

INDUSTRIAL ROBOT APPLICATIONS IN THE PROCESS INDUSTRIES

Isak Karabegović
University of Bihać
Faculty of Technical
Engineering
Bihac, BiH

Fuad Čatović
University of Mostar
Faculty of Civil
Engineering
Mostar, BiH

Damir Hodžić
University of Bihać
Faculty of Technical
Engineering
Bihac, BiH

ABSTRACT

In this paper there have been presented robot and robotic systems applications in some examples of process industries. Process industries and applications of new technologies in these industries are very interesting for Bosnia and Herzegovina and its industry, because those industries are well developed in Bosnia and Herzegovina. In this paper we will mostly present robot and robotic systems applications in food and beverage industries in which robots and its systems are mostly used for products manipulation, its transfer and transport and palletization.

Keywords: Industrial robots, process industries, material

1. INTRODUCTION

Process industry includes all other industries beyond industries which handle with machines building, tools manufacturing or heavy industries. So we can say that process industries includes chemical industries, food and beverages industries, cement industry, pharmacy industry, paper industry, tyre industry, tobacco industry and others [14]. Of course, in those industries robots are mostly been used for products manipulation, their transfer and transport and palletization. Those industry areas and robot applications in those industries can be very interesting for Bosnia and Herzegovina in which we have very wide applications of those industry areas.

Process industries are very huge spender of energy and raw material and that why it is necessary to have permanent activities for efficiency increasing in all manufacturing phases. Robot and robotic systems applications opens huge spectra of possibilities for efficiency increasing of those systems. Variability of process systems gives possibilities for many solutions of robot applications, which leads to their more effective work. Also they can replace human work on places which are dangerous and unvaried.

2. ROBOT APPLICATIONS IN FOOD INDUSTRY

In food industry robots are mostly used for picking and placing of end products and its packaging. For pick and place processes there can be used robots with robot vision if position of products is irregular. Robots presented in figure 1 are with small dimensions because they have been used for manipulation of small products.

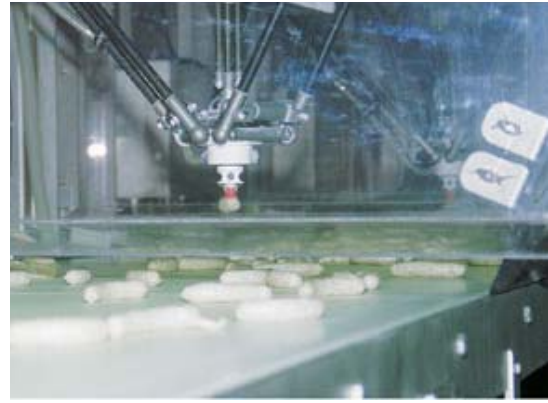
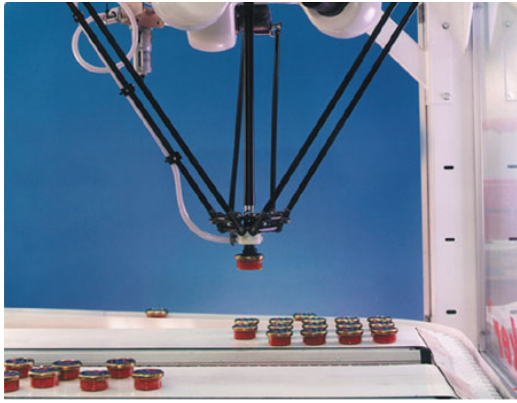


Figure 1. Robots with robot vision in food manufacturing processes [10]

Figure 2 shows packaging of cookies. Those robots have got gripper which is constructed for manipulation in small workspace. Robots can also be used for packaging of frosty food like shown in figure 3.



Figure 2. Robot application in cookies packaging [12]



Figure 3. Robot application in frosty food packaging [11]

Robots are also been used for transporting of products from one place to another. Figure 4 shows robot manipulation with big round of cheese which are picked by vacuum gripper.



Figure 4. Robot application by cheese transferring [9]

Robots which are being used in food industries are doing very quick operations with products. Because of that grippers have to be very sense, then the products are in most cases packed in glass or PVC package which must not be damaged.

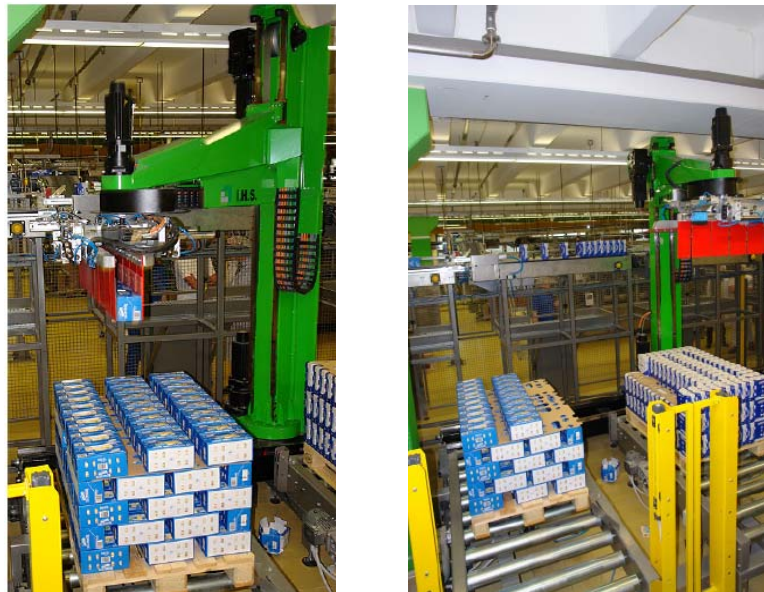


Figure 5. Application of palletization robot MMAN in milch palletization [13]

Figure 5 shows application of palletizing robot MMAN during milch palletizing. This robot is a product of firm IHS d.o.o. Krško, Slovenia and it can be constructed like two, three or four axis robot. The usability can be determined by the type of gripper head. Capacity of those robots is up to 300 cycles per hour and advantage is it small dimensions [13].

3. ROBOT APPLICATIONS IN BEVERAGE INDUSTRIES

In beverage industries robots are mostly been used for palletizing of bottles and crates. Figure 6 shows application of industrial robot for bottling and transport of beer bottles [9]. Brewery in which is installed such type of robot can bottle about 24000 bottles per hour. Robot can transport about 30000 bottles per hour (about 1500 crates) and it is possible to compensate some possible time disadvantages in other production phases. Bottle manipulation must be done for short time cycle, without large acceleration and robot programming must enable fast and exact movements.



Figure 6. Industrial robot application in brewery [9]

All big world companies are using robots and robotic systems for a long time in their production processes. Without them they could not be competitive in the world market. Figure 7 shows application of industrial robot in one of the largest world companies, Coca Cola [12].



Figure 7. Robot application in beverage industry [12]

Figure 7 shows industrial robot in automatic line in Coca Cola in which the bottles are being filled, transported and palletized on the crates. Robot task is to transport and put bottles in crates and to palletize crates.

4. CONCLUSION

From this paper we can conclude that industrial robots and robotic systems have got wide area of applications in process industries. Process industry has got big importance for our country, for Bosnia and Herzegovina, because lot of examples of process industry can be found in Bosnia and Herzegovina and are very successful companies like food industry, beverage industry, milch industry and tobacco industry.

Process industry, like all other industries beside specific processes has got some other characteristic activities like palletizing, assorting, transferring and transporting in which are used robots. Industrial robots can replace human work in some dangerous and heavy operations and instead of that worker can be trained to operate with robots or robot systems.

5. REFERENCES

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