

WORK ISLAND FOR REMOVING BURR AND FOR THE AUTOMATIC UNLOADING OF RUBBER SLEEVES WITH ANTHROPOMORPHIC ROBOTS

Work island for the automatic removal of burr and unloading of rubber sleeves that have been pressed with vertical presses provided with two double rotating male supporting bars, which consent to remove burr and pressed pieces in masked time, that is with closed press during vulcanization, so reducing the press cycle time to the minimum.

HANDLER USE ADVANTAGES:

- REDUCED THE TIME OF ITEMS REMOVE, because it's made at the same time for all the items and not one by one as in a manual removing cycle.
- REDUCED MANUAL LABOUR: cycles are completely automated and therefore one operator can control several machines.
- REDUCED OPEN MOULD TIME, then smaller moulds cooling and smaller vulcanization time.
- ELIMINATION OF UNDUE CYCLE STOPS and their pertinent problems due to moulds cooling down, such as scraps due to insufficient heating, moulds cleaning and eventual removing of them, purges for cleaning the nozzle from prevulcanized material.
- REDUCED MACHINE DOWN TIME: it is no longer necessary to wait for the operator to remove moulded items.
- IMPROVED QUALITY AND CONSISTENCY OF MOULDED ITEMS: continuous extractor cycles eliminate hazardous open machine down time due to operator absence and/or extraction speed, thus preventing the mould from cooling off and/or the compound from curing in the injection pot and extruder, which may change the physicalchemical properties of the moulded item.
- THEY PROVIDE A RAPID RETURN ON INVESTMENT.
- IMPROVED PLANT OPERATING TIME: simplifying the machine work load programming, it's really easier to program, because of constant cycle times.
- MORE FLEXIBILITY: the handlers can be simply coupled to similar machines, compatible to their pertinent electric and pneumatic connections taps: they can be used on several similar moulds with small differences in tap positions.
- REDUCED MANUAL LABOUR DEDICATED TO ITEMS TRIMMING: the handlers use allows to remove and part automatically the moulded items burr straight through during the removing cycle.
- INCREASE OF THE QUANTITY OF PRESSED MATTER PRODUCED IN THE TIME UNIT because it is possible to carry out the piece extraction in masked time, that is with closed press during vulcanization, so increasing the number of pressed matters produced in the time unit.
- CARRY OUT AN ACCURATE EXTRACTION of complex and difficult pieces, such as curved rubber sleeves for household appliances without affecting the overall cycle time because this operation is carried out outside the press in masked time, that is during the vulcanization phase;

DESCRIPTION OF THE MACHINE AND TECHNICAL SPECIFICATIONS	I
--	----------

- CARRY OUT the finishing (burr removal) on the machine edge without affecting the overall cycle time because this operation is carried out outside the press in masked time, that is during the vulcanization phase;
- REDUCE THE COST of the extraction heads. In fact, the head is built with a minimum number of adequate grips for the extraction of a single row of pieces and is then used also to extract the pieces that are located in the other rows on the same male supporting bar and on the other bars of the same mould;
- REDUCE TOOLING TIME at every change of production because it is possible to position several extraction heads in the same island, whose use can be selected by digiting the reference code in the man/machine dialogue terminal;
- CARRY OUT the control operations of the external quality of manufactured articles and sealing controls within the island.

The basic system is composed of:

- an anthropomorphic robot with:
- an axis for exchanging and translating the male supporting bars outside the press
- a group for gripping the male supporting bars
- a head for removing the burr on a single row
- a head for removing the pieces on a single row
- a Cartesian manipulator for removing the injection channels, to be used in case the press and/or the mould has not been provided with a thermo-regulated channels system.
- a press for injection pressing provided with two frames for handling the frameworks containing the double supporting male bars.
- a mould with four male supporting bars, two inside the press and two outside for the piece extraction and burr removal

DESCRIPTION OF THE MACHINE AND TECHNICAL SPECIFICATIONS	I
--	----------

Description and operation principle of the system with double framework and double rotating males

The manipulator is positioned with its front side open on one of the free sides of the press, normally on the rear right side.

After the vulcanization (reticulation) time has elapsed the press opens vertically.

At the end of the opening run the upper framework of the press descends and the bottom framework is subsequently lifted up. In this condition the manipulator carries out the exchange of the males located in the frameworks, so that the outside males go back into the press and the internal males go out from the press.

At the same time the Cartesian manipulator removes the injection channels in case the press and/or the mould has not been provided with a thermo-regulated channels system.

After the exchange has been carried out the press closes and the manipulator approaches with a horizontal movement to the gripping position of the first external male, then it comes down up to the point where it hooks the first male, lifts this up and translates it towards the head for the burr and piece removal. At the end of the multiple removal operations of the pieces and burr of the first row the manipulator rotates the male supporting bar and repeats the removing cycle of the burr and pieces of the second row of the first male. After the removals have been carried out the manipulator – with a horizontal translation movement – goes back to the starting position to deposit the male supporting bar completely free from burr and pieces.

After the release of the first male supporting bar the manipulator – with a horizontal movement – draws the second male supporting bar and translates again towards the multiple head to repeat the burr and piece removal operations on the first and the second row of the second male supporting bar. After the multiple removals have been carried out the manipulator – with a horizontal translation movement – goes back to the release position to deposit the second male supporting bar completely free from burr and pieces.

After the release of the second male supporting bar the manipulator - with a horizontal movement – frees the area over the male supporting bars and moves into the “wait position”, and remains waiting for a new exchange and extraction cycle to start.

The overall cycle time will be determined by the press according to the injection, vulcanization and frame exchange time.