

Clingclimbing

an innovative master graduation project

Background

For some time, a new and patented way to climb against steel walls is available: clingclimbing. With the help of magnets attached to the hands and the feet a steel wall can be climbed. Electro permanent magnets are used for this purpose. These magnets can be switched between the ON and the OFF state by a short electrical pulse. After the pulse, the magnet remains in the new state without the need of any additional energy. This makes the system inherently safe. The magnets at the feet are operated by a knob in the hand units. For more pictures and a movie, please check www.kleeflimmen.eu



A 'proof of principle' was shown on the Holland Innovation fair in October 2008. Several companies involved in industrial climbing showed great interest in the clingclimbing system. As a result, a second prototype has been realized. It was shown on the Maritime Trade Fair Europort 2009 in November. The magnets and the control system of this second prototype proved to be reliable. However, many other aspects need to be improved. For instance, the mass of the magnets for the hand sets is about 8 kg, and for the feet about 16 kg. These masses compromise prolonged climbing, even though the mass is only felt when the magnet is switched off.

Application

The clingclimbing principle can be applied everywhere where steel walls are present, like in ships and offshore constructions. Also many bulk storage tanks are made from steel. These types of steel constructions need regular inspection and sometimes small maintenance. For instance: replacing a sensor in the boom of an offshore crane, or the measurement of the wall thickness of a tank.

Assignment

An assistive system is envisioned to assist the climber when using the clingclimber. Such a system lowers the forces to be exerted by the climber, and possibly makes the control over the system easier. The assignment asks for several conceptual solutions based on a literature study, the application of generic principles, and your own innovative powers. One of the concepts will be made into a prototype. In experiments the safety and proper operation of the device has to be demonstrated.

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