



OMERÀ Mechanical Presses

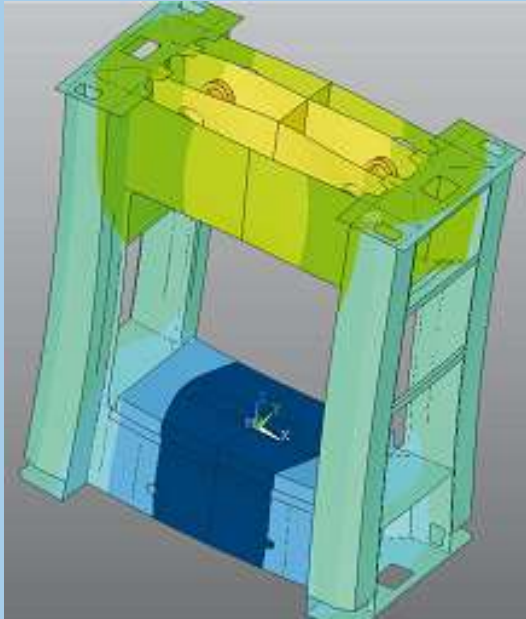
design criteria

Ferraro Valerio – Sales Manager

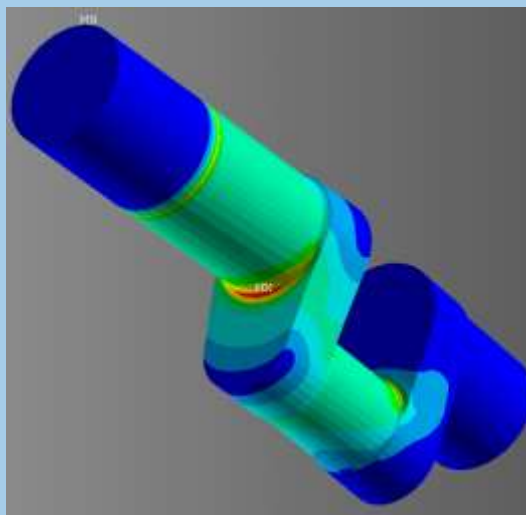
Mechanical Presses

Technologies - Structural Robustness

Omera Mechanical Presses were widely known for their reliability and robustness. This tradition represents now a new challenge for engineers and technicians involved in the developing of new Omera machines.



FEM Analysis of the frame



FEM Analysis of an eccentric shaft

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/EXT: i,20         | (Real Constant 13) spessore capello superiore
/EXT: vk,20        | (Real Constant 15) spessore lamiera laterale montante
/EXT: vr,80        | (Real Constant 10) spessore piegato
/EXT: y,41         | (Real Constant 17) spessore piastra appoggio cilindro principale
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/EXT: s,30         | (Real Constant 18) spessore rinforzo in y cilindro principale, a quota 004
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FEM Routine

Mechanical Presses

Technologies - Structural Robustness

Similarly to hydraulic presses, also for mechanical ones, rigidity levels are checked in order to verify calculations and assure customers requirements.

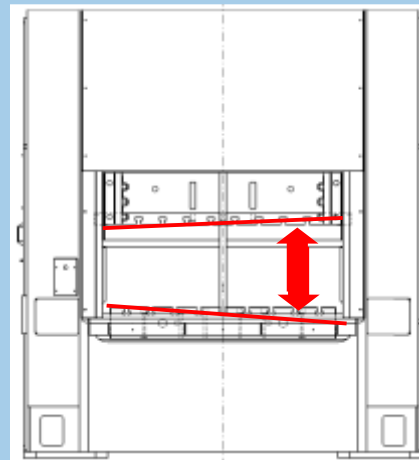
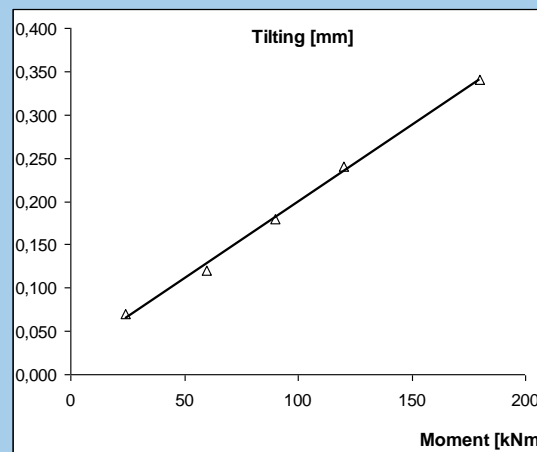
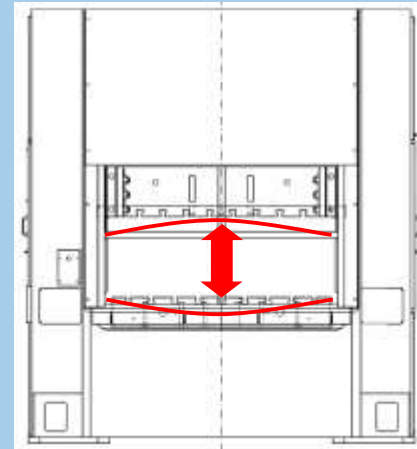
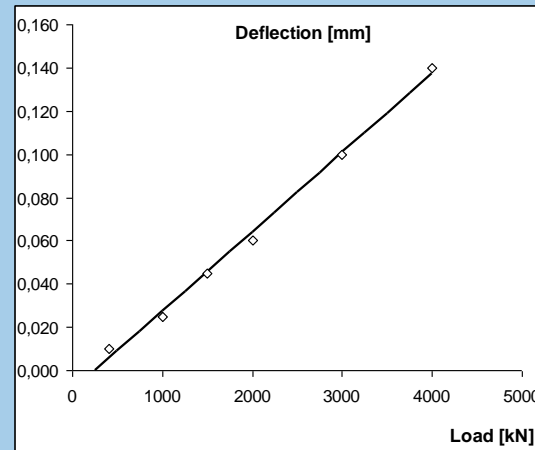
Even if, the deflection value in the offers is 0.17mm/m the real value often ranges from 0.14 to 0.13mm/m.

Accurate FEM calculations allows enhanced rigidity levels with the same weight.

Mechanical presses having 2 or 4 connecting rods present very low tilting deflections.

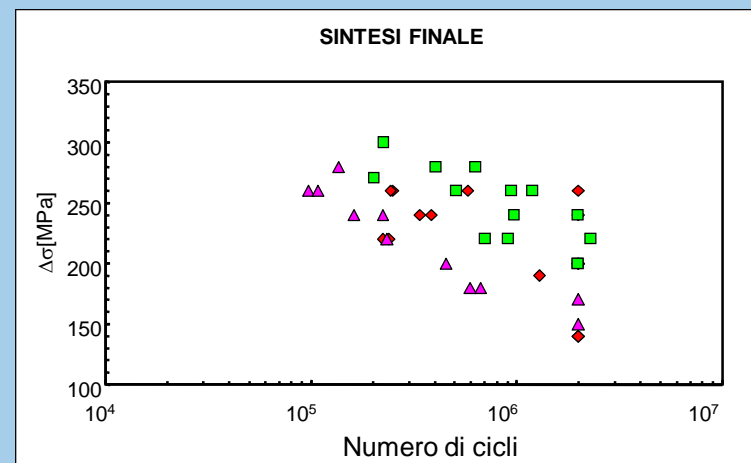
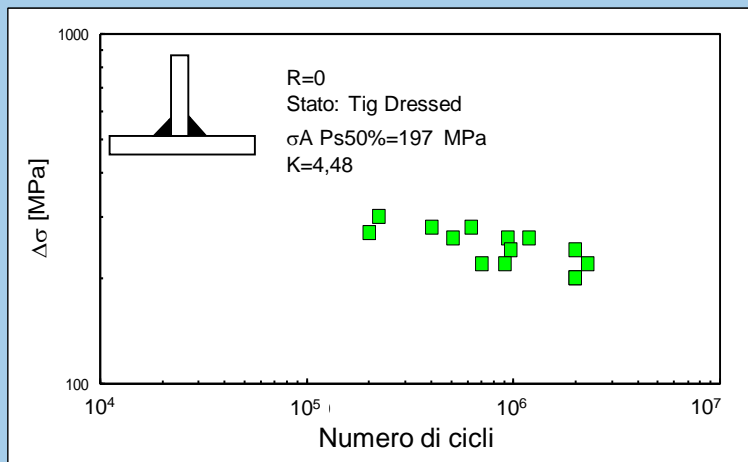
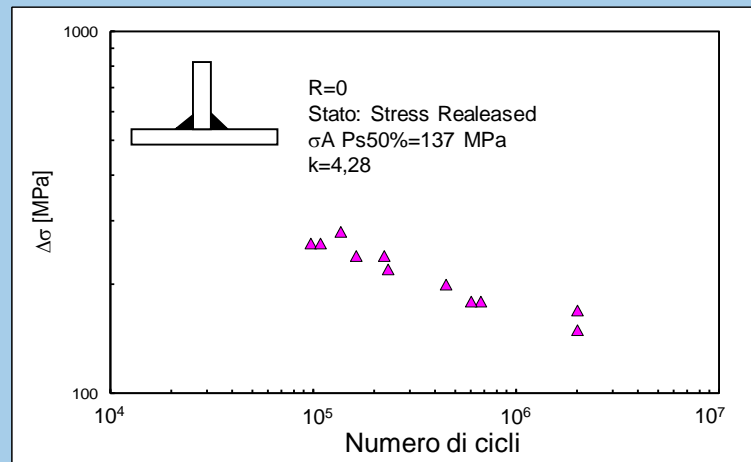
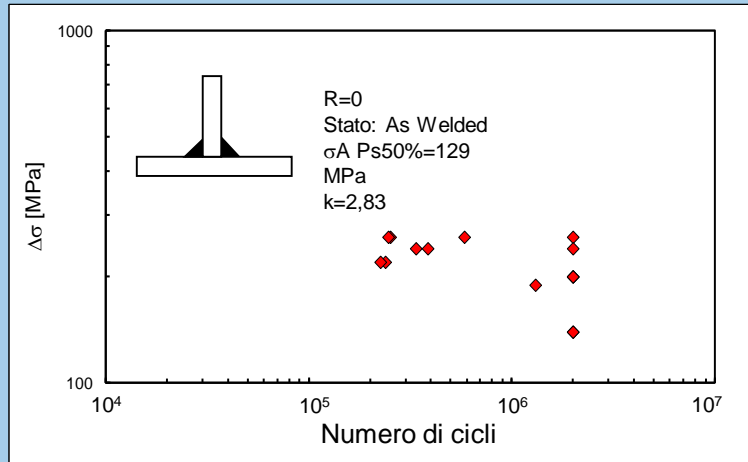
In those cases the tilting limit of 0.15-0.2mm/m can be easily reached.

Also for machines with only 1 connecting rod, in any case is possible to match value close to 0.35-0.4mm/m by adopting suitable structural solutions.



Mechanical Presses

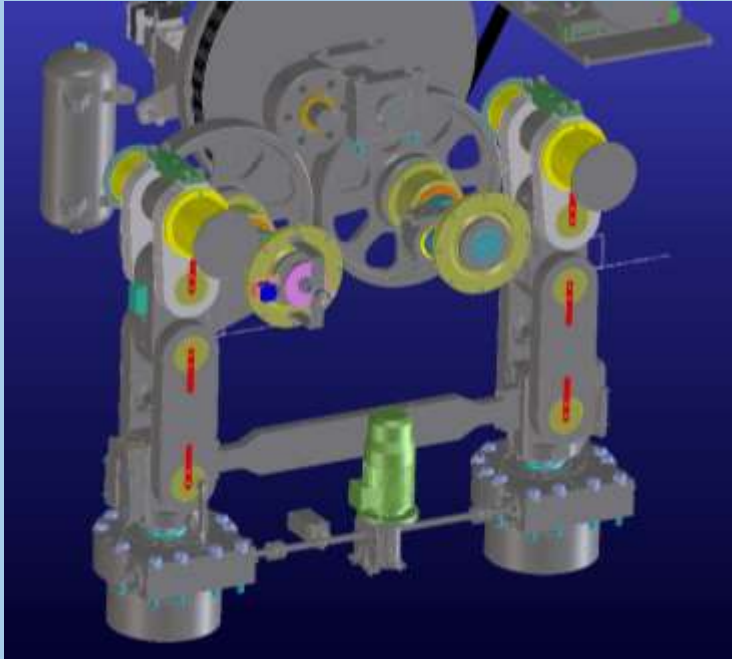
Technologies - Structural Reliability



Advantages of AWT - TIG dressing treatment has been extended to mechanical presses. In this case, fatigue failure improvement to significant enhancements in structural reliability.

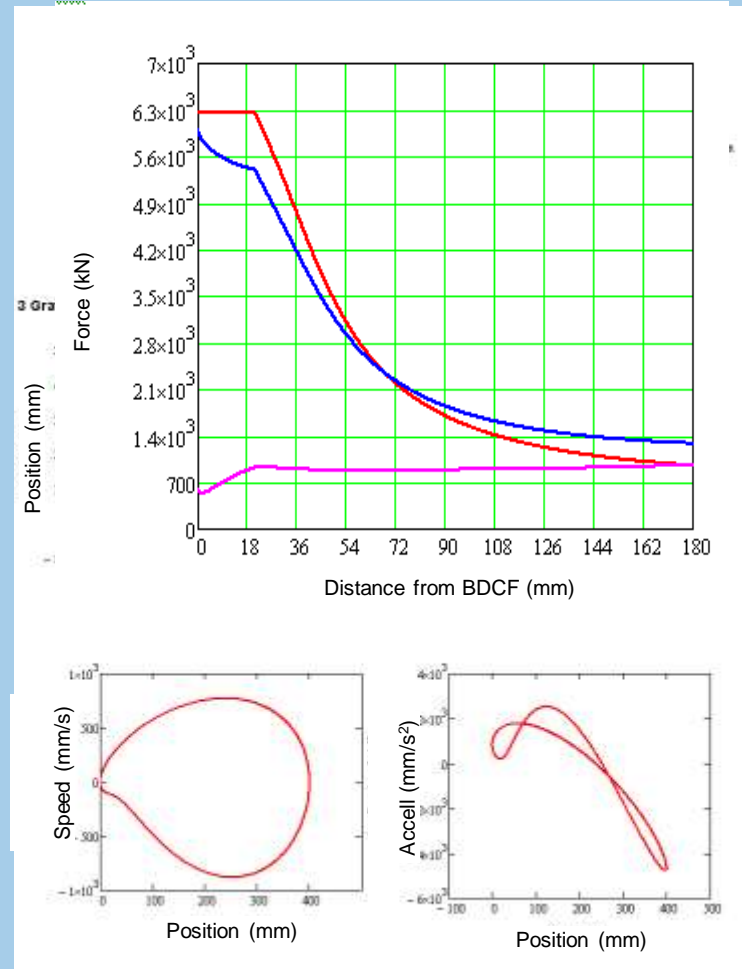
Mechanical Presses

Technologies – Cinematic Analysis



On the basis of Mathcad software Tech. Dept. has also developed a tool for cinematic analysis of complex systems like Link Drive or Soft Blanking.

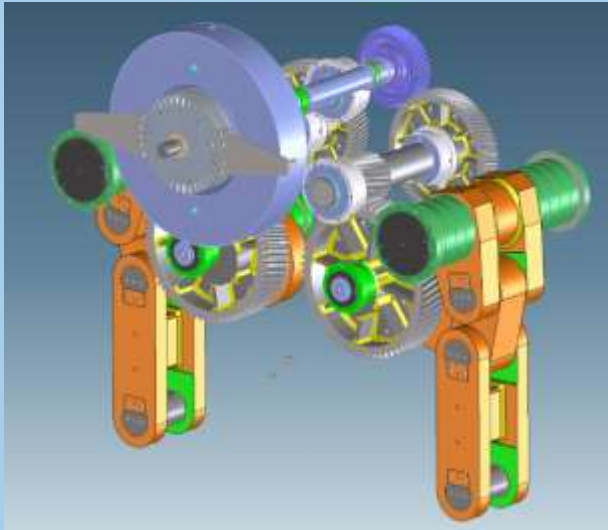
With respect to other solutions, this choice allows us to investigate not only position speed etc, but also the forces distribution lubricating conditions, inertia effects etc.



Mathcad Cinematic
Analysis

Mechanical Presses

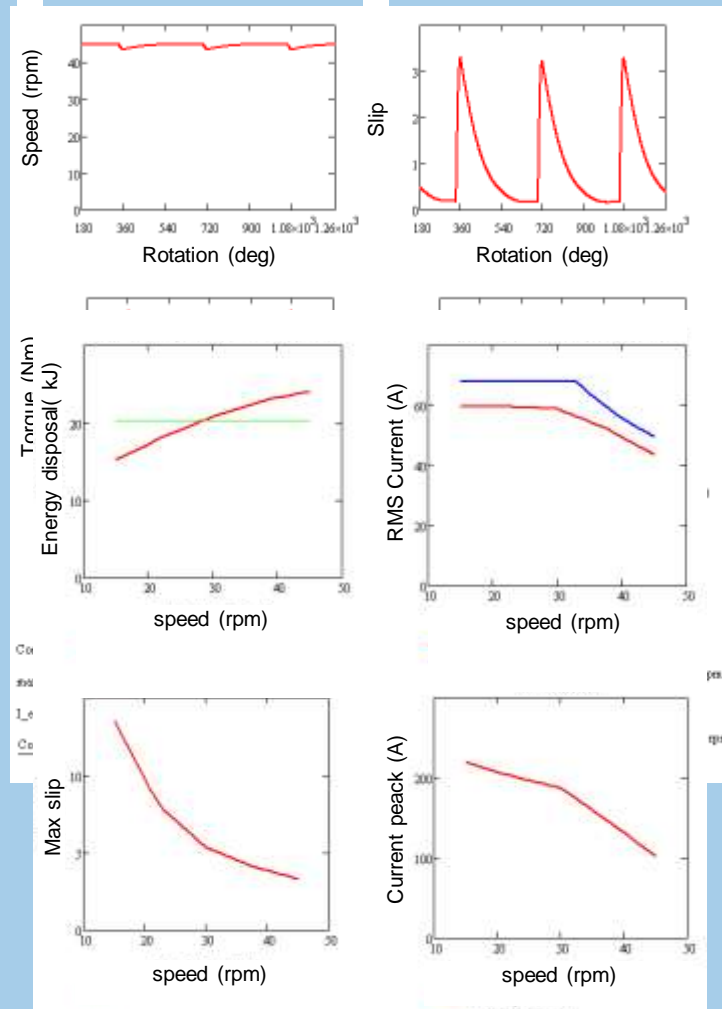
Technologies – Dynamic Analysis



The motor – flywheel dynamic is investigated by means of a set of differential equations, solved by high level mathematics software.

As a result, it is possible to give accurate predictions of Energy disposal both in automatic and single stroke mode.

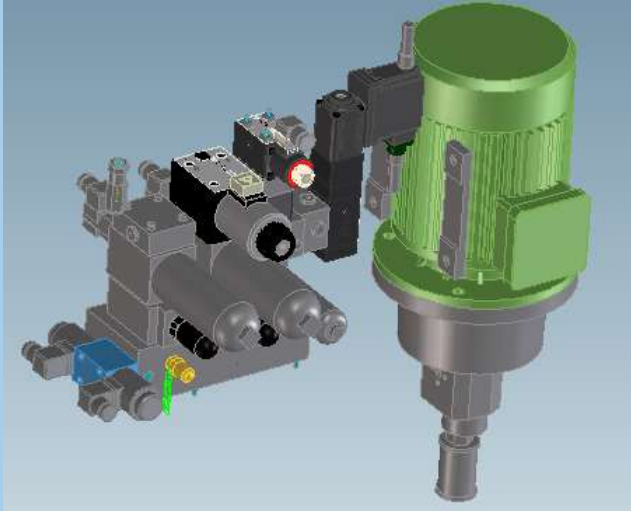
Moreover, an better knowledge of torque and current lead to a correct choice of motor and inverter.



Mathcad Dynamic Analysis

Mechanical Presses

Technologies - Auxiliary Functions



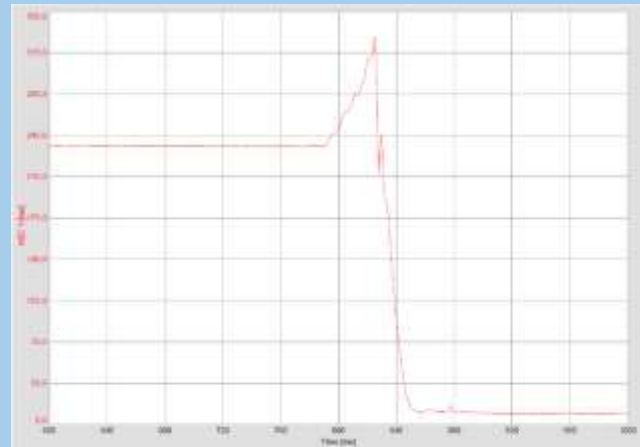
Omera knowledge in hydraulics has lead us to adopt this technology to realize any functions.

As a standard solution, in straight side presses, lubricating and the automatic hydraulic anti over load device are powered by a unique hydraulic power pack.

Proportional hydraulic valves are used in order to have an accurate control of over load force.

Similarly, balancing cylinders are also controlled by a proportional pneumatic valve. In this case, the pressure level is set by the PLC on the basis of speed, mass of the die, cinematic law.

Hydraulic power pack, in addition to proportional valves, could be also adopted in order to realize a basic of micro inching function.



Mechanical Presses

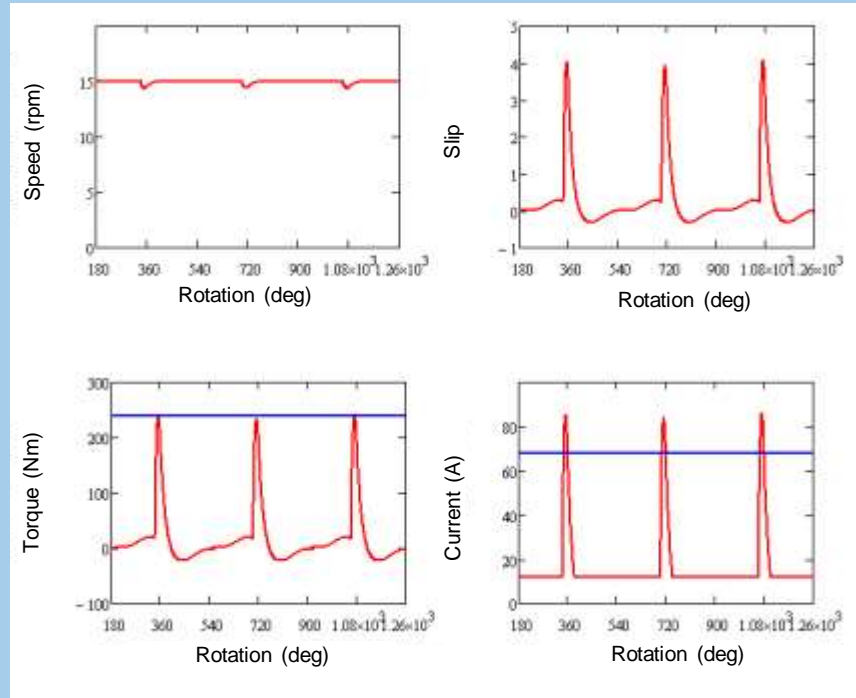
Technologies – Energy Savings

The basic architecture of classic mechanical presses, does not offer many chances for energy losses reduction.

Energy saving solutions can be easily adopted for the auxiliary functions but the amount of energy recovered is negligible.

An interesting area has been shown by accurate investigation of motor-flywheel dynamics.

Balancing cylinders produce a negative torque during the falling stroke, while they give an accelerating torque during the rising stroke.



Depending on the boundary conditions, such as, the speed of the ram, inertia of flywheel, torque of the motor, but especially at low loads and low speeds, the energy managed by balancing cylinders can be recovered or, alternatively wasted.

This condition will be investigated in the next year in order to introduce an efficient energy management of motor.

Mechanical Presses

Technologies - Electronics

Electronic control and programming represent a must for OMER standard.



Thus, it is clear that electronics and programming represent a very interesting field in order to assure a rapid improvement and a clear identity to our mechanical presses.

Our straight side presses are supplied with PLC version.

Anti over load force control, dynamic cams, automatic setting of balancing cylinders, speed and position of the ram are already present on all machines equipped by a PLC.

Acquiring data system will be available soon on the Siemens Panel 12".

Safety function are assured and checked in all models by a safety PLC by Pilz.

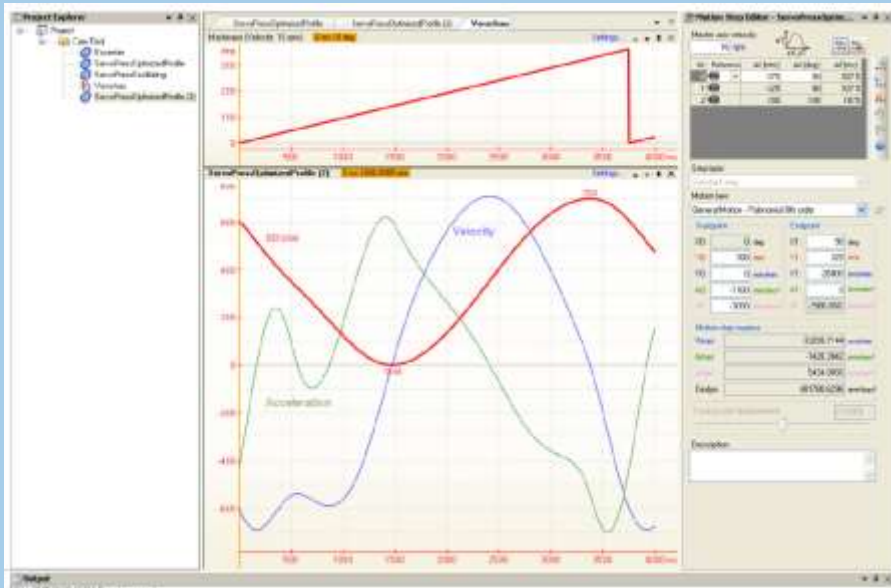
Mechanical Presses

Technologies - Electronics

Another challenge is due to a close integration between the mechanical press and its automation or feeding system.

The trend for Omera, in this field, is represented by the development of a new hardware /software platform useful to manage the whole stamping process.

This approach, has already become a standard for deep drawing lines with hydraulic presses. In those cases, Siemens PLC and profibus net has been adopted as standard.



Fast hydraulic and mechanical presses require fast PLC process and close loop control for speed and position profile management.

These capabilities can be probably match by adopting different hardware solution.

Rexroth MLC, already used in hydraulics seems to be suitable also for mechanical presses lines.

Mechanical Presses

Products - Straight Side Presses

On the contrary with respect to C framed presses, Omera engineers and technicians have been deeply engaged in modify the range of straight side presses.



Structural components are now, re-designed in order to reach a better cost/performance ratio, in any case rigidity and reliability result to be improved.

Assembly and machining result to be strongly simplified, the disposal of new resources allow us to move resources to the improvement of some other features, such as, the adoption of proportional control for the setting up of balancing cylinders and anti overload device, or the inspection platform.

New designed machines range, by now, from 130 ton monolithic frame machines to 1500 ton composite machines, both with modified cinematic or changing stroke system.

The rapid extension of new models range and the integration with feeding lines and automation represent, at the moment, the main guidelines for further developments.