Reducing damage to prefab metal products

Public summary

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In this assignment, an improved method of protecting prefab metal products during transport in a box truck is formulated. The assignment was carried out for the company Bouwmetaal in Tubbergen. The aim of the assignment was to help Bouwmetaal find solutions to improve protection of her materials and products. Bouwmetaal produces prefab roofing- and cladding products used in construction. The products are made of high-quality metal sheets and coils. Every product is tailor-made. In most projects, Bouwmetaal is also responsible for mounting the products at buildings under construction. In the current project process that Bouwmetaal follows, products can get damaged by a multitude of reasons. Improving the protection of products and reducing the amount of damage cases has an economic and operational advantage.

The most common form of damage that Bouwmetaal encounters are scratches to the surface of products. If a product is scratched it must be replaced, which means a new product must be produced, transported, and mounted. This causes delays in the project process and additional work for employees.

To reduce the risk of scratching products, this research recommends Bouwmetaal to purchase rubber anti-slip mats and anti-slip product separators. Additionally, Bouwmetaal is advised to clarify responsibility of protecting the material during each step in the production process, and to support the driver to adhere to transportation guidelines. These recommendations can help Bouwmetaal prevent damage during transportation of products, because the anti-slip protection materials prevent the products from sliding around during transport and reduce the contact points with potentially harmful materials on the surface of products. The suggested process changes can help support employees to effectively protect the products against damage.

Most damages occur during transportation of finished prefab products from the Bouwmetaal workshop to the construction site. Concurrently, the research shows that the consequences of a damage incident are more severe if damages are discovered later in the process. A scratch on a product noticed in the workshop can be fixed within an hour, but if the scratch is noticed after mounting at the construction-site, the project can be delayed for more than a day. Research into the causes of damage show that damage to the surface of materials used in products can be caused during any stage in a project process. It was determined that preventing all damage was unrealistic, and the focus was put on reducing the risk to damaging products during the transport of Bouwmetaal. The focus points highlighted in Figure 1 were used for the next part of the assignment.

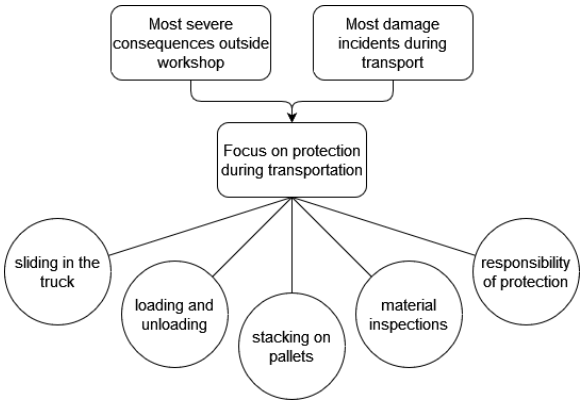

Figure 1 – Focus of assignment

The main cause of damage during transport of products is the sliding of products alongside each other or alongside harmful surfaces, such as pallet deck board. The factors that influence the volume loss of a scratch are the load on the surface, the distance of sliding, and the hardness of the material (Ashby et al., 2007, p. 234; Gale & Totemeier, 2004, p. 25-12). To reduce the risk of damage during transport, the product-to-product contact must be reduced, the products must be fixed in some way, and the contact with hard surfaces must be reduced. It is also important that the new protection solution does not leave residue on the product. Since the products that Bouwmetaal transports can have a variety of different shapes and sizes, the protection solution should be versatile and applicable to different product shapes.

To implement the suggested solution, workshop employees should apply rubber anti-slip protection products, drivers should consider standards and regulations, and employees can work together to circulate the protection materials such that those can be re-used. Part of the suggestion is to clarify responsibility of using the suggested protection approach and to encourage communication about the protection of products. An illustration of the suggested solution is shown in Figure 2.

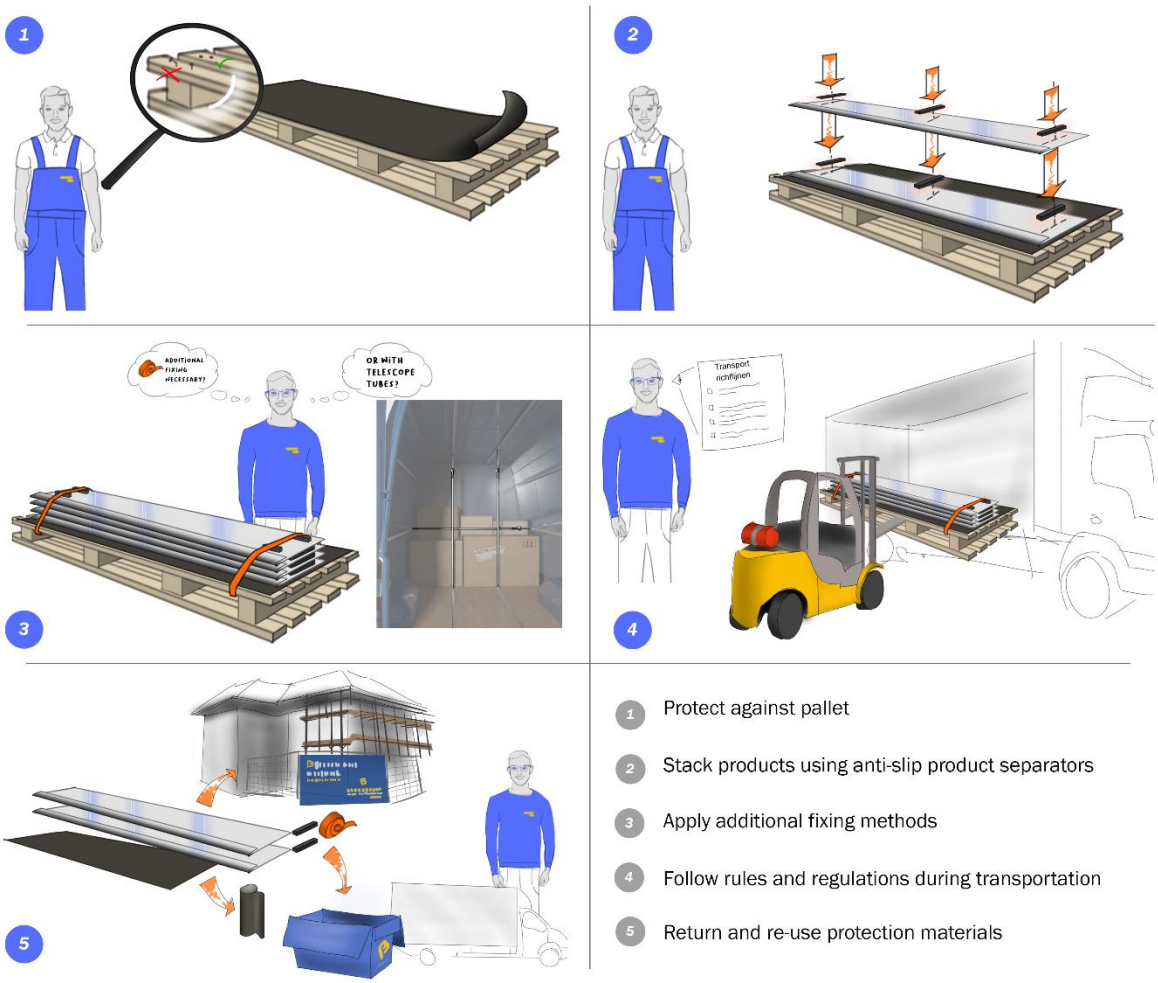

Figure 2 – Illustration of suggested approach

References

Ashby, M. F., Shercliff, H., & Cebon, D. (2007). Rub, slither and seize: friction and wear. In *Materials: Engineering, Science, Processing and Design* (1st ed., pp. 231–235). Butterworth-Heinemann.

Gale, W. F., & Totemeier, T. C. (2004). Friction and wear. In *Smithells Metals Reference Book* (8th ed., pp. 25–1-25–16). Butterworth-Heinemann.