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# NEWS RELEASE



AMADA CO., LTD.

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## **Development of Bending System with Double-arm Robot For Bending Small Sheet Metal Products Exhibited in EUROBLECH**

Amada (President Mitsuo Okamoto) has developed and commercialized the double-arm robot system in which robots with two arms carry out bending of small sheet metal products to replace of the current practice of manual by piece by piece bending done by operator using the press brake. In this system, which employs a method called the cluster (#1) capable of efficiently machining multiple products, the robots carry the work of up to setting the die length suited to the bending length of parts. This system is mainly intended for protecting the operators to engage in machining of small sheet metal parts from getting physical damage. It will be exhibited in the world's biggest sheet metal machining equipment "EUROBLECH" to be prepared for the incoming orders.

The product name of this bending system with the double-arm robot is "ASTRO-Ci." This system robotizes the small sheet metal machining process by combining the general-purpose small servo brake "FMBII3613-NT" with the maximum pressure of 36 tons with double-arm robot "SDA10D2 from Yasukawa Electric.

Currently operators are having a trouble in the press brake-based machining when the target parts are small, 20 to 25 mm or less in width and 200 mm or less in length. These small parts come in a wide variety - parts of the same shape and size are very limited. Since their shape of the portion to be butted against the package is small, automating this process was impossible.

On top of that, since these small bent parts are cheap in price, the bending process has mostly been carried out by part-time workers. And it was one of major causes of inducing frequent personal injuries.

Amada, therefore, adopted the cluster bending process in which multiple parts to be machined are blanked on a single of workpiece (raw material) and left in the micro joint (#2) state. In this way, Amada has built the robotized system. The parts to be blanked on a piece of work do not necessarily have the same shape. They can have different shapes from each other.

The minimum cluster work size that can be handled on "ASTRO-Ci" is 200 x 200 mm and the maximum size is 320 x 320 mm. (A gripping space of 30 mm is necessary in each side.) Machinable plate thickness is 0.6 to 3.2 mm.

The cluster bending process controls the robot operation by preprogramming the bending data and the robot actions that are to follow the given data. A double-arm robot holds a workpiece with its left hand and uses the right hand for setting a die. The robot proceeds with the machining using its hands variously - holding a workpiece with both hands, holding it with one hand, turning it upside down, shifting it from one arm to the other, etc. This makes shifting of gripping on the currently used work gripper (#3) unnecessary and cuts the time for the shifting substantially.

The processing is constantly carried out at the center of the press brake (center bending). Since the center of the machine minimizes distortion because of its structure, the center bending assures a high-precision processing. 680 mm wide space in the center portion is used as the processing area. The right side area of the press brake viewed from the robot is used for preparing a die and the left side is the die evacuation area to accommodate used dies (width of the preparation and evacuation areas are both 350 mm).

Dies to be used are arranged beforehand in the preparation area in the order of use, and the robot sets a necessary die at the machine center as the work progresses.

The "ASTRO-Ci" development concept is the innovation in small parts processing. Using (1) automation, (2) compactness and (3) blank connection as the keywords, Amada has built a general-purpose machine based system rather than an expensive dedicated system.

The chief purpose of the automation was to realize CAM-based offline preparation process and, as for the blank connection, the biggest objective was to connect the master blanking process done on the customer's currently used blanking machine to our process to be carried out by the double-arm robot.

The double-arm robot system is a new solution developed on the cluster bending process.

Amada proposes this new technology in EUROBLECHT to put it in the test of the world market.

Amada shows in this exhibit how a double-arm robot processes small independent parts like an operator does. And just for reference, Amada will show the work like butting and side gauging to present our bending operation done by use of the special gripper with an elastic vacuum pad.

And we will reproduce the robot's actions when simultaneous use of both hands is required such as loading and unloading (#4) of the material in processing an independent part. Amada is going to sell its technological capability in bending small parts to the audience.

After EUROBLECH is over, this double-arm robot will be displayed in the Amada Solution Center in Germany and the Isehara Solution Center.

(#1) Cluster:

Carrying out blank layout of multiple parts botryoidally on a piece of blank material.

(#2) Micro joint

Denotes, when punching out parts from blank material or base material, to leave slight connection between the part and base material so that the part can be easily separated with operator's hand at a later time.

(#3) Work gripper:

Refers to the portion on a robot used to grip the material. Various shapes of grippers are prepared to avoid gripping a wrong portion or bent portion in the bending process.

(#4) Loading and unloading:

Refers to carrying the material into the machine body and carrying out the processed material, respectively.