation has developed an automated permitting system that allows truckers to obtain permits online and quickly identifies safe routes for movement of oversize and overweight vehicles.
- To reduce delays and improve traffic safety, the Department of Transportation will replace the port of entry at North Sioux City with a new facility near Jefferson in 2003. Through use of in-motion weighing and vehicle transponders, the new port will allow truckers with good safety records and legal weights to bypass the port, saving valuable hours of operating time.

## The Need to Be Legal

Why are truck weight regulations so important? It's really a matter of dollars and cents, because roads and bridges have to be designed, built, and maintained to carry heavy axle loads. The heavier the axle loads, the more expensive roads and bridges become. The costs listed in the following table show that constructing roads is very expensive; building them to carry large numbers of overweight vehicles would make them even more expensive.

Cost per Mile to Construct	
Interstate 4-lane highway—concrete	\$1,900,000
State 2-lane highway—concrete	\$941,000
State 2-lane highway—asphalt	\$775,000
Secondary 2-lane highway—asphalt	\$476,000
Thin asphalt overlay—24' wide	\$112,000
Gravel base & surface—28' wide	\$107,000

Every axle passing over a highway consumes a portion of the pavement's life. With each application of load, the pavement experiences compression and bending that eventually lead to rutting and cracking. Extensive road tests over the past fifty years have shown that the amount of pavement life consumed by heavy axles greatly exceeds the amount of life consumed by light axles.

Axle Weight (pounds)	Pavement Life Consumed†
2,000	0.001
10,000	0.06
18,000	0.66
20,000	1.00
22,000	1.46
24,000	2.07

† all loads compared to a legal 20,000-pound axle

Two important concepts are evident from this table:

- First, heavy axles consume much more pavement life than light axles. Even a legal 20,000-pound truck axle consumes a thousand times as much pavement life as a 2,000-pound automobile axle.
- Second, the amount of life consumed rises much faster than the axle weight. For a seemingly modest 10% increase in weight (from a legal 20,000-pound axle to an overweight 22,000-pound axle), the amount of consumed life soars by nearly 50%. A 20% overweight consumes more than twice as much pavement life as the legal load.

## Damage to Bridges

Damage from illegally overweight loads is not confined to pavements. Bridges prematurely age, just as pavements do, when subjected to illegal loads. If the loads are great enough, they can actually destroy a structure.



An example from Tripp County is pictured, but it is not the only case. In the past two years alone, six county bridges had to be completely replaced because of damage from illegally overweight trucks:

- Two bridges in Moody County had to be replaced at a total cost of \$692,000;
- Two Brookings County bridges were rebuilt at a total cost of \$295,000;
- One Faulk County bridge had to be replaced at a cost of \$125,000;
- The bridge in Tripp County was replaced with culverts at a cost of \$18,000.

These illegally overweight loads not only cost counties more than \$1.1 million, but also deprived other road users of convenient access to their homes and farms. In each case, the board of county commissioners had to declare an emergency and close the road until a new structure could be built.

As costly as these cases were, they represent only a portion of the bridge damage attributable to illegally overweight loads. Many other structures have certainly been damaged, but in ways that are not yet apparent.