

HIPAVE 5.0

Advanced design of heavy duty industrial pavements.



Forklift, Mast Lift



Straddle Carriers



Tractor-Trailers, Trucks



Reach Stackers



Rubber Tyred Gantry

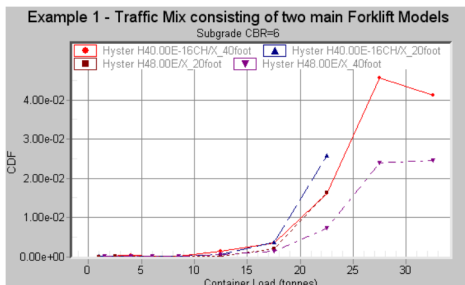
Comprehensive and Powerful

HIPAVE (Heavy Industrial PAVement design) is for the mechanistic analysis and design of flexible pavements subjected to the extremely heavy wheel loads associated with freight handling vehicles in industrial facilities, in particular, intermodal container terminals. It is designed to conveniently model each combination of vehicle model and container load and to combine the damage using the Cumulative Damage Factor concept. HIPAVE is an outgrowth of CIRCLY and APSDS (Airport Pavement Structural Design System).

HIPAVE has unique features to expedite pavement design projects—

- ability to define and store container weight distributions;
- automatic calculation of axle loads from vehicle geometry and container weight;
- user defined material performance properties (stiffness and transfer functions).

HIPAVE can handle the variety of mobile equipment used in container facilities, such as forklifts, straddle carriers, gantry cranes and side loaders.



Spectral damage graph shows damage for each combination of vehicle model and payload.

Easy to Use

Defining Loadings and Traffic

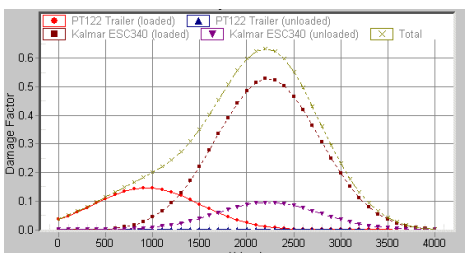
You can define your vehicle loadings and traffic in detail. Vehicle loading characteristics are specified 'generically' in terms of load cases that express axle loads as a function of container weight. HIPAVE automatically calculates wheel loads for other container weights by linear interpolation.

You define the anticipated repetitions over the design period for each vehicle model. You also define a payload distribution for each vehicle model. HIPAVE lets you specify detailed container weight distributions. These payload distributions can be saved and used for multiple analyses.

Viewing the Results

HIPAVE can generate "spectral" damage graphs that show the pavement damage for each combination of vehicle model and payload.

HIPAVE can also generate graphs that show the variation of the damage factor across the pavement.



Damage graph shows damage variation across pavement.

Proven Technology

HIPAVE is based on CIRCLY 5.0 and APSDS. CIRCLY has been in regular use World-wide for more than two decades proving its worth in thousands of design applications. APSDS has been used on dozens of airport and container terminal projects over the last decade.

Requirements

- Windows 7, Windows 8.x or Windows 10
- 800x600 display or higher

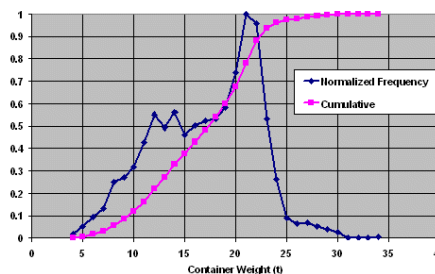
Features

Vehicle Loadings and Traffic in Detail

HIPAVE uses the actual wheel layouts of the vehicles—bypassing the “equivalent” axle loads used by older methods.

HIPAVE lets you specify detailed container weight distributions. For example, the British Ports Association Guide (3rd edition) includes frequency data based on data provided by UK ports. These payload distributions can be saved and used for multiple analyses.

Detailed container load distribution

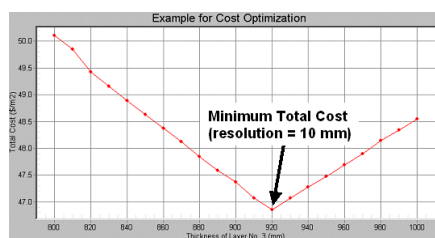


Optimize Costs

The Cost Analysis feature lets you fine tune layer thicknesses to minimize construction cost. You can specify unit costs for each material.

A Parametric Analysis feature can loop through a range of thicknesses for one or two layers, while simultaneously designing the thickness of another layer. This feature will optimise up to three layers. Combining this with the Cost Analysis feature, allows for fine-tuning of layer thicknesses to minimize construction and maintenance costs.

Automatically generated plot:



Total Cost vs. Layer 3 Thickness

Formulation

Full Spectral Analysis

HIPAVE accumulates the contribution from each loading in the traffic spectrum at each analysis point by using Miner's hypothesis.

The procedure takes account of—

- the design repetitions of each vehicle model/payload combination; and
- the material performance properties used in the design model.

This approach allows analyses to be conducted by directly using a mix of vehicle models. It is not necessary to approximate passes of different vehicles or axles to passes of an 'equivalent' standard load or "design vehicle".

Vehicle Wander

HIPAVE takes account of vehicle wander at a more fundamental level than earlier methods. Vehicle wander is the statistical variation of the paths taken by successive vehicle movements relative to lane centrelines. Increased wander reduces pavement damage by different amounts that depend upon pavement thickness.

Benefits from HIPAVE

HIPAVE offers benefits to all parties involved in designing, constructing, owning and using heavy duty industrial pavements.

- Designers benefit from the inclusion of automated functions and faster analyses.
- Material suppliers will make significant saving because the costs and dangers of over-specification or under-specification due to inaccurate information are significantly reduced.
- The facility owner benefits from more efficient use of materials and will reap long term benefits, because changing traffic patterns on proposed designs can be considered and planned for.



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Try out HIPAVE now!

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