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IML

PUZZLE®

PUZZLE®

SOFTWARE FOR OPTIMIZING LOADING UNITS AND TRANSPORT UNITS

PUZZLE® has been optimizing the shipping space on load carriers such as containers, pallets, and boxes since 1992. Numerous companies have already used licensed versions of the software developed by the Fraunhofer Institute for Material Flow and Logistics and benefited from the more efficient allocation of shipping space. PUZZLE® not only calculates the most optimal arrangement of geometric objects in a defined space but it also helps the user select the right loading equipment for the job.

Functionality

A complex algorithm based on item data (geometry, weight, surface structure, stability, and sensitivity), customer specifications, and master data (quantity, item group, priority and so on) calculates an optimal loading arrangement for the items along with the loading sequence and/or the number of loading aids required for the specified order volume.

PUZZLE® helps the logistician directly with the loading: the calculated packing patterns can be displayed onsite and used as instructions by pickers for the optimal loading of loading equipment. The software also helps less experienced employees work more efficiently with less training required. It can also take process requirements into account and can be used to generate packing patterns for automated palletizing.

Universal Software

PUZZLE® is universally applicable across all industries. Be it logistics service providers, freight forwarders, courier companies, logistics software vendors but also manufacturing and retail companies with their own logistics department: PUZZLE® can be used by any user in any branch of the industry because it can be customized and configured to meet any need.
PUZZLE® is a high quality solution that is easy to use, customizable, platform independent, and scalable.

Integration and Interfaces

Redesigned from the ground up, this portable software is based on the object oriented programming language Java and runs in a web browser independently of the operating system. WebGL is used to render the results of the optimization calculation as 3D graphics for the user. The browser-based nature of PUZZLE® means that all of the users in a company have access to its full functionality without having to install any software.

The vastly improved interface of PUZZLE® allows it to integrate fully into the existing IT environment as a black box solution (WMS, PPS, or ERP systems). Data is exchanged in validated XML documents or over a web service (REST), a file or network interface. An interface for Microsoft Excel is also available.

The rules used to calculate the optimization are configurable and can be adapted to meet specific technical requirements. The calculation of the optimal loading and transport units takes into account the different surfaces of the items as well as their stacking capacity.

Available in the Cloud

PUZZLE® is also available as a Software as a Service in the cloud (for example, in the Logistics Mall at www.logistics-mall.com): its redesigned browser user interface is easy and quick to use.
The software can be scaled accordingly based on the volume of order data to generate optimal results quickly even during peak times. The pay-per-use billing makes running PUZZLE® in the cloud an inexpensive alternative for end users.

Continuous Development and Optimization for the End User

PUZZLE® version 4.0 replaces version 3.0. More than 200 PUZZLE® licences have been sold in its more than 20 years of successful project experience. The result of being so close to the market for so long means that the software is developed on a continuous basis: special custom requirements and ideas have all contributed to the success of the solution.

An interdisciplinary team of engineers, scientists, experienced logisticians, and innovative developers are all part of the team that is responsible for PUZZLE®.

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Regardless of the form of distribution, PUZZLE® offers potential users the chance to lower transport costs by allocating shipping space more efficiently. Planning security also increases: The results from PUZZLE® can always be implemented – staging and costly repacking because of miscalculations are a thing of the past. The software has been solid for decades and it will continue to benefit from the resources and extensive know-how of Fraunhofer IML.

The optimization of loading and transport units is a core competency of Fraunhofer IML.

With its state of the art technology and completion of numerous research projects, Fraunhofer IML is a reliable, long-term partner for the development, testing, and implementation of innovative concepts.
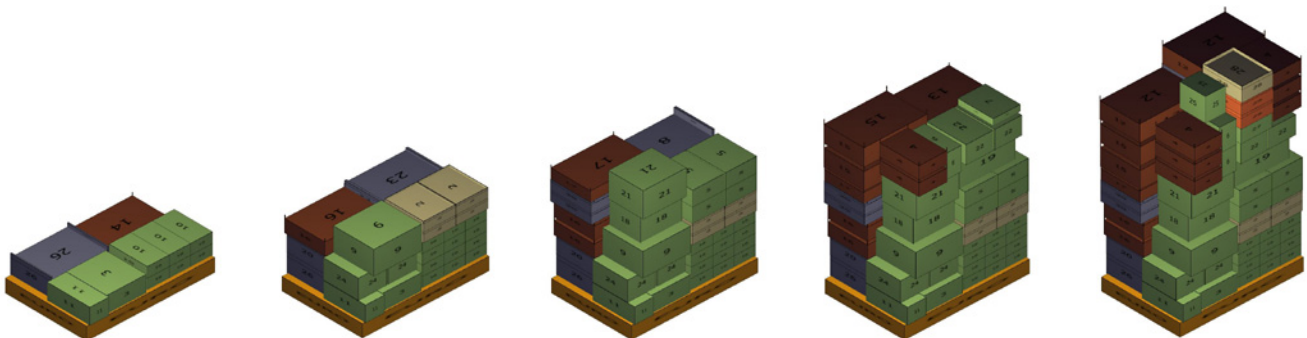
Figure 1: PUZZLE® can pack loading equipment while taking into account the surface features of the items.

PUZZLE® Customized

By integrating PUZZLE® into their IT solutions, logistics software vendors can make their own solutions more attractive and more mature. Customers can also order individual PUZZLE® modules and customize and expand them as desired.
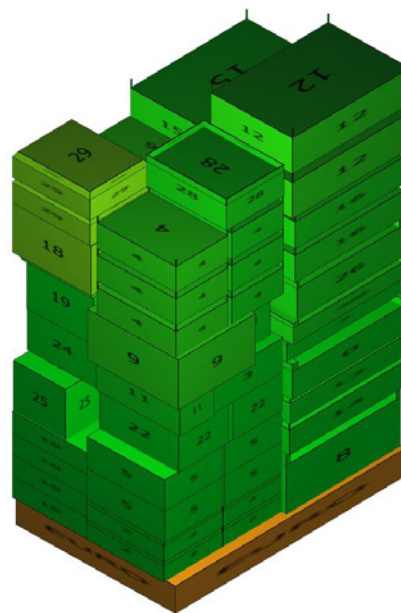
When are you going to benefit from PUZZLE®?

Figure 2: PUZZLE® performs rigorous analyses to ensure that the loading unit is stable. Your pallet will always be in the »green zone«.

More Information

You can buy the current version of PUZZLE® in the marketplace of the Logistics Mall: www.logistics-mall.com.

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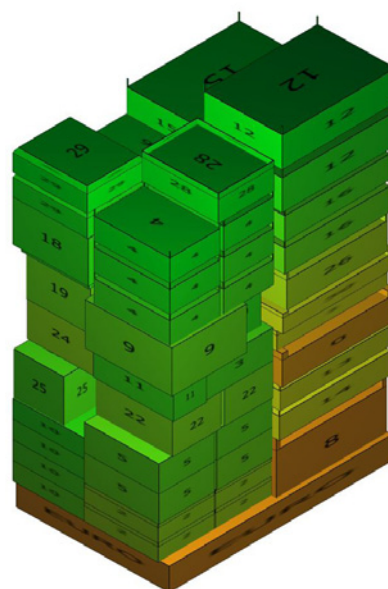
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Figure 3: By monitoring the weight distribution, PUZZLE® makes sure that no item is too overloaded and slips into the »red zone«.

SKILLFULLY PACKED, SKILLFULLY SHIPPED!

Who needs PUZZLE® …

- Freight forwarders
- Courier companies
- Logistics service providers
- Manufacturers and retails with their own logistics department
- Logistics software vendors who want to integrate a shipping space optimization software solution into their suite

What can PUZZLE® do …

- Plan transport orders quickly
- Select the right loading equipment
- Determine the number of containers required for a specified transport volume
- Plan the required transportation capacity
- Calculate the volume-optimized arrangement of items on flat pallets
- Calculate the truck load in accordance with the permissible payload and axle load
- Provide support to the picking/loading areas with detailed picking lists or packing instructions
- Help with the transportation planning

PUZZLE® is …

- mature
- intuitive and easy to use
- flexible
- scalable
- platform independent
- available in multiple languages
- cost effective

The three main advantages at a glance

1. Lowers costs by minimizing the loading and transport units
2. Saves time by simplifying the support for the loading process
3. Increases accuracy and precision because of precise precalculations

Selected References

- b.com AG (shipping box optimization)
- Binder GmbH (container optimization)
- Duropack GmbH (pallet optimization)
- GNS Gesellschaft für Nuklear Service mbH (container optimization)
- GUS GmbH (shipping box optimization)
- KHS AG (pallet optimization)
- Kraftverkehr Nagel GmbH & Co. KG (pallet optimization)
- Pfaff GmbH (container optimization)
- Smurfit Kappa RapidCorr GmbH (automated truck loading)
- Steico AG (container optimization)
- Veltins GmbH & Co. KG (container optimization)
- Wilhelm Layher GmbH & Co. KG (shipping space optimization for containers and trucks)

Further references are available on request.

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