



Load Rack Modeller

Are you designing a new load rack or considering upgrading your existing load rack because of problems with long queuing times or projected increase in throughput, or do you just want to check on the productivity of your existing load rack?

If you intend to perform any of these tasks then let the **DKI Load Rack Modeller** take the guesswork out of your analysis and design work.

Diamond Key International has developed a software modelling tool that can simulate loading activities in a loading rack. This tool scientifically uses inputs relating to your loading activities, and bay configuration and generates outputs including KPI's and graphical representation of how a particular configuration performs.

This Model has been developed and proven over many years; its results have been validated against actual terminal operations. It can be used for single or double sided configurations and provides a scientific analysis of load rack operation/performance to enable customers to evaluate a number of aspects associated with the load rack.

Load Rack Modelling provides the ability to take into consideration all the variables in load rack operations. These can be tuned for top loading, bottom loading and mechanical loading. Some of the time variables are: *enter the bay, connect interlocks, select and connect each arm, load authorization, start each loading arm, change arm to next compartment, park arm, disconnect interlocks, exit bay, ramp up time, ramp up volume, ramp down time, ramp down volume, and of course flow rates.*

The modelling software requires one or more load profiles or types of loads to be defined to represent the actual or planned loads e.g. single product loads or mixed product loads and in this case how many compartments of each product, also the size of the vehicle and number of and size of compartments. It also requires Load Schedules, being the average number of load profiles that arrive at the terminal each hour in a 24 hour period.

DKI have also developed a Load Analysis tool, which assists in generating Load Profiles and Load Schedules from real terminal data. This tool reviews actual loaded data, which can be from an existing TAS, ERP or manual system. The Load Analysis tool outputs:

- Day summary of loads
- Product summary
- Load profile summary
- Load schedule list

Optimum results are obtained by providing at least 3 weeks loading activities preferably during a peak load period. This ensures a set of loading details that closely resembles actual loading activities in the terminal.

The modelling software performs a finite analysis on the loading gantry. This process schedules each truck to the optimal bay and calculates detailed queuing and loading time for each bay for every minute of a 24 hour period. Typical use includes obtaining current actual loading data from the site at input data to the Load Analysis tool which generates Products, Load Profiles and Load Schedules outputs which in turn are used as inputs to Load Modelling.

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Maximum Wait Time	Minutes	126.1	122.3																																																																																																																																																																																																																																																																																																																																																																				
Maximum Queue Length	Trucks	8	7																																																																																																																																																																																																																																																																																																																																																																				
Truck Waiting Time (TWTM)	Minutes	57.26	23.35																																																																																																																																																																																																																																																																																																																																																																				
Trucks Impact of (NTI)	Trucks	81	64																																																																																																																																																																																																																																																																																																																																																																				
Average Waiting Time	Minutes	40.1	40.9																																																																																																																																																																																																																																																																																																																																																																				
Trucks Not Impacted	Trucks	16	14																																																																																																																																																																																																																																																																																																																																																																				
Clear Activity Time each Bay	Minutes	380	400																																																																																																																																																																																																																																																																																																																																																																				
Total Loading Time each Bay	Minutes	152	120																																																																																																																																																																																																																																																																																																																																																																				

The first output from the Load Model then becomes a baseline for comparison against outputs for changed configurations. For a typical loading gantry, once this baseline data has been validated, running the model only takes a few minutes so it is simple to perform 'what-if' type analysis and rapidly see the results against the baseline.

Based on this data one can then ascertain current loading and queuing times.

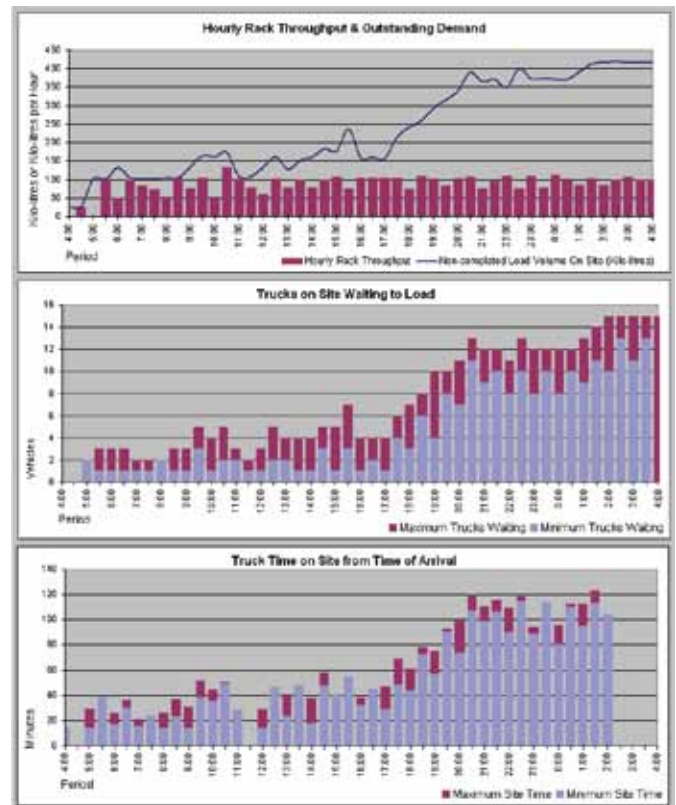
It is then possible to simulate the impact of eg:

- adding arms to bays and/or adding bays
- changing flow rates
- changing products over existing arms
- changing from top to bottom loading

The resulting output over various options can be graphed and the impact as a result of the changes can be quantified. From this a cost/benefit ratio can be derived.

Another use for the load analysis and modelling tools is to confirm productivity of an existing load rack configuration. This could be provided on a regular basis as the loads through a gantry change. Outputs could be used to review the arm/product mapping to improve terminal efficiency.

If you have a gantry that requires modelling, we can provide you with pro-forma templates to collect the required data. This can then be used as input into the model to run a range of options and provide a detailed report complete with graphs for each option. Where there is more than one option, which will give a similar improvement in performance, our report would include a reasoned recommendation as to which option should be used.



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