THE BRICK INDUSTRY ASSOCIATION

Brick Brief

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CLAY PAVERS FOR FIRE LANES AND H-20 LOADINGS

What is an H-20 (HS-20) loading?

H-20 and HS-20 are the AASHTO designations for vehicle loads used in the design of bridges and suspended surfaces like manhole covers. Although clay pavers are fully supported rather than suspended, H-20 is the standard load rating for a single unit, two axle **H**ighway truck that weighs 20 tons or 40,000 lbs., with a maximum (rear) axle load of 32,000 lbs. An HS-20 loading refers to a two-unit, three axle **H**ighway **S**emi-trailer truck with three axles and a tractor weight of 20 tons.

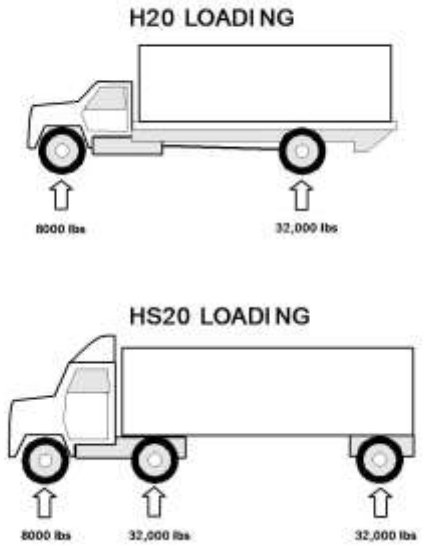

Figure 1. H-20 and HS-20 Loading

Can clay brick pavers withstand H-20 and HS-20 loading?

Clay pavers are designed for use in systems capable of handling millions of cumulative ESALs (Equivalent Single Axle Loads) of traffic from a variety of vehicles from cars up to heavy trucks. The high compressive strength of clay pavers is **far greater than** the minimum needed to easily support H-20 and HS-20 truckloads, as shown below:

- Maximum axle load for H20 and HS-20 loading is 32,000 lb.
- Max. wheel load, with one wheel at each end of the axle:

Example:

$$\frac{32000\ \text{lb}}{2\ \text{wheels}} = 16{,}000\ \text{lb}$$

- AASHTO defines tire contact area as 200 sq. in. (10 in. L x 20 in. W).
- *Actual tire contact area should be used when available.*
- Therefore, the calculated pressure exerted on the pavers is:

$$\frac{16{,}000\ \text{lb.}}{200\ \text{sq.in.}} = 80\ \text{psi}$$

- For a more accurate, conservative contact area:

$$\frac{16{,}000\ \text{lb}}{80\ \text{sq.in.}} = 200\ \text{psi}$$

- 200 psi is **5%** or less of the ASTM C902, Class SX **minimum** required average compressive strength for clay pavers. In other words, **supporting H-20 and HS-20 loads are well within the capabilities of all clay pavers**.

How strong are clay pavers?

Clay pavers comply with ASTM C902, *Standard Specification for Pedestrian and Light Traffic Paving Brick*, or Type R of ASTM C 1272, *Standard Specification for Heavy Vehicular Pavers* and can have **minimum** required average compressive strengths as high as 10,000 psi. In any case, **the compressive strength of clay pavers would provide a safety factor no less than 20x the design loads calculated above.**

What about fire trucks?

Support of fire trucks must consider loadings from the wheels as well as from the outriggers. Where limited, the maximum single axle loads of fire trucks typically do not exceed 31,000 pounds (50,000 for tandem axles). Since those wheel loads are less than H-20 and HS-20 trucks and NFPA 1901 limits the pressure exerted by the outriggers to a maximum of 75 psi over the ground contact area, it's easy to see that clay pavers conforming to ASTM C902 and ASTM C1272 are **many times stronger** than the surface pressure exerted by even the heaviest fire trucks.

While clay pavers are the most visible layer in a heavy pavement, they are only one component in a successfully performing system. In order to perform properly, they must be supported by an adequate setting bed and base designed to withstand heavy loading. Detailed guidance on the design of clay paving systems can be found in Flexible Vehicular Brick Paving – A Heavy Duty Applications Guide, which is one of many clay paving resources that can be found at www.gobrick.com/pavers.