E. GAMBAO, M. HERNANDO, D. SURDILOVIC. ***A new generation of collaborative robots for material handling.*** *Gerontechnology 2012;11(2):368;* doi:10.4017/gt.2012.11.02.362.00 **Purpose** The handling of material is a high resource consuming task in many different manufacturing industries and especially in the construction sector. Global demand for material-handling products is projected to rise by 7.0 percent annually until 2014 to a total of $119 billion[1]. Typically, work on the construction site, in the materials distribution process or in the construction materials production, includes extensive material handling tasks. Advanced automation and robotics technologies can enhance the productivity of this process, guaranteeing at the same time the highest level of safety for workers. Modular reconfigurable robotic systems are considered as one of the most challenging topics[2]. A worldwide cutting-edge technical solution for material handling, based on the development of a modular intelligent power assists systems (collaborative robots, COBOTS), is presented in this paper. **Method** Conventional manually-guided handling systems lack an intuitive and responsive control and may lead to back discomfort and fatigue. A significant improvement has been achieved by power-assisted systems developed by Stanley Cobotics in the USA[3], as well by the first cobot prototypes in German industry implemented through cooperation of IPK and Schmidt-Handling GmbH[4]. The proposed material handling approach would constitute a significant breakthrough by bridging the gap between fully automatic and manual technologies[5]. The developed intelligent power systems are capable of working with people also in a direct physical contact, combining human flexibility, intelligence, and skills with the advantage of sophisticated technical systems. Safety issues have been considered to be of paramount importance. **Results & Discussion** A modular flexible collaborative robot prototype has been designed and developed as a demonstration of the proposed new generation of material handling methodology. This technology supposes a break with traditional paradigms regarding flexibility, cost, accessibility and applicability of high-tech handling solutions as well as conventional human-machine interaction. The control system is based on hierarchical order control block architecture. Since a collaborative robot is characterized by real cooperation between human workers and intelligent assist devices, an elaborate safety system has been developed. The prototype can operate in an area of about 4.7x2.4m including travel in Z-direction of about 1.3m. It has five powered axes driven by servo drives. The axes are the X-, Y- and Z-axes, rotation about the Z-axis and pivoting up and down of the end effector. To allow simple and friendly interfacing with the human worker, a sophisticated human machine interface, based on a touch panel, has been developed.

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Keywords: material handling, collaborative robots, modular robots, robots in construction.
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Full paper: doi:10.4017/gt.2012.11.02.362.776

Figure 1. Collaborative robot prototype