**Motivating staff and optimising processes**

**How to easily boost productivity with Karakuri/LCA**

**Karakuri is a Japanese term for automation systems that are purely mechanical and don’t utilise electricity, drives, sensors or compressed air. As part of a lean production strategy, they provide a fast and simple means of moving goods and small load carriers (SLCs) from A to B – using only muscle power, gravity and mechanical principles. But how can** [**Karakuri/low-cost automation**](https://welcome.item24.de/karakuri-low-cost-automation) **(LCA) be rolled out successfully and what are the biggest benefits of mechanical automation?**

Karakuri/LCA refers to mechanical automation and is as intelligent as it is cost effective. item has long been familiar with the benefits of the concept and has been helping companies implement low-cost automation for some years now. In this interview, Stefan Armbruster, who heads up the Karakuri Application Team and is a Karakuri coach at item, talks about the requirements companies need to meet when rolling out Karakuri/LCA and provides an insight into the practical aspects.

**Karakuri/LCA was first developed in Japan and doesn’t seem to have really made it in Germany yet. Why is that?**

Karakuri/LCA is actually just one small, but very important aspect of the lean philosophy that focuses on continuously improving processes with the aid of mechanical automation. All the same, you have to create the right kind of environment for that to work. If you have an external company come in and install a Karakuri/LCA application then leave it to its own devices, it won’t really work. It’s actually your in-house staff who play a crucial role – you need their creativity, since they’re the ones who should develop the Karakuri/LCA solution. That can require a change of mindset. You’re giving more responsibility to your mechanics, application engineers, fitters, etc., who therefore need to have certain skills and be able to develop them further. Tried-and-tested processes need to be modified and set structures need to be broken up. Some companies find that easier to do than others. They’re way ahead on that score in Japan. There’s another sticking point when it comes to Karakuri/LCA solutions – the material and labour costs for a project are difficult to estimate in advance. That frightens off a lot of companies.

**Which processes are suitable for Karakuri applications?**

Low-cost automation can be used effectively in any application that revolves around handling materials. For example, intralogistics transport processes can be implemented using Karakuri bridges, but you can also build automatic storage racks, stacking systems and corner solutions. Goods are usually transported in small load carriers (SLCs). Ideally, these SLCs should have an overall weight of between two and twelve kilograms. Karakuri solutions can turn, tip, empty, lower, lift, insert and remove these SLCs. Shooter systems for automated material supply are also an option. Even the simplest of tasks can be automated in next to no time in order to boost productivity.

**What role does the lean philosophy play when introducing Karakuri/LCA?**

If you want to make sure your Karakuri applications really work, you absolutely must have a good understanding of the lean philosophy. Ultimately, it’s about ensuring production staff can focus on activities that add value and about simplifying production processes. You’ll often find that time, energy and money are all being wasted. That applies to complex working processes, but also to really minor processes such as lifting and moving crates. That’s why it’s a good idea to automate these repetitive tasks, which prevents waste and thus helps companies continuously improve. Continuous improvement doesn’t frown on mistakes and corrections – it embraces them as opportunities to learn and draw the right conclusions. Lean principles need to be firmly embedded in the company and championed by senior management, too.

**What else do companies need to bear in mind?**

Success all comes down to your staff, their abilities and the freedom you give them. To start off with, all production staff should be brought on board early on, to encourage acceptance of the project and its implementation. Then you need to give your application engineer or industrial mechanic a lead role. They will take on responsibility as the creative lead – a “blue-collar designer”, if you like. You don’t just need to accept that, you need to reward it, too. It is important to support these workers, nurture their creativity and expand their expertise. Special training courses like the ones we run in our teaching factory are a good way of doing that. Without the right know-how, lots of people make the mistake of working out the mechanics on paper first. It’s better to start by building the prototype then modify it and carry on improving it. It’s only afterwards that you create your CAD drawing and documentation. Ideally, this mechanic should have a space of their own – somewhere separate from their usual workshop area – where they can develop their prototype. And if they’re able to work with an external Karakuri/LCA specialist that can provide advice and support, then there’s no reason why the Karakuri/LCA project can’t be a success.

**What are the biggest benefits of Karakuri/LCA?**

One is how quickly it can be implemented. A Karakuri/LCA solution can be up and running in a few days, whereas conventional automation projects often last several months or years. Developing conventional specialist machinery is a very complex process. You need countless parts, motors, gearboxes, electrical sensors, controllers and programming software. Naturally, all that comes at a cost, as you need to buy in expensive electrical, pneumatic or hydraulic components – not to mention the power to run the system. The costs for development, operation and maintenance are enormous. If the system needs to be serviced or a part repaired, you need to bring in an expert. By contrast, when creating and running Karakuri/LCA solutions, the experts are on site and are the same people who developed the system, know its parts inside out and understand how they all work together. They can fix faults and stoppages themselves straight away. Ultimately, the maintenance costs are exceptionally low. Procurement costs are much lower, too, and there are no energy costs to factor in, as everything operates on a purely mechanical basis. An [independent practical test by NORDAKADEMIE University of Applied Sciences](https://blog.item24.com/en/lean-production/independent-practical-test-to-see-how-economical-karakuri-lca-really-is/) has shown that Karakuri/LCA can help save 40 percent compared to the costs of a conventional automation solution. I believe the savings are actually much higher on most projects. All the same, Karakuri/LCA doesn’t just pay off financially – it is also environmentally sustainable and thus helps companies reduce their carbon footprint. Further benefits include the modular nature of the systems and the ability to quickly adapt the system to new requirements. Even the simplest of processes can be automated, thereby improving workflows throughout the entire company – and all that is tied in with improved motivation and performance among staff.

**Can mechanical automation also be combined with conventional automation and, if so, can you give us a specific example?**

Yes, we refer to projects like that as hybrid Karakuri/LCA solutions. Sometimes you need to fall back on traditional drives, for instance when heavy loads need to be lifted. However, when you do that, you need to make sure that the logic is in the mechanical part of the system, so you don’t need complex controllers and sensors. We [combined linear technology with Karakuri/LCA](https://www.youtube.com/watch?v=fF-Gc5_8Ytc) in a model project for Toyota in the Czech Republic. The mechanics involved got a great deal of training from us – as did staff from other Toyota plants in Europe. We led workshops and supported them as they rolled out the solutions. The end result was a bridge construction measuring 6 metres long, 6 metres wide and 5 metres tall that provided a rapid and smooth solution for transporting air conditioning units for small cars. Tugger trains can travel underneath the bridge unhindered at the same time as the air conditioning units are being transported over the bridge. As a result, the Karakuri/LCA application supports an efficient material flow while boosting productivity.

**Thanks for talking to us, Mr. Armbruster.**

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**Images: 3** (source: item)

**Caption 1:** How can Karakuri/low-cost automation (LCA) be rolled out successfully and what are the biggest benefits of mechanical automation?Stefan Armbruster, who heads up the Karakuri Application Team and is a Karakuri coach at item, reveals all.

**Caption 2:** A Karakuri/LCA solution can be up and running in a few days, is more cost-effective than conventional automation projects and can optimise production sequences. Further information about the versatile functions of Karakuri/LCA can be found at [https://welcome.item24.de/karakuri-low-cost-automation](https://linkprotect.cudasvc.com/url?a=https%3a%2f%2fwelcome.item24.de%2fkarakuri-low-cost-automation&c=E,1,9EkYKCK3ntkoj5cJJVZP4HbBkh440PrHlgxI0kIWwTB4S4UeG7jKS9dpqt9yGbMcPihT3NJhLJs5vABdeTAAblqnPdT6GlzEHsCpCO6kOlLRNGpKlkTIRw,,&typo=1).

**Caption 3:** item combined linear technology with Karakuri/LCA in a model project for Toyota in the Czech Republic. Air conditioning units for small cars are transported over an ingenious bridge construction.

**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.

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