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ROBOTICCOMPLEX MODELING OF THE PASTRY PRODUCT PALLETIZING

Today, industrial robots are widely used in service of technologicalprocesses and automation of transport operations. The use of industrial robots in modern technological processes allows to realize complete automation, to simplify the production process, to increase the efficiency of the workforce, ensure the quality of work and to reduce the financial expenses on work payment. In general, robots are used for such operations as welding, painting, assembling, selection, and installation, packaging, product inspection and testing.

An industrial robot is a device which consisting of a mechanical manipulator and a programmable control system, that is used to move objects in space the various manufacturing processes. Industrial robots are important components of automated flexible manufacturing systems. This systems allow to increase work productivity.

The use of industrial robots can be divided into automatic execution of processes for welding, assembling, painting, coating, soldering, performing of the control operations, packaging, transportation and automation of the machining processes (service of various cutting, plangent and abrasive machine tools), presses of cold and hot stamping, forging and foundry equipment, installations for heat treatment and loading/unloading of semiautomatic devices of second welding and contact welding machines, automation of assembly operations. The main idea of a robotic technological complex is that the industrial robot has to be used in combination with specificprocess technological equipment.

The purpose of this work is to apply software products to modelling, programming and visualization of robotic complex of the of pastry productspalletizing.

Software product RoboDK allows to perform the following tasks:

1. To model and to program industrial robots offline.

2. To optimize the path of the industrial robot automatically avoiding collisions with objects.

3. To calibrate industrial robots in order improve their accuracy and efficiency.

4. To export the developed program to the control system of an industrial robot.

RoboDK software product will be used for the development of robotic complex of the pastry productspalletizing, and programming of an industrial robot. RoboDK allows to visualize the process of palletizing, and simulate work of the robot. The dimensions of the boxes for palletizing, the number of boxes on the pallet and speed to assembly line (Fig.1). Have to be specify in the developed program code to control the industrial robot smooth and uninterrupted operation.
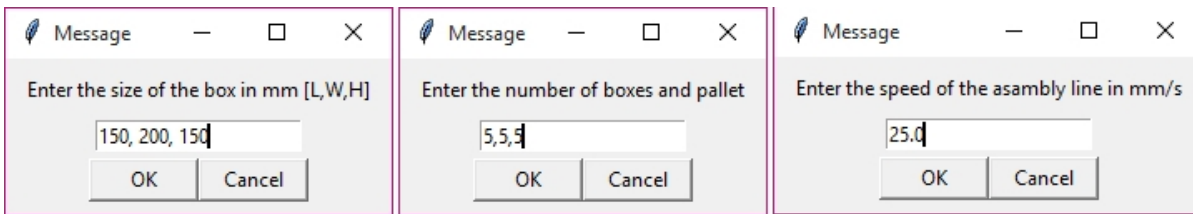
Message — □ ×	Message — □ ×	Message — □ ×
Enter the size of the box in mm [L,W,H]	Enter the number of boxes and pallet	Enter the speed of the asambly line in mm/s
150, 200, 150	5,5,5	25.0
OK Cancel	OK Cancel	OK Cancel

Fig. 1. Forms of specifying parameters for the palletizing process

The principle of the robotic complex is the followingoperation: boxes with pastry products are transferredto the industrial robot, whichit has the trays on both sides. After a box has reached the final point on the assembly line, the sensor sends a signal to permit industrial robot to transfer boxes on the pallet. The cycle repeats until the tray does not reach the specified number of boxes by operator. After filling the pallet, industrial robot moves to start place the boxes on each other at another pallet. At the same time filled pallet is transported to the storehouse, and the new pallet is supplied.

As a result, the developed robotic complex of the palletizing of pastry products will increase the speed of the box palletizing on the pallet, win ensure more steady placement of boxes on the pallet, which will increase the security level in the warehouse and makes it easier to load the assembly line.