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Short Communication

MANEX COMPANY AS LEADER FOR CREATION OF AUTOMATED AND ROBOTISED SYSTEMS WITH CONNECTION TO INTERNATIONAL PROJECT ERASMUS PLUS – RUSOS

Róbert Jenčík [1✉]

[1✉] Economy Director, Manex Company, Alvinczyho 12, Kosice, Slovakia, email: robert.jencik@manex.sk

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ABSTRACT
This paper describes the portfolio of Manex Company that is one of the partners in the Erasmus plus project with title: RUSOS – Robotics for teacher of secondary vocational school. Company has been involved into the project as the leader in the field of automated and robotised systems.
KEYWORDS: robots, automation, RUSOS, education, qualification

1. Introduction

MANEX Company is a family owned business that offers highly professional solutions in the field of automation and quality mechanical engineering production. The main activity consists in the design, production and delivery of complex automated systems for the field of transport, handling, packaging and filling of various types of goods, see Fig. 1. With comprehensive solutions of automation of process lines, solutions of robotic systems and conveying systems, the company MANEX, which was founded in 1994, is well-established in the food, chemical, construction, paper and automotive industries [1]. Currently is going on an expansion into other industries.

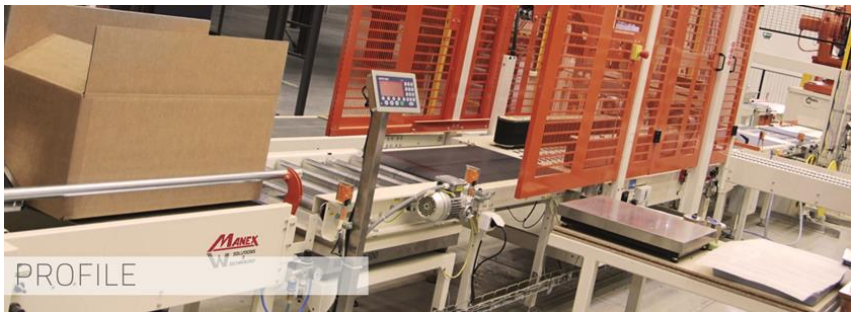

Fig. 1. Company solutions

The handling, packaging and filling lines of MANEX, as well as the independently delivered equipment are currently used by tenth of clients in Slovakia and abroad. Company MANEX within its production plant deals also with production of components and parts of machines, conveyors and single purpose machines and equipment. Emphasis on product quality and satisfaction of the customer are the reasons for successful export of MANEX production to renowned companies in whole Europe. Within its effort to maintain first class quality and increase its competitiveness, the company focuses its activities on continuous restoration and improvements of machines,

revitalisation of production plant and innovation of IT Technologies. MANEX actively cooperates with Technical University in Kosice and participates in scientific and research projects which enable the origin of unique technical solutions.

Top experts in MANEX use their extensive professional knowledge to create technological procedures, solutions of construction assignments and mechanical engineering production itself. The goal is to satisfy specific requirements of customers whereas we prefer individual approach to technological solutions of projects. The company MANEX has currently a team of 60 people and the production plant disposing with own production, storing and administrative premises covers 5760 m^2. The production area of company MANEX forms an industrial unit which is equipped with machines and devices for basic processing of metals as well as modern technologies for processing of metal parts.

MANEX has been for more than 20 years a guarantee of quality and reliability. MANEX uses managerial and information systems ABRA (production module), is a holder of certificates ISO 9001:2009, ISO 14001:2005 and ISO 18001:2009, has an elaborated internal system of production and maintaining of quality and system of archiving of production documentation for the case of repeated production [2].

2. Products of company

Applications including industrial robots are currently the most used examples of automated workplace [3]. Due to high variability and good performance parameters the industrial robots proved usefulness in various applications such as e.g. robotic manipulation or robotic palletising, see Fig. 2.

Fig. 2. Palletising robotic workstation

2.1. Robotic systems

Due to high variability and good performance parameters the industrial robots proved usefulness in various applications such as e.g. robotic manipulation or robotic palletising [4]. However, MANEX, integrator of robots, uses them most frequently in food, beverage, chemical, timber and automotive industry.

We successfully integrated also the most recent “pick and place” robots which are used for fast handling of small and light objects [5]. Within projects MANEX uses and integrates industrial robots of marks ABB, KUKA. MANEX also offers design and production of robot handling heads, manipulation heads, and grippers.

2.2. Conveying systems

Transport conveying systems delivered by company MANEX are created by conveying tracks which consist of partial conveying modules and conveyors. In term of production type MANEX focuses mainly on food, paper, timber, construction, chemical and automotive industry.

The transport conveying system can be the only automated part within all production however, in most cases it forms only subsystem of all automated line or robotic system [6].

2.3. Manipulation – automated handling systems

MANEX realises automated handling systems for handling of single products, group packs or complete already packed pallets. In term of performed act they are: palletising/de-palletising systems, stackers and de-stackers, inserters and unloaders, or workplaces with specific way of handling [7]. MANEX realises applications from the simplest handling consisting of simple movement up to complicated multiplied acts and complicated trajectory.

2.4. Packing and fixation

Company MANEX realises within its projects a large part of automated packaging workplaces which are either part of a larger whole, such as the complete filling or production line, or it is the delivery of autonomous packaging equipment.

2.5. Filling

Company MANEX delivers filling lines and technological equipment of lines for branches of food industry, above all for wine factories, for producers of spirits and liquors, for breweries, producers of mineral and table waters, dairies, etc. Automated lines of MANEX can fill: mineral and table waters, still and sparkling non-alcoholic beverages, still and sparkling wines, beer and spirits and liquors.

3. Equipment and conveyors

Single purpose machines and equipment, constructional designed and produced by company MANEX prove usefulness within various automated operations and production plants. We produce most frequently standard equipment such as turntables, perpendicular transmission units for pallets and pallet magazines, see Fig. 3.

Fig. 3. Single purpose robotic workstation

Construction and production of special equipment and single purpose machines are substantially influenced by requirements connected with applications delivered within automated lines and workplaces realised by company MANEX. These are mainly devices performing a specific type of manipulation or another undefined type of operation. For example carton elevators, accumulation tables; group packs swappers, preparation tables, and conveyors with horizontal or vertical movement or tilt conveyors [8].

All types of conveyors are produced on the basis of own and proven construction solution with use of most modern technologies. We produce most frequently: belt conveyors, slat-chain conveyors

for group packs and bottles, roller conveyors for group packs, roller and chain pallet conveyors. In case of individual requirements of the customer company MANEX can produce also non-standardised modules of conveyors and conveyors according to original drawing documentation. In such case we tailor the conveyors to customer´s needs [9].

4. Manex company and RUSOS project

Manex company, in cooperation with TUKE and other partners, is involved in a project RUSOS with aim to create an electronic learning material for secondary vocational schools. The project focuses on education of teachers at secondary vocational schools in the field of robotics, at innovative, high-quality and updated information from robotics. An innovation of project is at creation of study materials for teachers of technical subjects at secondary schools that are grounded on basic and the latest knowledge from robotics [10].

ICT learning platform are based on e-learning and will deal with current data from industrial and service robotics. The platform will be built for ease of use and intuitiveness with multilingual content for all three countries included into project, as well as its overall functionality and usability. Virtual laboratory is designed as an interactive source of knowledge, allowing interaction between students and teachers. It will consist of 3D virtual models of robotic and automated equipment, with which it will be possible to work in virtual reality and verify in MATLAB [11].

Virtual laboratory will be used to verify practical knowledge gained from training on ICT platform. The level of education in the field of robotics, which is a key for modern automated production, is expected to increase after the project's implementation [12]. The project will create educational materials which should be a part of training and education of all students in secondary vocational schools.

5. Conclusion

The current situation of increasing European and global competition and the resulting downward pressure on prices and forcing at Slovak companies use modern automated and robotic manufacturing systems. After the state of the art analysis evaluation there were certain conclusions gained, showing lack of information from the field of robotics among graduates. Low level of education in the field of robotics is caused by poor material and technical facilities at secondary schools, as well as by poor level of theoretical and practical experiences of teaching staff.

Therefore, the staff is not able to pass on important and satisfactory level of education in the field of robotics. This clearly demonstrates the need and necessity of education in the field of robotics that can be adequately insured by professionally trained teachers. Teachers will benefit in terms of gaining the latest information and knowledge from the field of industrial and service robotics, which is now highly popular and attractive, giving them the benefit of professionalism.

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