**Digital engineering – design made simple**

**Customised tugger trains for lean production**

**Safe, efficient and reliable – tugger trains are the perfect choice when regular and predictable supplies of parts for production are needed. They are a key element of lean production. However, to respond quickly to production changes, tugger trains need to be easily reconfigurable and adaptable to existing conditions. The ideal solutions are designs based on the modular building kit principle with modular components that support numerous variants and combination options. These bespoke frames and structures can be constructed quickly and conveniently with digital assistance. This results in customised tugger trains – ensuring an optimum, demand-based material flow.**

The areas of application for tugger trains are many and varied, whether it be companies in the automotive industry, logistics service providers, railway stations or airports. They transport materials and production equipment from storage facilities to various supply points – generally assembly areas or production lines. Tugger trains can optimise material flows and make processes more efficient and leaner. Even small batch sizes reach the right locations at the right time and in the right sequence. Tugger trains are thus a key element of lean production. Parts and materials aren’t just collected and dispatched in a circuit at specific intervals – empty containers are also filled and returned. This concept is referred to as the milk run principle, as it is based on traditional milk deliveries. Milk bottles are taken to various locations, while empty bottles are collected at the same time. The complete material flow in logistics can be controlled seamlessly using the Kanban method. The individual steps take place smoothly one after the other and, in line with the pull principle, additional supplies only need to be ordered when stocks run low. This eliminates both bottlenecks and excessive inventory levels.

**Modular and compatible – components for custom design**

Tugger train requirements vary widely and can repeatedly change in a company, depending on working processes and production conditions. It is therefore important that tugger trains can be adapted and customised at any time. “Welded systems quickly reach their limits here,” says Axel Mohr, a product manager at item, the pioneer in building kit systems for industrial applications. “Our system made using aluminium profiles and appropriate fasteners produces frames that can be easily changed at any time.” item uses the building kit system philosophy, which requires that all components are mutually compatible and can be used together in a range of combinations. The aluminium profiles are screwed together and can be disassembled without causing any damage. Standard constructions are created quickly and easily, for example for europallets or mesh crates, as are customised structures and tugger train solutions. Using appropriate aluminium profiles ensures that constructions are extremely robust and benefit from outstanding rigidity.

**Creating solutions from two building kit systems**

Numerous components from the [item MB Building Kit System](https://www.item24.de/en/productworld/building-kit-system.html) and [item Lean Production Building Kit System](https://www.item24.de/en/productworld/lean-production.html) are available for the design process. Swivel and Fixed Castors in a range of variants enable perfect rolling and handling. The Castors are fastened directly to the grooves of the support frame. They are easy to remove and move back, making them flexible to install. The central arrangement of the Fixed Castor with an anti-torsion feature ensures optimum directional stability. The Castors withstand loads of up to 500 kilograms and in some cases are available as an ESD-safe version. As a result, tugger trains achieve speeds of up to 16 kilometres per hour. Drawbars and Couplings from the item MB Building Kit System ensure perfect connection of several trolleys together and with the towing vehicle. They provide fast and reliable coupling, while the Drawbars are also available with or without a self-lifting mechanism. Self-lifting Drawbars with a tensile load of 3000 Newton or 6000 Newton can be slotted into the Coupling from below by using a foot-actuated mechanism. The Drawbars can be installed anywhere on the frame, thus having a direct impact on handling. In addition to connecting several trolleys together, it is also possible to connect to commonly used coupling systems in electrical towing vehicles from other manufacturers and to automated guided vehicles. Other key components for designing tugger trains are the Stacking Guide, Corner Deflector Guard and Forklift Pocket from item. The Stacking Guide is a robust centring aid that ensures pallets and boxes slide immediately into the correct position when setting them down on tugger train trolleys. The steel Corner Deflector Guard acts as a bumper and protects the frame of the transport trolley from damage. The item Forklift Pocket is used as a guide for forklifts and stops the load and goods from slipping. Line 8 aluminium profiles from item are ideal for constructing robust frames for smooth and safe transport, while the components from the item Lean Production Building Kit System are perfect for customised designs of structures. Users benefit from the lighter D30 profiles, compatible roller conveyors and matching accessories such as the release unit with pawl latch, which supports automatic loading and unloading of shooters. The numerous components make it possible to produce compatible racks and customised shooter solutions in next to no time.

**Engineering made easy with the item Engineeringtool**

How do you build the ideal tugger train? With a software solution that combines the flexibility of a 3D design with an intuitive and straightforward user guidance system – such as the [item Engineeringtool](https://item.engineering/DEen/tools/engineeringtool/C0101-NN044JJ72). Engineers are thus able to design trolleys and load carriers of various shapes and sizes in great detail. The solution is based around the item MB Building Kit System and the item Lean Production Building Kit System. The online tool ensures only compatible components can be selected, as appropriate to the specifications provided by the user, and thus reducing the risk of errors in the working process. Thanks to the integrated variant technology, engineers can modify the characteristics of the product configuration at any time and switch from standard profiles to a design using lightweight profiles. It only takes a few steps to design a frame with Swivel and Fixed Castors, Coupling, Drawbar and Stacking Guide for transporting europallets, for example. The programme supports the process with a whole host of functions. The measuring function, for instance, makes it possible to build frames that are perfectly adapted to europallet dimensions without much effort. “The Engineeringtool enables users to quickly create a platform that can provide the basis for constructing a number of trolleys,” says Christian Thiel, a product manager and online tools expert at item. “It’s extremely straightforward and saves time.” These trolleys can then be extended and easily altered, depending on requirements. The software enables users to produce [customised structures and frames](https://youtu.be/93_kz-aj5qU), geared to specific needs. As a result, more complex projects in the low-cost automation sector can also be carried out. In the engineering process, the item Engineeringtool immediately flags up any collisions between components. What’s more, an integrated plausibility check prevents components from being placed incorrectly. Engineers are given comprehensive support at every single step all the way to the final project documentation, including an installation guide, and can order the construction directly in the item Online Shop. item thus offers an extensive range of possibilities for streamlining production processes by using ideal tugger trains.

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**Caption 1:** With the item Engineeringtool, it only takes a few steps to build a frame with Swivel and Fixed Castors, Coupling, Drawbar and Stacking Guide for transporting europallets.

**Caption 2:** The software solution supports the process with a whole host of functions. Trolleys and load carriers of various shapes and sizes can thus be designed in great detail.

**Caption 3:** Drawbars and Couplings from the item MB Building Kit System ensure perfect connection of several trolleys together and with the towing vehicle.

**Caption 4:** Trolleys and structures can be modified and extended at any time. Compatible racks and customised shooter solutions can be created extremely quickly.

**About item**

item Industrietechnik GmbH is the pioneer in building kit systems for industrial applications and a partner of the manufacturing industry across the entire globe. Today, the item product portfolio comprises more than 4,000 high-quality components designed for use in machine bases, work benches, automation solutions and lean production applications. The company has received a string of awards for products with ground-breaking industrial design and end-to-end ergonomics.

item is spearheading digital engineering by driving forward the digitalisation of processes with software tools developed in-house. The item Academy offers training at various levels with on-demand training and online courses available in multiple languages.

Headquartered in Solingen, Germany, item has subsidiaries in various countries. Some 900 employees worldwide harness their know-how and passion to develop innovative solutions and services. Twelve sites make sure the company is always close to customers in Germany, with a global logistics chain ensuring swift delivery times for all components.

**Company contact**

Nicole Hezinger • item Industrietechnik GmbH

Friedenstrasse 107 - 109 • 42699 Solingen • Germany

Tel.: +49 212 65 80 5188 • Fax: +49 212 65 80 310

Email: n.hezinger@item24.com • Internet: www.item24.com

**Press contact**

Jan Leins • additiv pr GmbH & Co. KG

Press work for logistics, steel, industrial goods and IT

Herzog-Adolf-Strasse 3 • 56410 Montabaur • Germany

Tel.: +49 26 02-95 09 91 6 • Fax: +49 26 02-95 09 91 7

Email: jl@additiv-pr.de • Internet: www.additiv-pr.de