

Special info:

Automation



LASCO UMFORMTECHNIK
WERKZEUGMASCHINENFABRIK

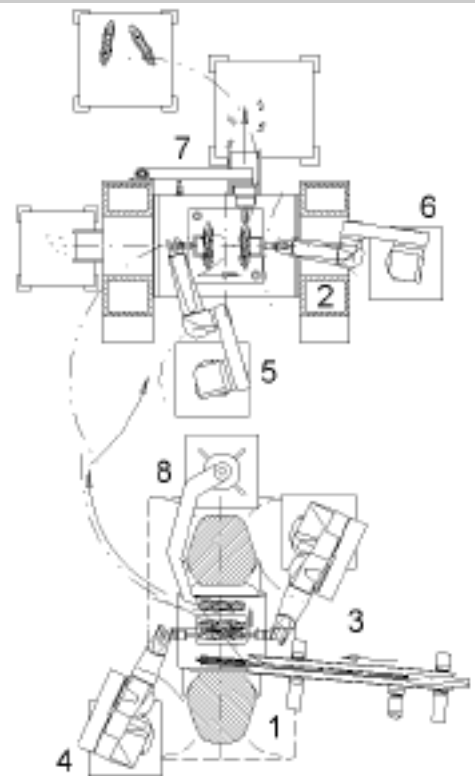


Economic production machines

Company survival in this age of transparent markets and global procurement strategies is dependent on optimized and thoroughly rationalized production machines. One of the major factors contributing to the efficiency of forging machine operation is the cost of personnel. However, this is complemented by the need to reduce the stress placed on workers in production.

As a supplier of technology to the forging industry, LASC0 has accepted the obligation of developing solutions to automation

and handling applications specific to metal forming processes. The combination of modern technology and automation permits the efficient manufacture of evermore complex forgings. Trendsetting machine concepts, consequent optimization of all components and improved availability over long periods highlight the distinct economic advantages over conventional, manually operated systems. As such, they form the backbone of their user's success in the markets of the present and future.



Layout of a fully automatic hammer forging line, specifically engineered:

- 1 = Die-forging hammer
- 2 = Piercing and trimming press
- 3, 4 = Forging robot
- 5 = Feeding robot
- 6 = Transfer robot
- 7 = Flash removing unit
- 8 = Swivel unit

The benefits from LASC0 automation technology

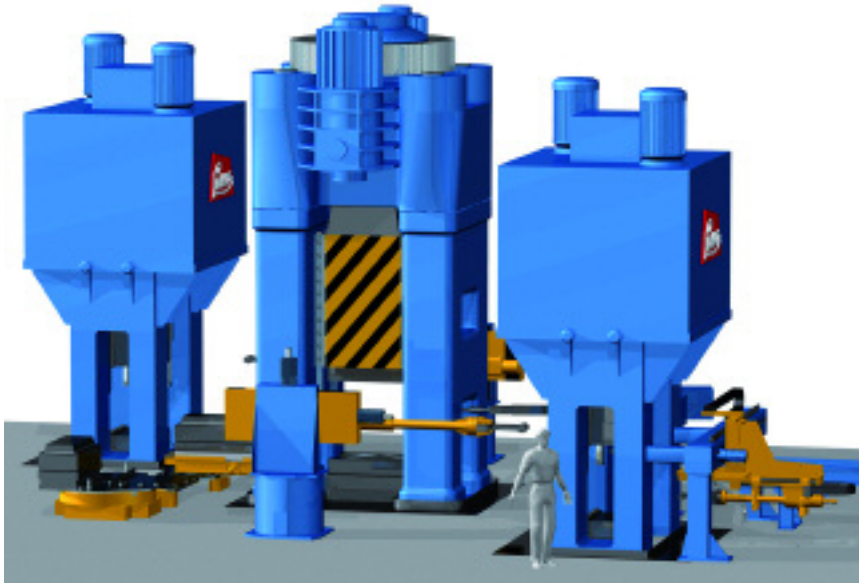
- Continuous working pace allows time and quantity-based calculation and control of production capacity.
- Outstanding productivity is ensured by short cycle times.
- High operational reliability makes the production processes plannable.
- Intelligent controllers and handling devices permit reproducible processes and quality assurance over the whole production cycle.
- Flexible, rapid setup ensures suitability for small batches.
- Integrated, automatic die care lowers die wear.
- Operators are relieved of heavy manual labour.
- Central control of all process parameters from single source solutions.
- Specific solutions for the customer's requirements ensure optimization of production processes.
- Low spares inventory because of modular design.
- Short setup times because of simple change of grippers and jaws.
- Possible operating errors minimized by dead stop limit switches and mechanical stop position dampers.
- Locking of the axis position with fail-safe brakes on the stroke axes at a mains failure or emergency stop.
- Effective protection against dirt.
- Heat protection devices (hot forming).
- Continuous control concept for robots and forging equipment, bus systems for component data exchange and networked computers.
- Minimum operator effort.
- Simple maintenance.



The 300 experts at LASC0 have one common goal: the delivery of machines that will ensure the client's long term success.

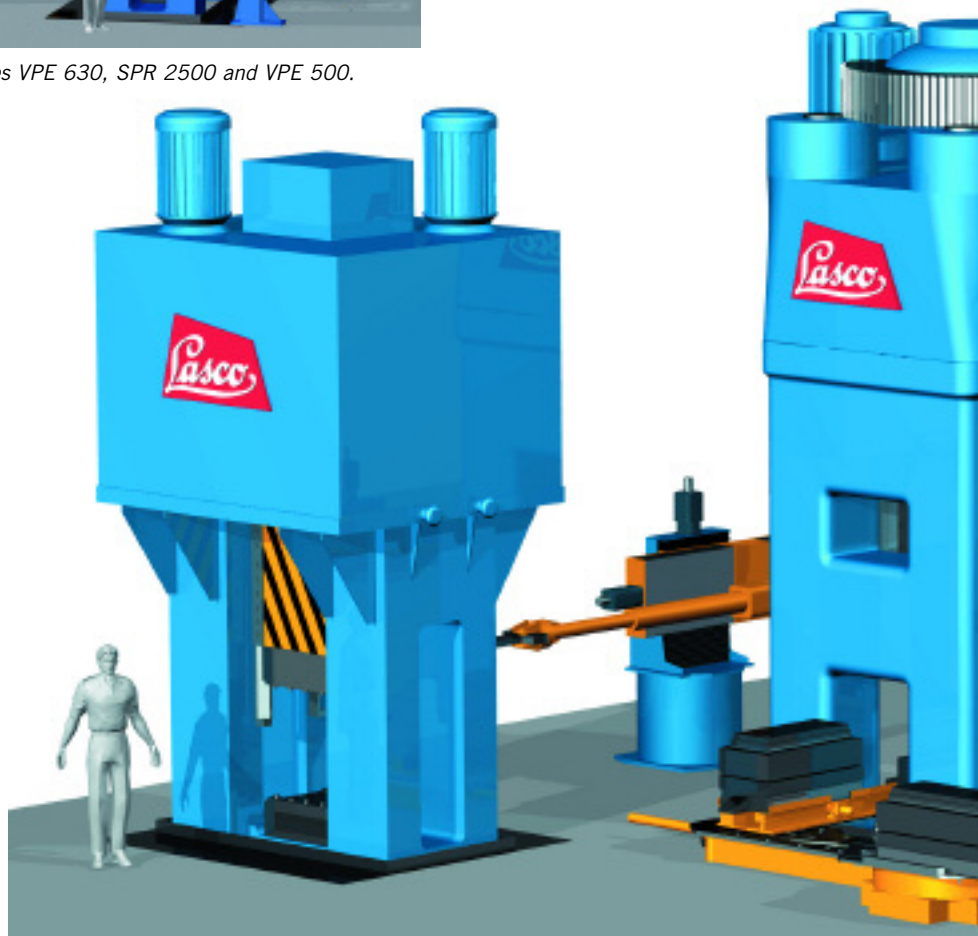
Flexible forging line

Optimally set up for frequent product change



Three interlinked and automated LASCO presses VPE 630, SPR 2500 and VPE 500.

An inductively heated bar is cut to the required length by hot shears and fed to the VPE 630 by a manipulator. On this press, upsetting, extrusion and light stretching operations can be carried out. The following SPR 2500 screw press can carry out final forging in one or two operations with multiple blows, if needed, in the same impression. The VPE 500 carries out piercing, trimming and calibrating tasks. Material transport between the presses is done by the two transfer robots. Transfer slides, conveyors and chutes are used for removal of the forged parts from the punching, trimming and sizing presses.

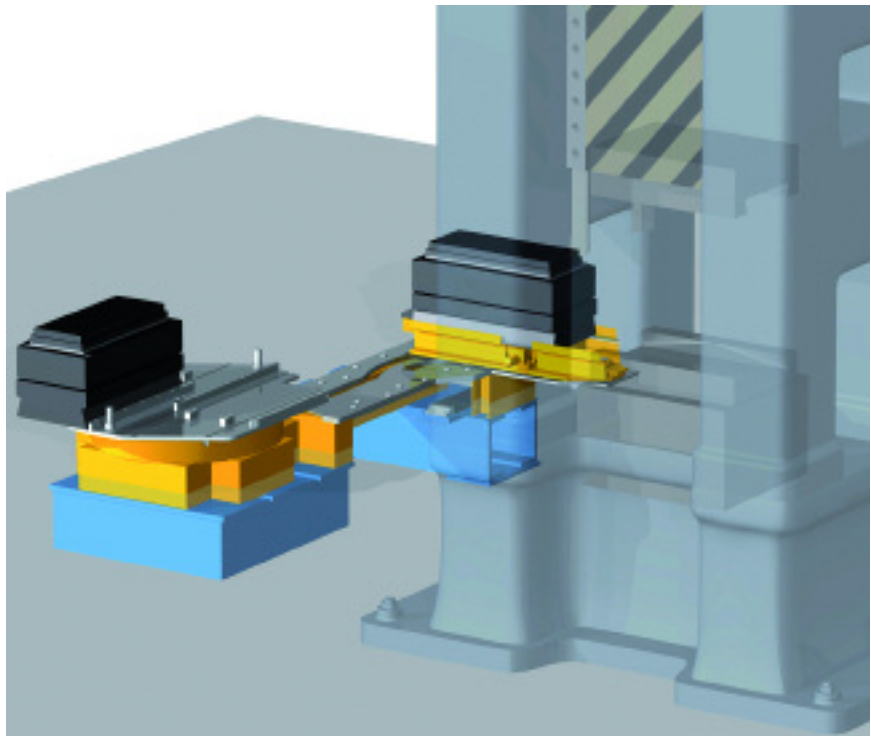


Front view of automated LASCO presses VPE 630, SPR 2500, VPE 500.

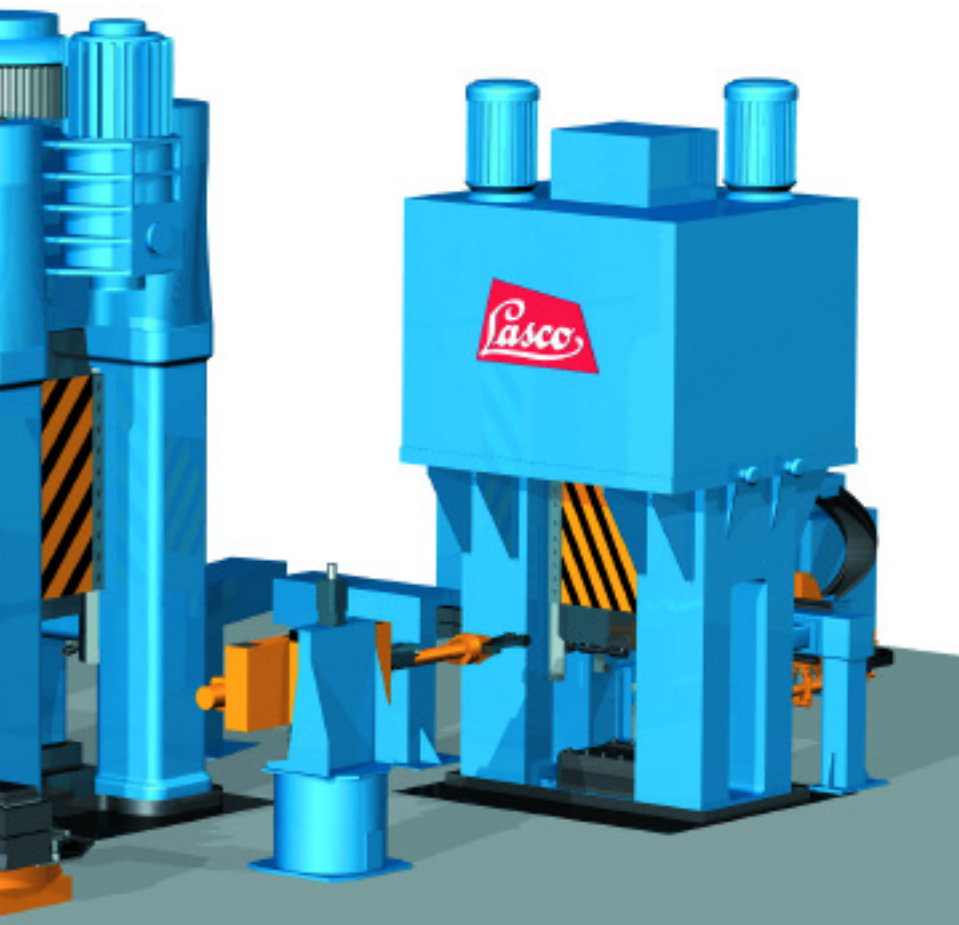
Quick die change

A particular advantage of this line:

The short times for die change result from a tooling cassette that can be replaced for a new product at the touch of a button. This makes this production line particularly interesting for small batch production.



Fully automatic tool change on the SPR 2500 screw press.



Robots as operator



A fully automated die forging hammer from LASCO with synchronized forging robots.

Fully automatic forging line with hydraulic die forging hammer

With the help of modern hydraulics, control and sensing technology, coupled with a whole range of patented features, LASCO has drastically enhanced the range of applications for die forging hammers. LASCO hydraulic die forging hammers fulfill all the demands placed on metal-forming machines regarding process capability and efficiency. As the first manufacturer of machine tools worldwide, LASCO has realized full automation on die forging hammers.

Components

A sensor patented by LASCO designed for the demanding environment which is found in the forging industry measures ram position and velocity. The system detects, for example, if the die is closed, whether the part is fully forged or whether a further blow is required. The detected ram speed is compared with the preselected value. This allows compensation to be made for any external influences that may have an effect on the system.

The essential key component of automatic hammer forging is the patented forge gripper that holds the part accurately in the required position during all operations.

The robot works on the principle of a human operator: taking up the billet with the gripper – positioning in the impression – deliberate

yielding during the blow (without releasing) – lifting – transferring to the next impression.

Special, adapted and commercially available industry robots are used for handling. The synchronous master-slave operation of two robots provides a number of benefits: The billet is initially gripped at both ends and then synchronously cycled through the individual forging operations in the impressions. This allows to forge safely and remove longer blanks in multiple die cavities configured in a row.

Increase quality and reduce costs

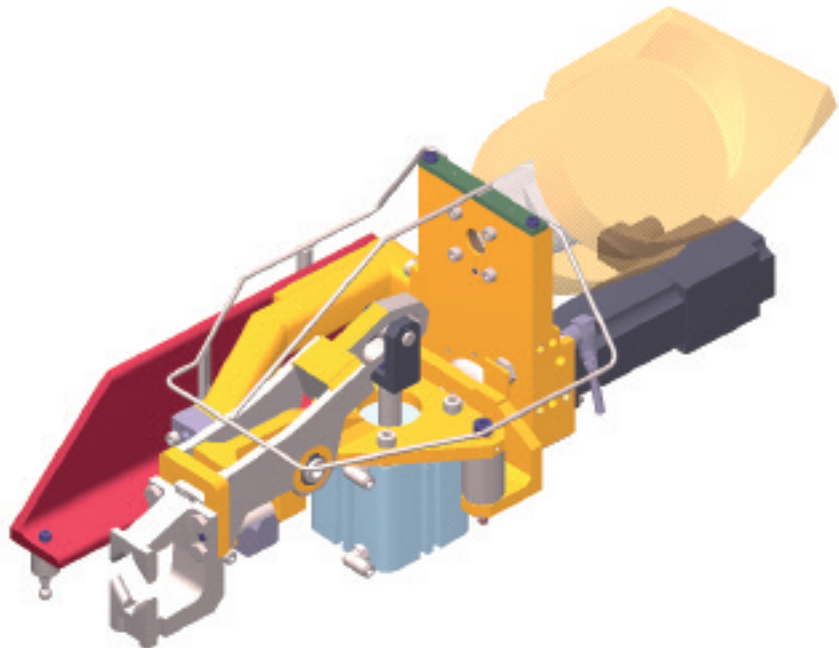
Complex requirements

The forge grippers have to fulfill complex requirements:

- safe positioning in the impressions
- safe absorption of acceleration forces and relief of robot axes
- compensation for changes in the length of the billet
- deliberate release when the billet adheres to the upper die
- general suitability for the demanding working environments which exist in the forging industry

Programming

The overall system is programmed via a special user surface on the central process control. The programmer enters the essential parameters and only a few points are taught during die installation. The actual programming of the robot is taken over by the master control.



The patented gripper from LASCO is the key to automation of die forging hammers.

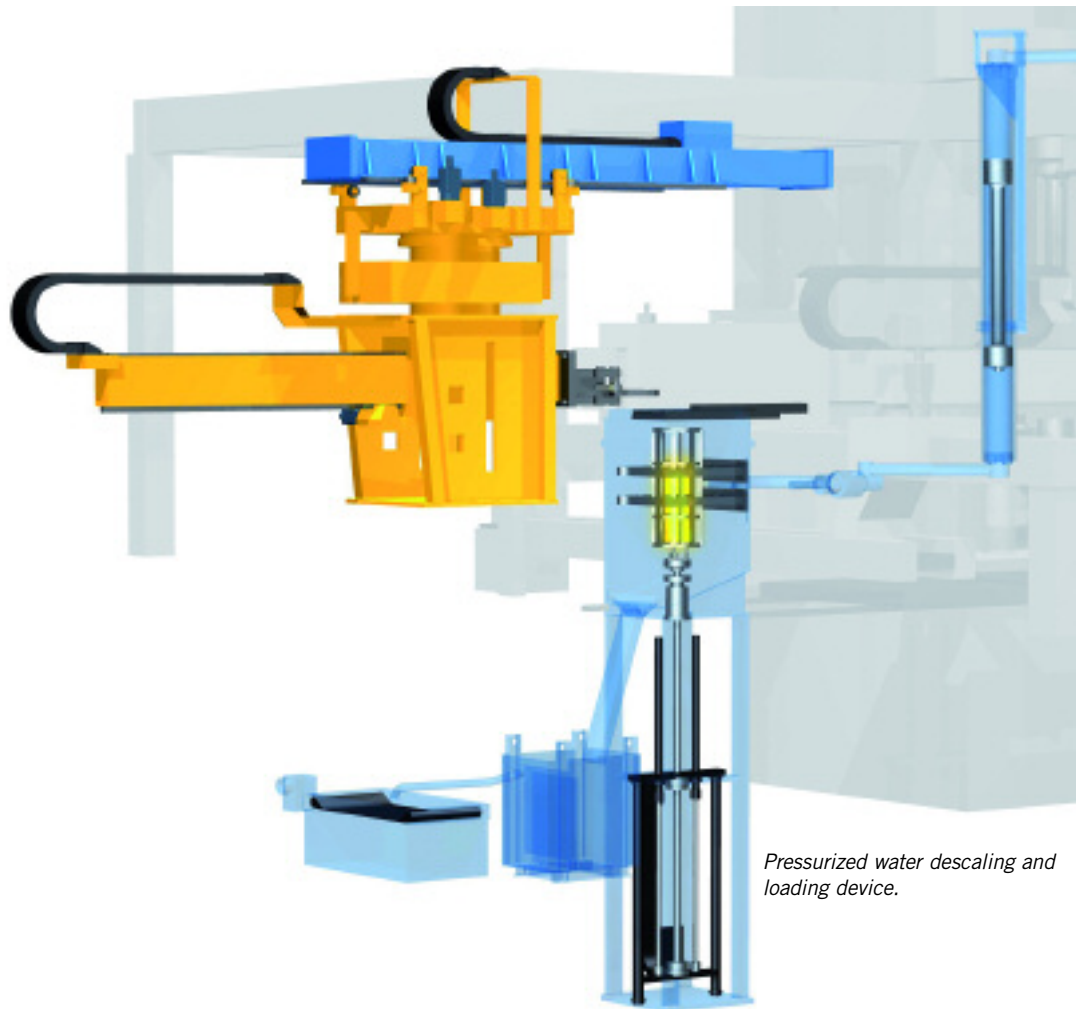
Benefits

The possibilities for installation of a forging line are just as diverse as the parts to be manufactured. The main advantages of automatic hammer forging are:

- process stability
- exclusion of positioning errors
- savings in personnel costs
- increase in output
- increase quality of the forged parts
- reduction in scrap rate
- enhancement of multiple impression forging

Steel bottle production

Fully automatic steel bottle production - a new era in quality levels with optimum descaling using pressurized water



Pressurized water descaling and loading device.

Square billets brought to the line on pallets are singled-out and placed in a rotary hearth furnace by an automatic feeding device. The rotary hearth furnace cycles the blocks to the discharge port where a suspended manipulator removes each individual block to a de-scaling station. After descaling, the same manipulator transfers the blocks to the piercing press. During two pressing cycles, with intermediate and automatic shifting of the punches, a bowl-

shaped workpiece is formed. The quality of the pre-form at this stage is vital. A second suspended manipulator transports the hot workpiece to the second press in the line for drawing.

The LASCO forging line is equipped with fully automatic lubrication, cleaning and cooling systems for all tooling stations. A third manipulator removes the bottle workpiece from the stretching slide in the drawing

press and places it on an elevator with which it is lifted to a size-checking station and then loaded onto a cooling conveyor.

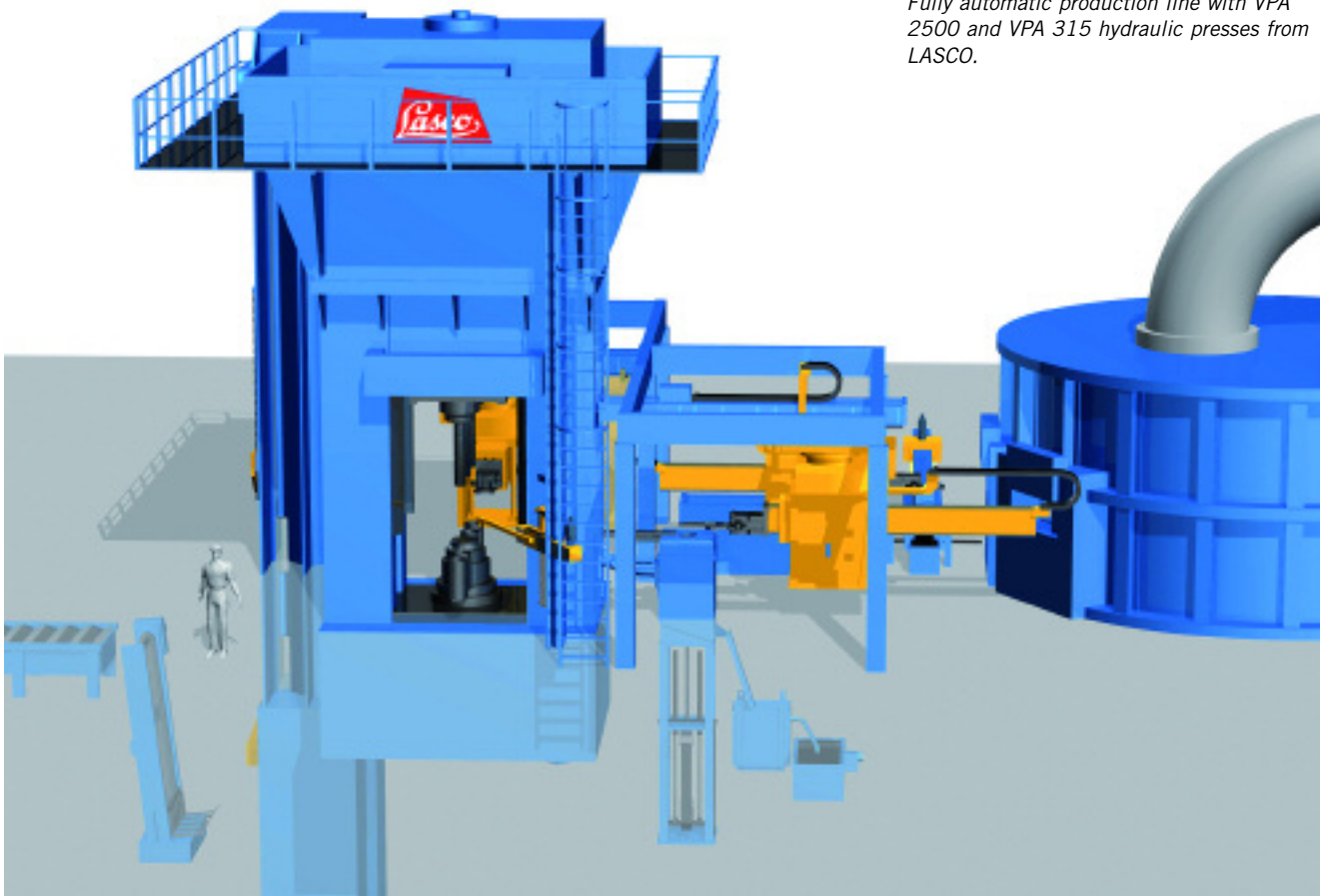
Special advantages of this production line:

Pressurized water descaling technology frees the blank of scale and ensures a smooth surface prior to pressing, an important factor determining the quality of the final product.

Precision, tempo, innovation



Fully automatic production line with VPA 2500 and VPA 315 hydraulic presses from LASCO.



Hydraulic VPA 2500 LASCO press with loader.

Linked processes

Production line for axle tubes

After induction heating, descaling and rounding of the edges in a roller-sizing unit, the square blocks are passed through a piercing and drawing press. When the exact diagonal dimensions have been established, piercing, drawing and reverse extrusion operations follow.

Before stretching and sizing of the base thickness with the drawing slides located at the side of the press, the inside of the form is descaled. The finished part falls to an elevator via a chute by which it is lifted to a cooling conveyor.

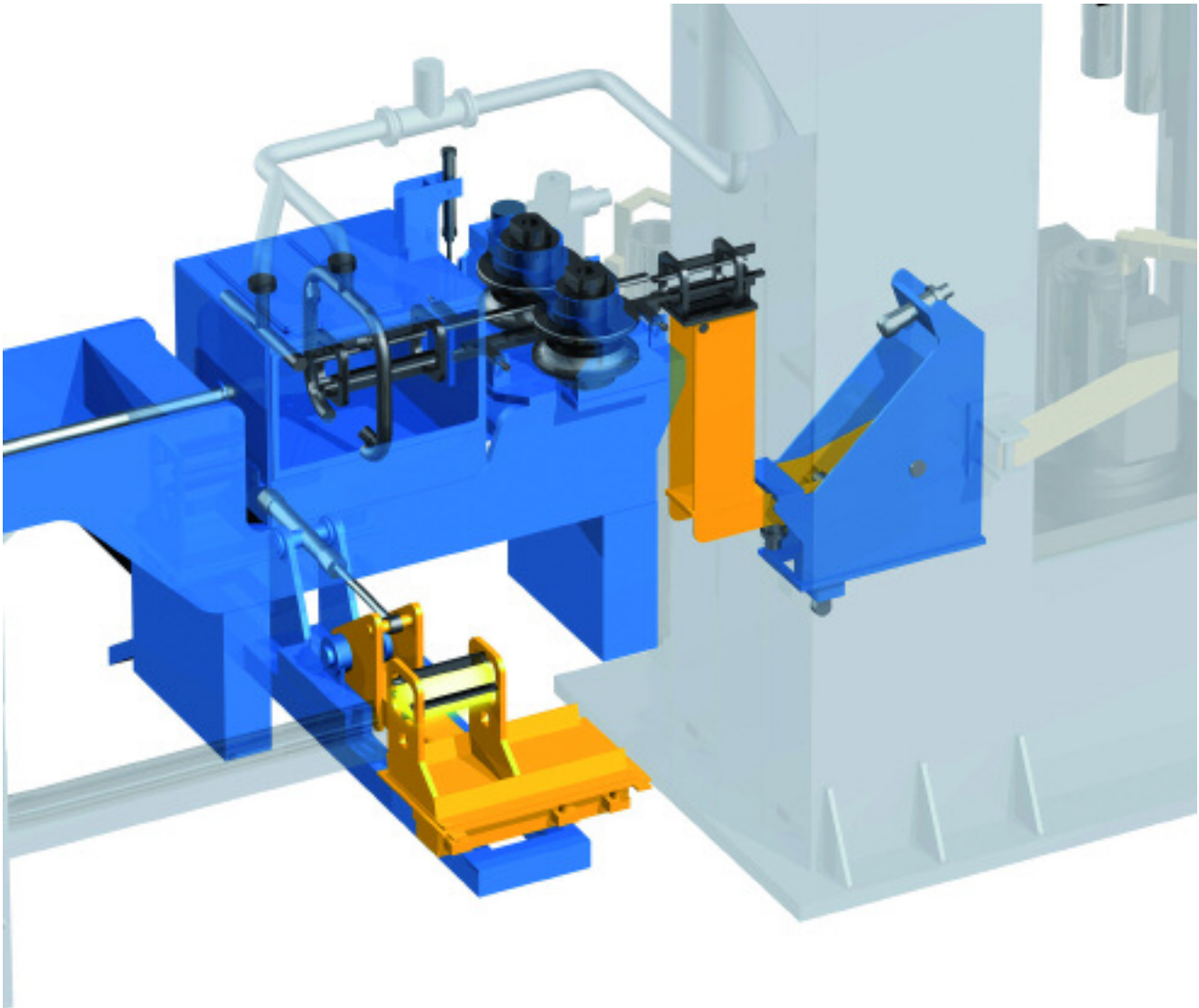
Special advantages of the line:

The inclusion of the roller-sizing unit allows the use of either round or square material. Central control of all system components in the line, including the furnace, simplifies operation and control considerably.



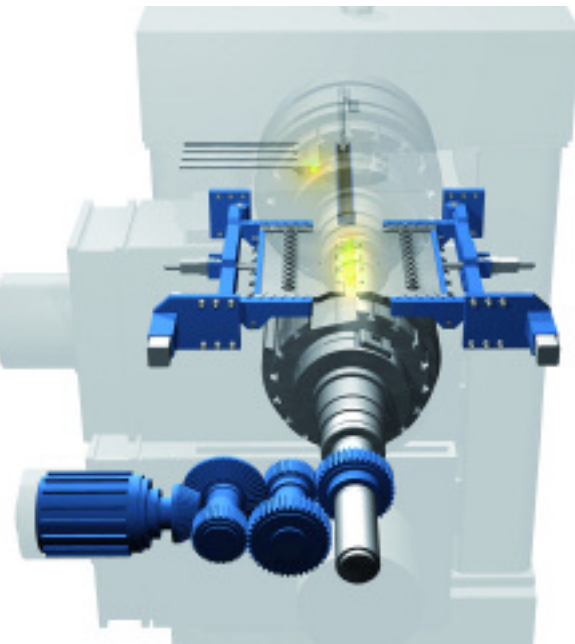
Automated LASCO VPZ 500 piercing and drawing press.

Forging axle tubes



Combined pressurized water descaling and roller sizing station.

Preforming with forging roll and cross wedge roll

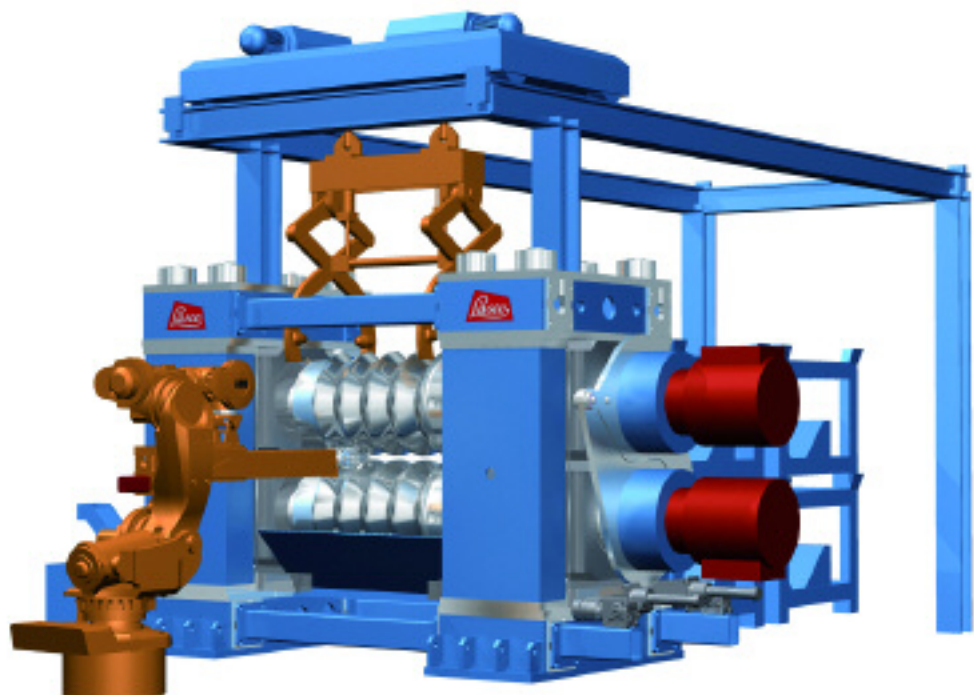


Single roll drive (here: QKW).

Efficient material distribution with a highly flexible spectrum of applications

The forging industry demands for economical metal distribution and solid metal forming to practically final contour sizes. LASCO is able to meet this demands with its own machine concept for automated preforming operations using rolling techniques, ensuring the most effective use of material and repetitive quality of the final forming operation. With its QKW and RCW series of machines, LASCO can supply cross wedge- and forging rolls specially designed

for use in highly flexible automated lines. The cross wedge roll is designed for the forming of round material, and square material can also be processed on the forging roll. In certain applications, one machine may be used for both processes. Because of the narrow final tolerances achievable, they are also suitable for use as main metal forming machines, for example, for stepped rotational shafts or wheel hubs.



LASCO RCW forging roll with a freely programmable robot working as manipulator (carrying the stretch gripper).

Innovative overall concept

Common features QKW and RCW

- high frame rigidity
- two independent servo motors drive the rollers
- hydraulically clamped roll shafts
- short tool change times (less than 20 minutes)
- roller change without auxiliary tools
- measurement and automatic correction of the roller gap under operational load
- high parallelism in the roller gap
- large range of adjustment of roller gap
- reliable repeatability of all engineering parameters
- adjustable and programmable deformation speed, depending on the roller angle

Optional components

- automatic roller changing device
- setting up device for automatic roller change
- temperature compensation (heating/cooling) of the rollers (cross wedge roll)



LASCO cross wedge roll QKW with automatic positioning device.

Automation

Heated billets are automatically put in the **cross wedge roll**. Positioned in prismatic slides, the billet is precisely put between the two rolls by a servo driven insertion bar without the loss of temperature.

For the **forging roll**, a freely programmable robot is used as manipulator (carrier of the tongs). To shorten cycle times additionally, it can be coupled with a rotary table for positioning the billets in front of the manipulator.

Highly flexible stretching manipulator

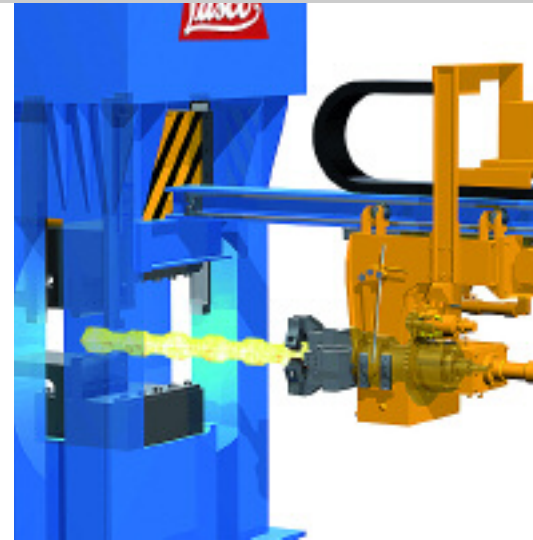
Preforming concept especially suited to smaller series production

An automated hydraulic press reduces the crosssections of the heated workpieces between two stretching saddles.

The workpiece is automatically rotated and repositioned between each pressing stroke until the part has been correctly formed. Finally, the manipulator lays the part aside.

Special advantages of the manipulator:

As no product-specific tools have to be used, the system is highly flexible and suited to small series production. Because of the simply formed tools used and partial billet shaping (low pressing force), this concept can be realized with relatively small investment. The contours of the pre-form geometries to be achieved are determined on the display and can be saved.



The working space of stretching manipulator in a LASCO VPE 250 press with gripper.



LASCO AR 250 stretching unit consisting of a VPE 250 hydraulic press and a stretching manipulator.

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