



**TRANSPORTATION ACCOUNTABILITY
COMMISSION**

**OVERSIZE AND OVERWEIGHT VEHICLE
STUDIES**

August 4, 2010

**Gary Allen, Ph.D. VDOT Chief of Technology & Research
Audrey Moruza and Brian Diefenderfer, Ph.D., P.E. VTRC Research
Scientists**

Background

- In 2007 General Assembly session three bills were submitted which led to a VTRC study of the additional maintenance costs associated with overweight trucks (HB 2917, HB 1645, SB 1321).
- VTRC research in 2007 resulted in a reduction in the fee for tank wagons (SB 1321) to \$265 rather than the existing \$800 fee.
- In 2008 HB 1551 called for VDOT Commissioner and CTB to propose fee schedules for overweight and overload permits to help recover the additional maintenance costs associated with all overweight and overloaded vehicles.
 - Issue was forwarded to Transportation Accountability Commission for review
 - Stakeholders from the trucking industry were involved in VTRC study through two meetings and reviews of the work in June and November 2008
- In 2010 five bills regarding overweight vehicles were proposed

Overweight Permits Issued FY08

Type	Number Issued	Permit Revenue	Average
Single Trip	75,500	\$1,647,000	\$22
Blanket	6,273	\$975,000	\$155
Tank Wagons*	53	\$42,400	\$800
Hydroexcavators	12	\$1,580	\$132
Exempt	10,551	0	0
Coal Haul**	750	0	0
Total	93,139	\$2,665,980	--

*Current fee is \$265 for tank wagons based on previous work done by VRTC

**No permit fees charged; pay coal severance tax instead

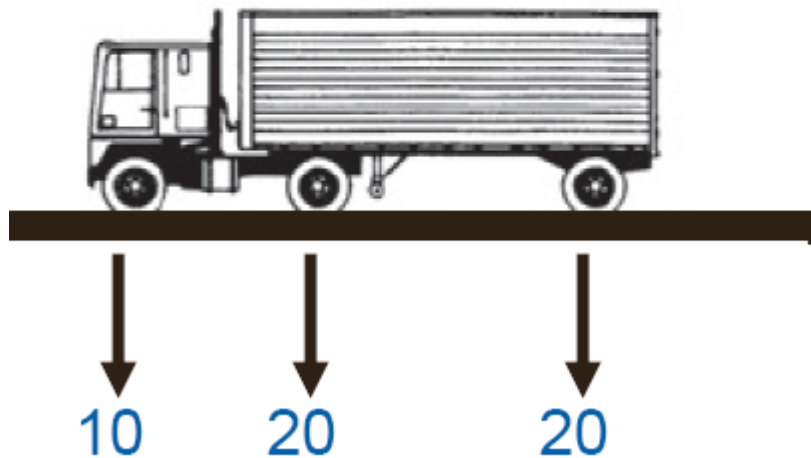
Engineering Principles

- Engineering principles dealing with impact of overweight and overload vehicles is different for pavements and bridges
- Pavements
 - Load on each axle is important
 - Equivalent Single Axle Loads (ESAL) allow for comparison of pavement damage between different vehicles
 - Pavement designed for lifetime ESALs, each vehicle consumes some portion
- Bridges
 - Total load, load on each axle, and axle spacing are important
 - Significant damage does not occur until load exceeds design standards, but fatigue damage occurs with each pass

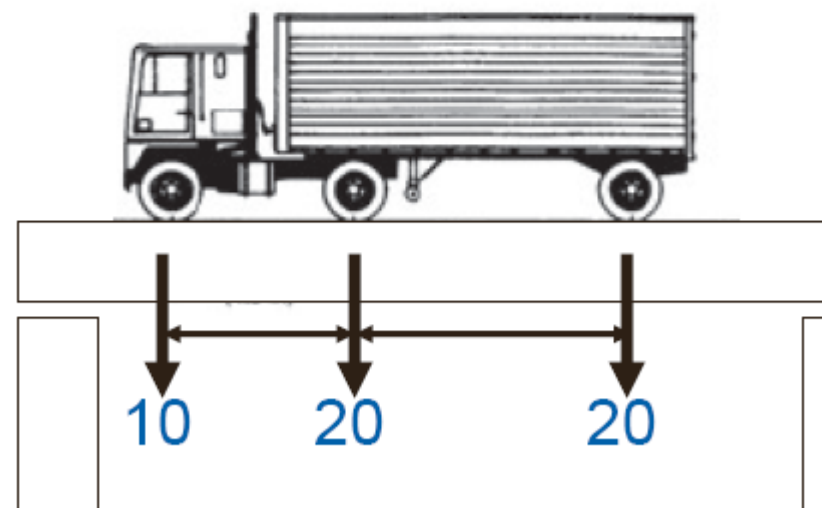
Engineering Principles, ESALs, and Bridge Stress & Strain

Weight Matters!

Pavements



Bridges



Pavements

Cost Analysis Methodology

Methodology

- Uses average axle weights of all vehicles to determine cost per ESAL-mile traveled
 - VA weigh-in-motion data
- Accounts for miles trucks travel at less than full capacity
- Charges only for axle weights above standard legal weight limits
- Can be used to estimate the added maintenance cost from a single overweight trip or for blanket permits
- Could be used to establish fees for any vehicle, not just overweight vehicles

Bridge Cost Analysis Methodology (Total Weight, Axle Weights & Spacing)

- **Damage functions for bridges are much more complicated than for pavements**
 - Each bridge would have to be analyzed individually for each overweight vehicle because of differences in design and bridge configuration
- **Flat fee approach could be reasonable option**
 - Flat fee per axle is common on tolled structures nationwide
 - Other options include a flat fee per bridge crossed or a flat annual fee
 - City of Suffolk website states that it now charges \$300 per blanket permit and \$75 for single trip for oversize and overweight vehicles

Findings

- **Permit fees for overweight vehicles can be estimated that relate axle weight and configuration to pavement damage**
- **Based on 2007 data, the fee was estimated at 3.56 cents per ESAL-mile for pavements**
 - Rate should be reviewed and updated over time to account for changes in the characteristics of travel, haul weights and vehicle configuration
- **For bridges, a flat fee could be assessed based on recovering a portion of weight-related maintenance costs**

Applying the Methodology : Example Fees for Weights Above Legal Limits

- Overweight pavement damage fees are sensitive to both the amount of overweight ESALs and mileage
- Four axle concrete truck operating under permit for a gross wt. of 70,000 lb (rather than 58,000 lb) traveling 10,000 miles currently pays no fee. The pavement damage cost model would result in a fee for pavements of approximately \$970.
- Five axle tractor trailer with gross wt of 100,000 lb traveling 50,000 miles presently would pay approximately \$165 for a two-year permit. The fee based on the pavement damage cost model would be approximately \$3070 for 50,000 miles. The pavement damage fee for a truck with the same gross wt. traveling the same distance, but having 6 axles would be approximately \$2000.
- A seven axle tractor trailer 78 ft in length with a gross wt of 132,000 lb obtaining a single trip permit to travel 335 miles presently would pay \$46. The fee based on the pavement damage cost model would be approximately \$50.
- A nine axle super-load 92 ft in length with a gross wt of 168,000 lb obtaining a single trip permit to travel 335 miles presently would pay \$50. The fee based on the pavement damage cost model would be approximately \$96.
- Any fees established for bridges would be in addition to the pavement fees noted above.

Overweight Permit Fee Administration

- **Pavement damage fees**
 - Truck configuration and axle weights are reported in permit applications now
 - ESALS can be readily calculated from this
 - **Estimated mileage would need to be reported to DMV**
- **Bridge damage fees**
 - VDOT Structure and Bridge collects relevant data regarding overweight vehicles to assess the potential damage to bridges
 - Flat fees could be used for blanket permits & single trips

Policy Issues Related to An Overweight Permit Fee Structure

Should fees be based on pavement impacts, bridge impacts or both?

- Permitted overweight load-related pavement impact is approximately \$175 million, based on 2007 data; for bridges \$24 million

Issue of keeping fees reasonable during difficult economic times

- Very long haul permit fees could significantly increase shipping costs
- Impact on Ports

Whether to keep exemptions presently in place

Concluding Remarks

- A rational and engineering-based method is available for developing a weight-related fee schedule for the damage overweight vehicles cause to pavements
- A reasonable approach for bridges would be a flat fee
- Weight-related fees based on VTRC methodology would provide incentives to utilize less damaging axle configurations because more axles for a given weight and distance would pay a lower fee.