DESIGN
ENGINEERING
MANUFACTURING
ERECTION
TRAINING
CONSULTING
SITE MANAGEMENT

CTS

CREATIVE TECHNOLOGICAL SOLUTIONS

INTRODUCTION

CTS Makina established in 2006 as an Industrial Heavy Machinery and Equipment manufacturing facility in order to serve for iron and steel sector with more than 30 years of experience.

CTS has reached the position and had the right to say by using resources effectively, as well as Turkish engineering and well-skilled labour power and became one of the leading heavy machinery manufacturing company in Turkey with a 20.000 tons/year capacity. The company is richly equipped with a heavy machining plate processing, welding and handling facilities especially is organized in manufacturing machinery for the Iron and Steel and Power Plant Industries in production plant in Izmir, Turkey.

CTS has manufactured, assembled, erected and commissioned the industrial plants and/or heavy machinery and equipment, in the field of;

- Iron and Steel Industry
- Power Plants
- Cement Industry
- Material Handling System and Cranes

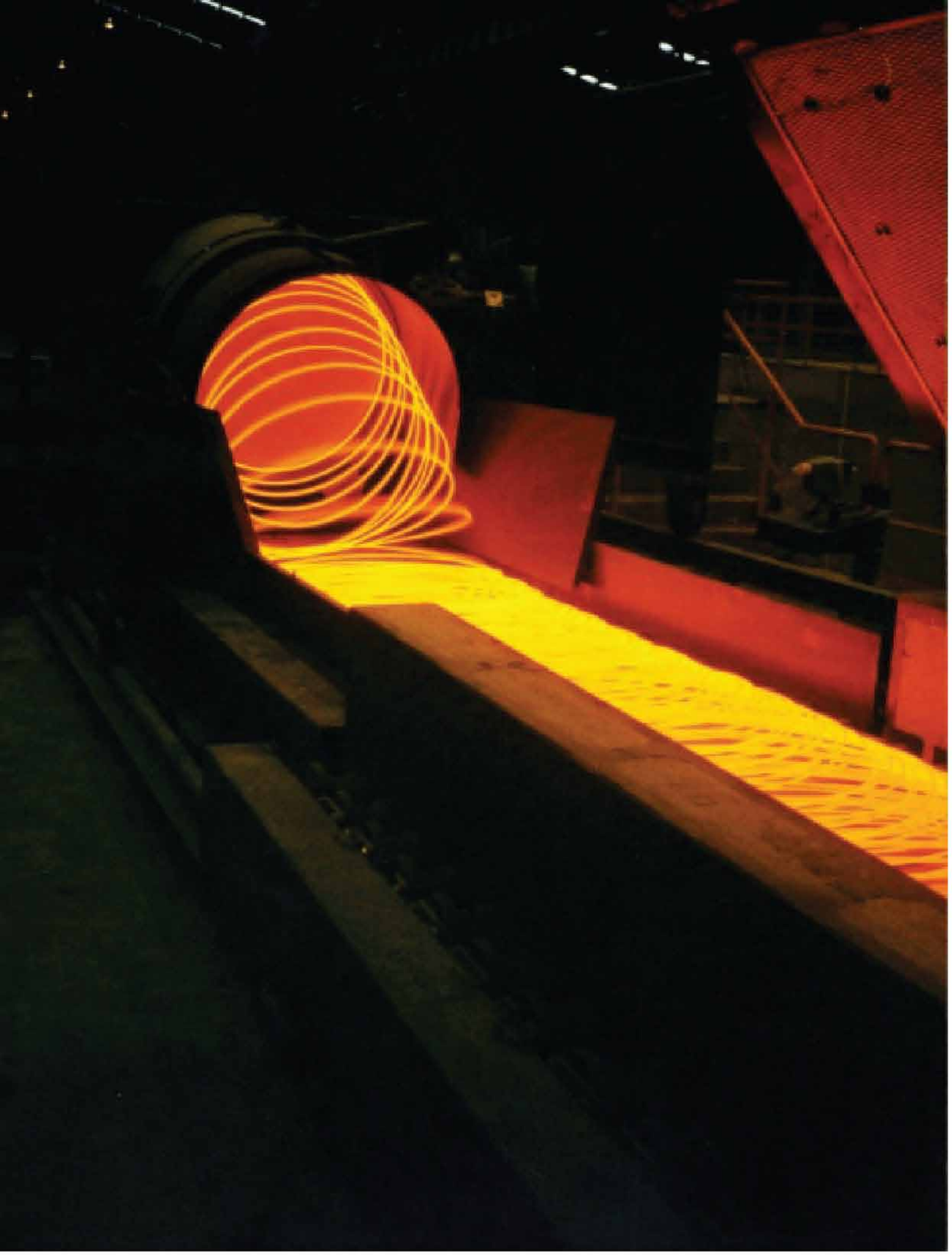
For requirements of national and international market, CTS Makina designs and commisions all kind of turn-key projects related to rolling mill and melt shop with the equipment are fabricated as per CTS's own plant. At the same time, not only turn-key projects, but also spare parts and some equipment are provided by CTS Makina and it generates the most suitable solution based upon the costumer satisfaction correspond to industry's conditions.

CTS Makina renders engineering and consultancy services to rewamping of current systems. In addition to the mentioned issues, decreasing of production costs and manpower by considering of practical solutions, latest technology and manifacturing on the national and international standarts are provided by cooperation with CTS.

CTS Makina accomplishes the establishment of project and engineering, incorporating contemporary suitable technology for general engineering of Iron and Steel Industries. When its necessary, collaborates with foreign companies who posses advance technologies on the issues of engineering, projects and production and is very proud of its contributions to our country in her fields of expertise and further technological deliveries to the foreign countries.

CTS's power and passion are formed by specialized workers and engineers with a modern machinery park. CTS Makina has achieved to catch quality above the world standards through its CNC Machinery Park and experienced staff. All products of CTS Makina are manufactured according to considered common in the world class standards, quality certificates which are carried import-export to domestic and overseas markets. CTS Makina has done all the products and equipment of turnkey Meltshops and Rolling mills, in the particular design and calculation results are selected according to determined resistance values.

With its engineering partner; MWE Magdeburger Walzwerk Engineering GmbH; CTS is two step away from competition. MWE was founded on 2001 to uphold the many years of German tradition maintained by SKET trough building plants and plant components for the rolling mill and metallurgical industry. MWE is experienced in relocating and revamping old plants as well as reinstalling and modernising them. Services provided by MWE also include project engineering, design, assistance with manufacture, supply and commissioning of plant sections for steel bar and rod mills.



The MWE - Magdeburger Walzwerk Engineering GmbH was founded 2001 to uphold the many years of German tradition maintained by SKET through building plants and plant components for the rolling mill and metallurgical industry.

MWE manufactures their high-grade products in a tailored and reliable approach, as fast as practical and meeting challenging requirements. Given many years of expertise, a marked quality awareness and a high-standard innovative power.

MWE provides one-stop services by supplying plant, equipment, technology and automation as an overall solution to satisfy the ever rising requirements to be satisfied by rolled products with respect to flatness, thickness tolerances and surface finish. The systems solutions MWE offers based on the comprehensive process expertise we boast. It is by supplying complete systems that we furnish to our customers the expertise and the experience we have gathered in the field of rolling mill automation. Product quality improvement, enhanced productivity, minimum maintenance requirements, and economic efficiency: These are the objectives addressed in developing our systems.

MWE supplies long-product rolling mills and their components for rolling wire, steel bars and profiles. State-of-the-art technologies are used therefore

- Rolling with high speed in mono and vario wire rod blocks
- Using state-of-the-art housingless mill stands
- Flying shears with speeds up to 40 m/s
- Garret coilers and winding technologies up to 35 m/s
- High-speed delivery systems for cooling beds
- Thermocoil® water-quenching technology for wire rods and small section products
- Using industrial robots for handling rolled material
- Developing rolling technologies with help of software systems for pass design developed by MWE
- MWE is experienced in relocating and revamping old plants as well as reinstalling and modernising them.

Quality : Advanced CAD systems and a consistent quality management according to DIN EN ISO 9001:2010 pursued in project engineering, design, manufacture, erection and commissioning of equipment are adapted to guarantee that cutting-edge quality requirements are met to our customers' satisfaction.

Flexibility : Being a medium-sized company with a flat management hierarchy and a customer-related business organisation enables us to respond very quickly to changed requirements and wishes of our clients.

PARTNER
MWE MAGDEBURGER WALZWERK ENGINEERING GMBH

WHY CTS?

• CTS is experienced to work not only read from already designed projects on hand but also able to work on designs and execute them to fully support customer demands,

• From inquiry to transfer of project, CTS aims to reach full satisfaction of its customers,

• For turn-key projects CTS guarantees its design and equipment. Consumption figures such as; fuel, water, electricity, lubricants, compressed air and even spare parts are guaranteed to be within the promised range,

• CTS designs the projects in house with its well-experienced research and development team,

• CTS manufactures and assembles the equipment in house as well thanks to its wide machinery park and skilled personnel,

• CTS works only with the best vendors all around the world to serve its both national and international customers,

• CTS's working principle is focused on customer satisfaction with innovation and the latest technology therefore CTS serves its customers with all kind of after sales services such as technical consulting and supervision,

• Manufacturing is performed fully in accordance with the customer projects which material certificates and quality control inspection reports are served at the end of the work,

• CTS claims to be the sole address with best quality and competitive prices since CTS provides; Creative Technological Solutions.

QUALITY POLICY

CTS Makina answers the costumer's requests consisting of investment planning, machinery and technical support with the low production costs and high flexibility which improves the quality of the finished products. Decreasing of production costs and manpower by considering of practical solutions, latest technology and manufacturing with the national and international standards are provided by CTS's targets which proceeds on its way are;

• Revision of exist systems and if needed, to build up new systems according to the costumer requirements

• Designing new products by means of R&D applications and technics for quality fabricating

• Execution of innovated techniques in the field of R&D studies on projects

• Application of known and developed quality procedures and requirement

• Manufacturing of high quality products considering customer satisfaction

ENGINEERING

The world steel production landscape has been changing dramatically since the 1980s. One notable trend is for firms in industrialized countries to reallocate iron and steel production facilities to developing countries.

CTS Makina, by co-operating with internatonal companies in the application of up to date technologies, has already upgraded its rank as one of the leading companies in Turkey in the field of heavy machinery. CTS performs project and engineering services incorporating contemporary high technology for general engineering and design of steel mill equipment, cranes, material handling equipment and also cement industry. By co-operating with internatonal companies in the application of up to date technologies.

CTS Makina has an extensive knowledge of the Iron and Steel sector with working with some of largest Iron and Steel companies in the world, CTS has executed major projects from feasibility through to site support to oversee fabrication, installation and commissioning.

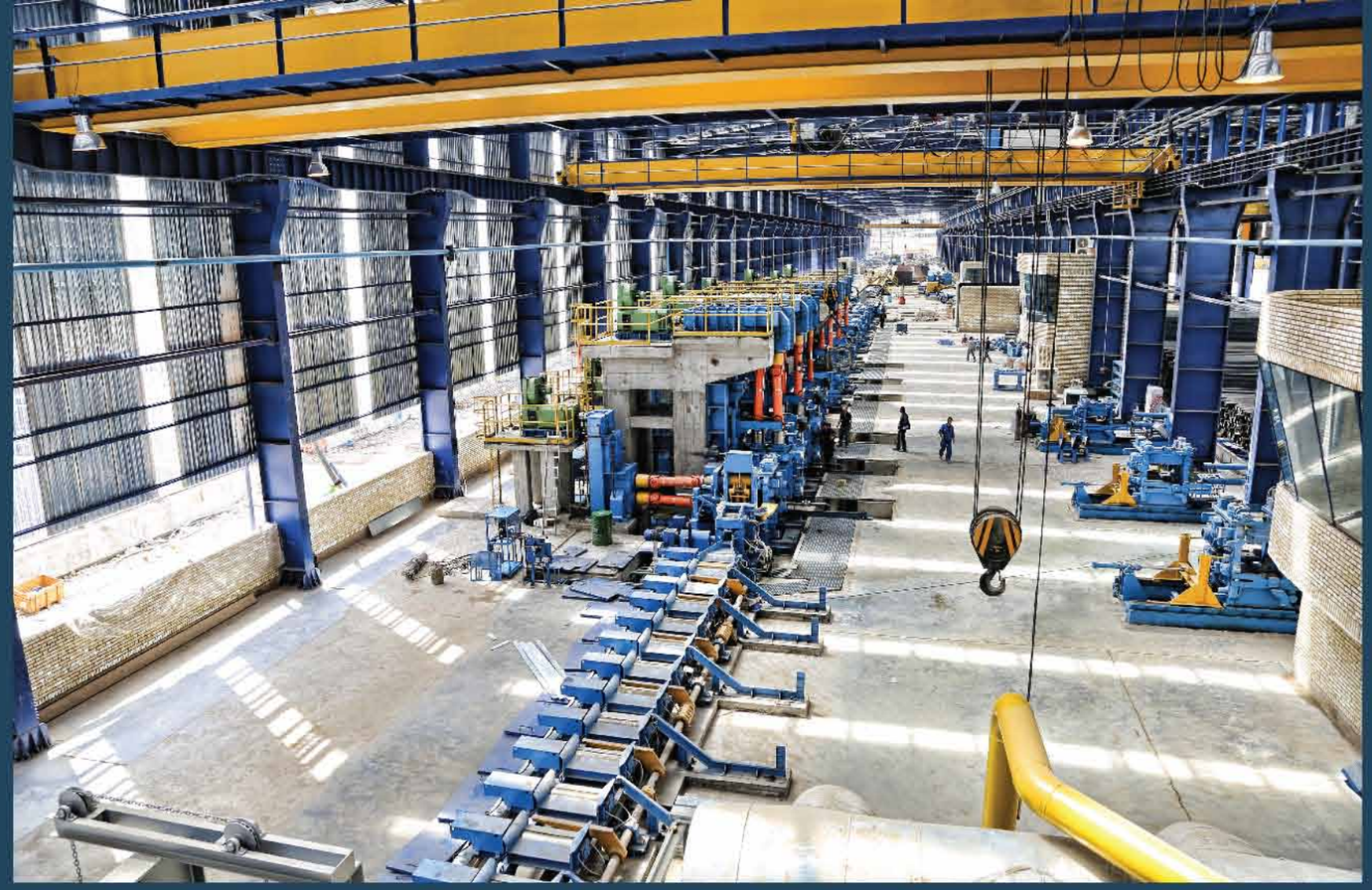
CTS Makina is proud of its know-how and experience. Invest in R&D and believe in our engineering prowess. From a simple piece of equipment to the most complicated turnkey project, CTS Design Team offers efficient and feasible solutions to our customers.

Our systems are designed according to the 3Q concepts: Quality, Quantity and Quickness. According to this; CTS's goals, which are focused on satisfying our customers' needs and requirements.

- Quality - Excellence in quality and product quality certification
- Quantity - High productivity
- Quickness - Quick response to market demand

CTS' engineering department aims the following main objectives;

- Minimum operation and maintenance costs
- Optimal utilization of spaces inside/outside the rolling mills / meltshops
- Automatic operation, "hands-off" type
- Environmental respectfulness
- Maintenance friendly operation



TRAINING AND CONSULTING

Whenever CTS receives an order for steelmaking equipment, engineering services and know-how transfer are mutually agreed upon between both parties. Thanks to our experience, there is no question that we know that this is fundamental basis for succesful production equipment. The second step of know-how transfer is an off-site training of customer's engineers, technicians and skilled workers.

• The main target of training on the customer's site is to familiarise their personel with hands-on operation of the supplied machines and equipment.

• The operators and maintenance personel are trained step by step to prepare them for successful operation of the equipment.

ERECTION AND CIVIL WORKS

For erection engineering, site management and site monitoring, our professional handling of the site ensures the quality of the plant and guarantees adherence to both the budget and the schedule.

Erection / Civil Works engineering & site management
Cost estimation for site management and execution of Erection / Civil Works
Preparation of time schedules for greenfield and brownfield projects
Preparation of site organization, site regulations and safety rules
Preparation of tender documents for the execution of Erection / Civil Works
Final accounting of subcontractors
Enforcing safety rules and site regulations
Follow-up of progress and budget
Assuring quality requirements
Consistent coordination with customer

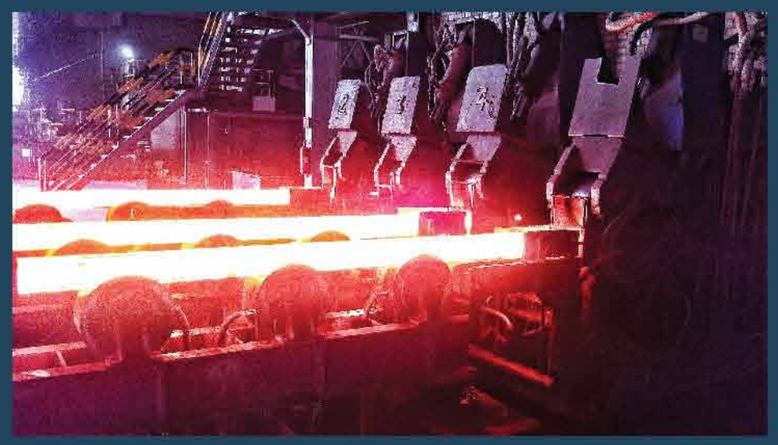
ACTIVITIES FOR TURN-KEY SOLUTIONS

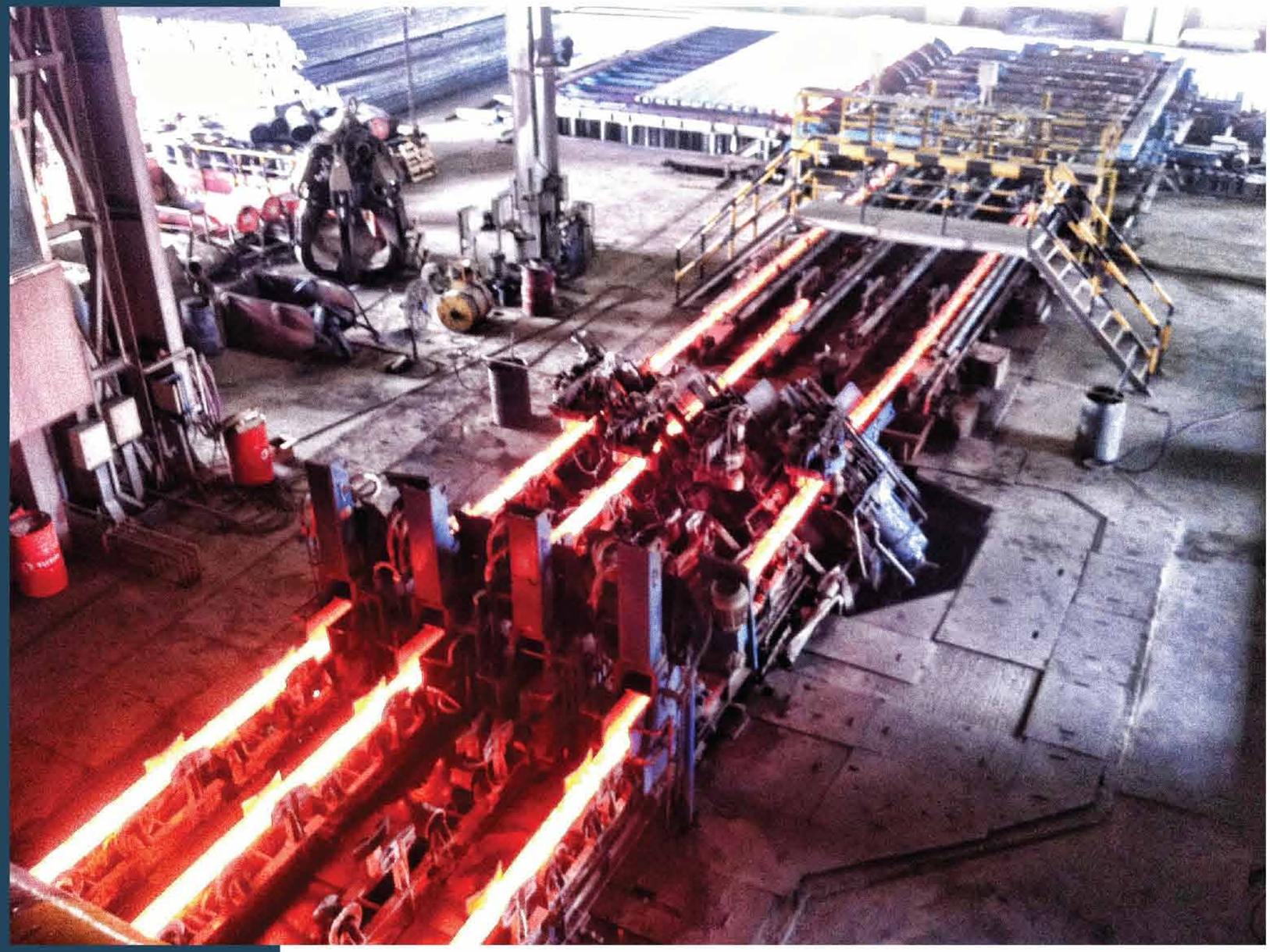
As a turn-key plant specialist and thanks to our experts and qualified engineers and technical personel capable of the developing and executing projects as;

- Turn-key Bar Mills
- Turn-key Section Mills
- Turn-key Wire Rod Mills
- Turn-key Meltshops
- Revamping of Existing Plants
- Training and Consulting Services
- Erection Services
- Supervision Services

In CTS's workshops, the company performs following actions with care in order to present best quality machinaries to the customers as the company's motto is customer satisfaction and CTS is the factory which make factories.

So the company, supplies rough materials all around the word and pre-manufacturing processes such as coating fully in accordance with customer demands; machining of the parts under requested tolerances and specifications; workshop assembly and post-assembly tests in order to ensure the performance of the equipment; fully support customer as per its demands during the whole project.





ROLLING MILLS

CTS Makina offers a full range of solutions for increasing capacity and quality. CTS uses its experience and proficiency to supply engineering services and components of Rolling Mills. CTS designs and manufactures rolling mill equipment from furnace to packing and bundling area. Including;

- Reheating Furnaces
- Rolling Mill Train
- Cooling Bed Area
- Packing and Bundling Area

CTS also supplies all kind of rolling mills

- Bar mills and merchant mills
- Sections mills
- Wire rod mill

ROLLING MILL TRAIN

- Pinch Rolls
- Rolling Mill Stands (Two/Three High, Housingless / Universal / Classical Stands)
- Rolling Gearboxes
- Shafts, Shaft Holders and Couplings
- Loopers (Vertical / Horizontal)
- Rolling Guides
- Crop and Cobble Shears
- Snap Shears
- Flying Shears
- Controlled Quenching Systems

REHATING FURNACES

- Walking beam furnaces
- Walking hearth furnaces
- Pusher furnaces
- Rotary hearth furnaces
- Bogie type and chamber furnaces
- Furnace Charging and Discharging Area Equipment
- Furnace Billet Feeding Station (Chain / Pawl Type Feeding Stations)
- Charging Roller Table
- Billet Charging Pusher Type
- Furnace Discharging Equipment
- Furnace Exit Pinch Roll
- Furnace Exit Roller Table (With Chain Transfer)
- Billet Rejecting System

COOLING BED AREA

- Pinch Rolls
- Cut-to-length finishing shears
- Connecting Roller Table
- Run-In Roller Table Equipped With Aprons
- Cooling Bed (Rake type / Chain Type / Twin Channel)
- Cooling bed entry side equipment
- Cooling bed exit side equipment (Chain conveyor or Take-Out System)

PACKING AND BUNDLING AREA

- Cold Shears (Entry / Exit Transfer System)
- Take-In Car System
- Packing Chain Conveyor
- Bundle Forming Station
  - *Semi-Automatic Binding Machine*
  - *Full Automatic Binding Machine*
- Automatic Weighing and Bundle Collecting System
- Straightener Machines

In turn-key basis the company only works with the best vendors and share know-how in order to supply for its customers. Also the company designs and manufactures;

- Electric and Full Plant Automation
- Furnace Automation
- Water Treatment Plants
- Hydraulic and Lubrication Units
- Cranes
- Laboratory and Workshop Equipment

BAR AND MERCHANT BAR MILLS

SINGLE-STRAND HIGHSPEED BAR MILL

This mill ideally combines limited investment cost and simplicity with high productivity, a solution guaranteeing the fastest return of investment. Generally these mills are sized for a medium range production up to 500,000 tpy. The typical product sizes range from 8 to 32 mm diameter round and rebars, which are the predominant sizes in commercial bar rolling. The layout mainly consists of:

- Reheating furnace
- Roughing mill, with stands of cantilever or housingless design, in alternating horizontalvertical arrangement with quick-changing device
- Intermediate mill, with stands of housingless design, in alternating horizontal-vertical arrangement with quick-changing device
- Finishing block
- Quenching and self-tempering facilities
- Cooling bed
- Finishing facilities with cold shear, bundling system with bar counter and wire tying machines

SLIT ROLLING BAR MILL

This bar mill operates at relatively low speed in multiple lines, normally consisting of 2 to 4 strands, with a common starting material stock. Even though the slit rolling process is employed only for production of rebars, this process is a very economical solution to achieving high rolling production, even for small sizes. The annual production may vary, depending on the number of strands, but tonnages in the range of 1,000,000 tpy can be achieved with product sizes from 10 to 50 mm.

The layout mainly consists of:

- Reheating furnace
- Roughing mill with horizontal-vertical stands either of housingless or cantilever design
- Intermediate mill with horizontal-vertical stands, housingless design
- Finishing mill with horizontal, vertical and convertible stands, housingless design and quick-changing device
- Quenching and self-tempering facilities
- Drop wall roller way with lifting aprons
- Cooling bed
- Finishing facilities with cold shear, bundling system and wire tying machines

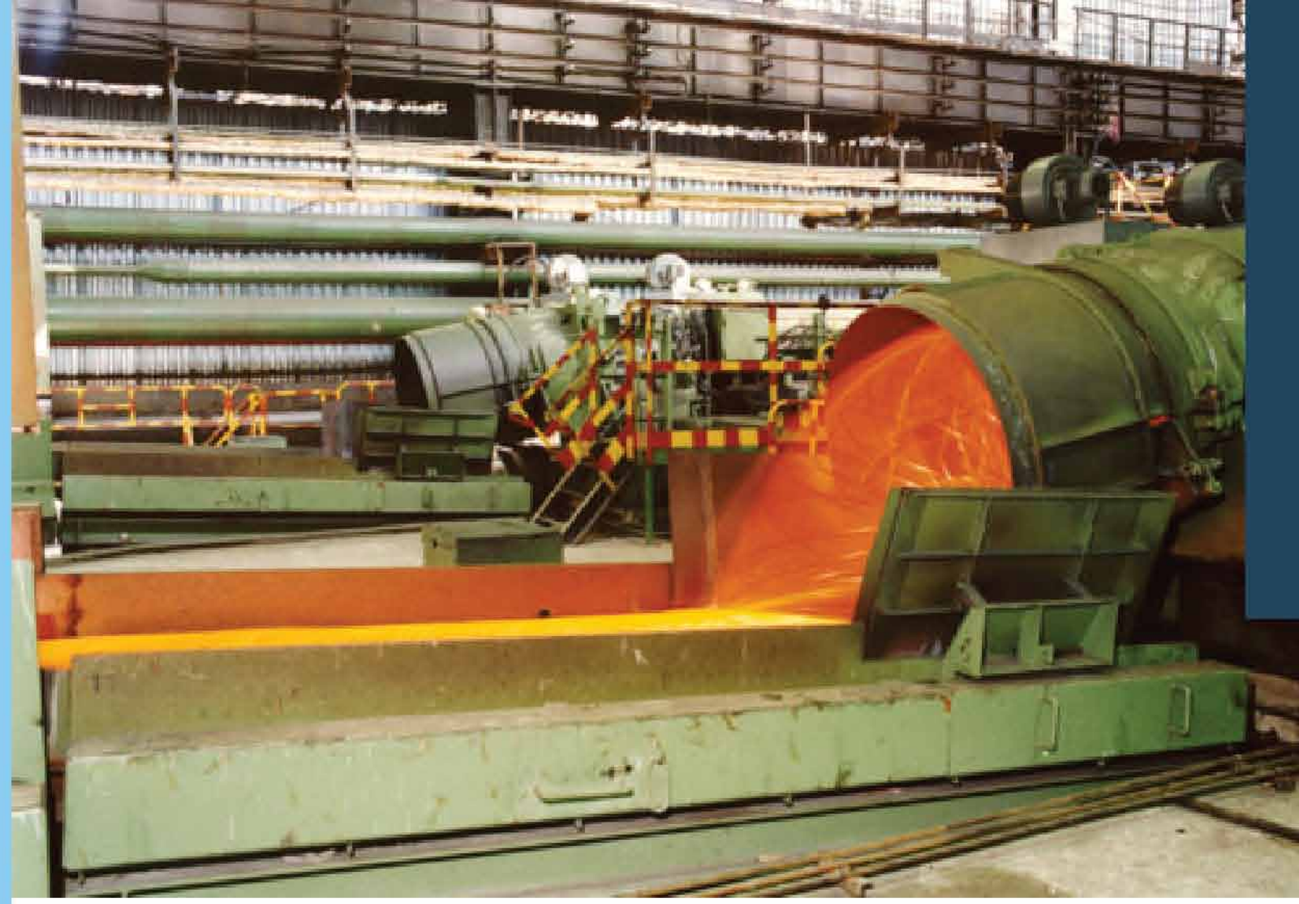
BAR AND MERCHANT BAR MILLS

COMBINED BAR AND WIRE ROD MILL

Among the most flexible configurations, the combined bar and wire rod mill using a single finishing block can either be operated to produce straight bars via switched to the production of wire rod in coils. The highest speeds and hence the highest productivity rates can be obtained for both types of product. The annual production averages around 600,000 tons and products may include rod from 5.5 mm and straight bar from 8 to 36 mm.

The layout mainly consists of:

- Reheating furnace
- Roughing mill with horizontal-vertical stands, cantilever or housingless design
- Intermediate mill with horizontal-vertical stands, housingless design with quick-changing device
- Finishing block
- Quenching and self-tempering facilities
- Cooling bed
- Finishing facilities with cold shear, bundling system with bar counter and wire tying machines
- Wire rod line with laying head
- Coil forming and handling line with compactor and wire tyingtying machines



MERCHANT BAR MILLL

A modern merchant bar mill has the capacity to produce a variety of products such as angles, squares, flats and small channels. Round bars can naturally be
produced, too. A mill of this kind has a capacity of 500,000 to 600,000 tpy and a product ranging from 40 to 150 mm angles.

This mill mainly consists of:The layout mainly consists of:

- Reheating furnace
- Roughing mill with horizontal-vertical stands, cantilever or housingless type
- Intermediate mill with horizontal-vertical housingless stands
- Finishing mill with horizontal and convertible housingless stands with quick-changing device
- Drop wall roller way with lifting aprons
- Cooling bed
- Multi-line straightener
- Finishing facilities with cold shear, stacker and strapping or tying machines

FINISHING EQUIPMENT

Rod coils are further processed and handled by finishing equipment comprising compacting and tying machines, trimming units, weigh-scales, and unloading devices.

Power&Free systems are used to advance product coils with a horizontal centreline from station to station of the finishing department. Alternatively, pallet handling systems are used for product with the coil centreline vertical.

CONVOLUTION CONVEYOR

The convolution conveyor is designed as a secondary cooling train; it is equipped with eight air blowers. These air blowers can deliver up to 960,000 m³/h (S.T.P.). The conveyor is designed to permit retarded or accelerated cooling of convolutions to suit the particular desired properties of the material.

LOOPLAYERS

The looplayers used are based on a development by SKET engineers who have also contributed in CTS and MWE their many years of experience. In recent years, the looplayer design has been consistently improved to achieve a longer useful life of the components involved.

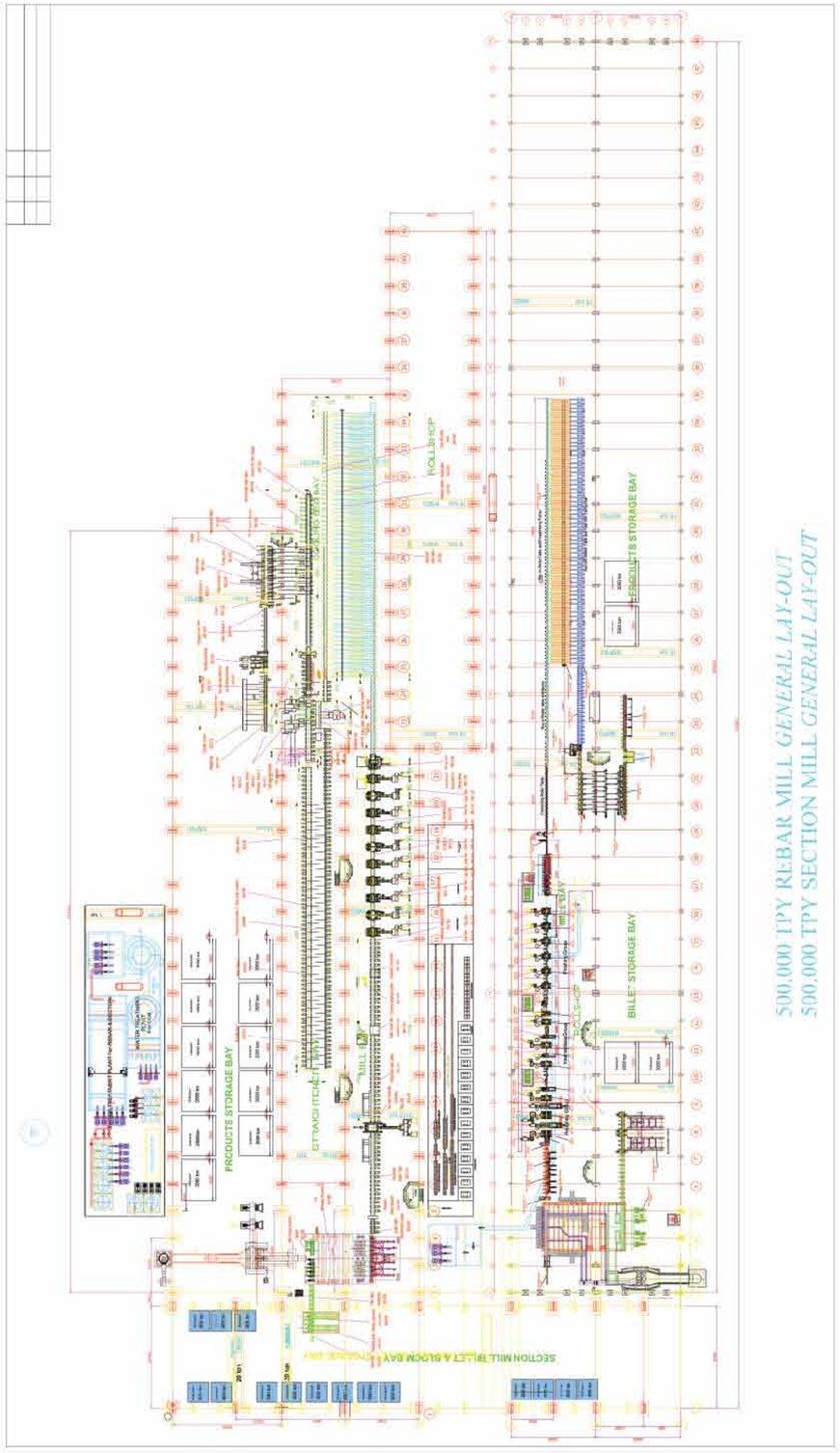
Product speed up to 120 m/s
Slant 12°
Laying circle diameter 1,070 mm

COMBINED BAR STEEL AND WIRE ROD MILLS

The demand for wire rod and bar steel is changing continuously: Today structural steel for new buildings, tomorrow wire rod for the automotive industry. Manufacturers who can react quickly to market changes, who are flexible in the product formats and can produce varying lot sizes cost-effectively have a clear advantage. That is why CTS offers combined mills on which both wire rod and bar steel can be produced cost-effectively and in high quality.

WIRE ROD MILLS

Wire rod is an all-round talent. From components for the automotive industry, the chemical industry, power stations and machine engineering through to connecting elements such as nuts and bolts – everything is based on wire rod. That is why CTS designs its solutions for wire rod mills with versatilityin mind. All size ranges, materials and alloys can be produced efficiently and with high productivity on the wire rod mills.



The rolling of sections has a long tradition. It began with the period of industrialisation in the 19th century, driven in particular by the birth of the railways and the need to produce rails in large quantities. The section mills initially produced railway rails and other sections. Later beams manufactured using the 2-high rolling method were added to the product range. The advancing industrialisation resulted in a growing demand for beams. The invention of the universal mill stand at the end of the 19th century enabled beams to be manufactured with parallel flanges.

ROLLING METHOD

Sections are produced on a variety of mill types:
3-high or 2-high mills, universal reversing mills, continuous or semi-continuous mills.

Over the course of the years, both the rolling technology and the mills themselves have changed significantly. Modern mill stands are equipped with hydraulic adjustment systems that offer a large number of benefits. Beams are predominantly rolled on universal stands. These stands have two driven horizontal rolls that influence the web cross-section and two vertical rolls that act on the flange of the beam. All four rolls are adjustable.

A wide range of sections, such as beams, channels, angles, universal flat steel, sheet piling sections, special sections and rails are produced on section mills. Billets, rounds and squares, rectangles and hexagons also belong to the product range. Depending on the rolling programme, these sections are produced on different mills. A distinction is made between the following mill types:

Heavy beam and section mills on

which beams, channels, angles and possibly also sheet piling sections are produced. Beam dimensions from 200 x 200 up to 1,000 x 400 mm.

Heavy beam and section mills on

which beams, channels, angles and possibly also sheet piling sections are produced. Beam dimensions from 200 x 200 up to 1,000 x 400 mm.

MEDIUM SECTION MILLS

Sections such as beams, channels, angles and flats are rolled on medium section mills. Special sections such as fork-lift mast beams and wheel rims, etc. are also produced on medium section mills, whereby these sections necessitate a special arrangement of the mill stands. The universal rolling method and the two-high method are employed. The product range of a medium section mill starts with a section height of approx. 100 mm and flange width of 50 mm and generally extends up to a web height of 450 mm (max. 500 mm) and flange width of 240 mm (max. 260 mm).

SECTION MILLS

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CTS scope of meltshop works consist of the following; ;

- Engineering
- Equipment manufacturing
- Equipment supply
- Erection and Commissioning
- Training on site

From Water Cooled Panels to complete Electric p Arc Furnaces, from Ladles to complete Ladle Furnaces, from Tundishes to complete Continuous Casting Machines, from Ducts to complete Fume Treatment Systems and from Engineering Services to Turn-Key Plants, CTS offers economically viable solutions at European standards.

MELTSHOPS

Some auxiliriaies for Meltshops;

- DRI/HBI Continuous Feeding
- Water Treatment Plants
- Oxygen Plants
- Off-Gas Systems of Converters
- Scrap Buckets & Buckets Cars
- Ladles & Ladle Cars
- Tundish & Tundish Cars
- Ladle Turrets
- Vertical/Horizontal Preheater Systems
- Tundish Dryer & Preheater Systems
- Copper Cladded Electrode Arms
- Combined Burner Systems
- Slag Door Lance Manipulators
- Wire Feeding Machines
- Ladle Bottom Gas Purging Systems
- Deep Injection Systems
- Water Cooled Panels
- Cranes for Mills
- Scrap Bucket Press Systems
- Scrap Pre-Heating Systems

REHEATING FURNACE AND HEATING TECHNOLOGIES

Reheating Furnace is the heart of any hot rolling mill where in the charge is heated to rolling temperature. The charge could be in the form of billets, blooms, slab or ingots. The type of furnace could be pusher, walking hearth or walking beam- either top fired or top and bottom fired.

Every rolling mill is different – and the same should apply to every furnace. CTS Makine reheating experts offer tailored to the particular properties of each plant solutions for any process and layout. The design capability includes:

- Walking beam furnaces
- Walking hearth furnaces
- Pusher furnaces
- Rotary hearth furnaces
- Bogie type and chamber furnaces

The furnace and heat treatment portfolio covers the full spectrum of solutions for all rolling mills and metal forming plants produced by the CTS. Plant operators benefit from fully integrated plant concepts and the singlesource approach: all components are perfectly harmonised and designed for maximum efficiency. The furnaces have been determined with the aim to:

- Guarantee a very low heat consumption,
- Avoid the bending of billets due to differential heating of top/bottom and front/back faces,
- Ensure the billet pushing through the furnace on horizontal hearth without trouble,
- Optimise the heating curves to achieve the desired temperature uniformity as well as minimize oxidation inside the furnace.

With productivities ranging from 50 to 250 tph, these furnaces are engineered to reheat billets, blooms (either round or square) and beam blanks. CTS also offers a tailor-made design for specific applications. Proven mechanical design and cutting-edge technologies for combustion control, guarantee high product quality, minimal environmental impact, and the lowest operating and maintenance costs. Purpose of the design process for reheating furnace is to;

- Minimize great loss and aim for lowest enegry consumption.
- Apply uniform heating on materials to prevent varying forms of elongation, therefore bending.
- Move the material out of the furnace safe and sound after reheating process is finished.
- Reach desired heating behaviour inside aiming both accuracy in the manner of time and reducing oxidation minimum.

Some key points to reach mentioned specifications can be featured below in light of latest technological decelopments;

- Positioning burners latreally over the top and frontal to acquire uniform heating with fewer burners.
- Divide the hearth and recuperative zone with a screening barrier.

All furnaces are provided with the Best Available Technology on combustion plants. Auto-recuperative and regenerative burners assure higher performances, temperature uniformity and lower fuel consumption.

- Bogie hearth furnace for re-heating, austenitising, tempering and normalizing
- Fixed hearth furnaces for re-heating, austenitising , tempering and normalizing
- Rotary hearth furnaces serving the forging press

For turn-key solutions in reheating furnace area
CTS Makina designs, manufactures and erections;

- Combustion systems
- Burners
- Recuperators
- Full furnace combustion automation
- Full furnace automation for Rolling Mills
- Furnace Charging and Discharging Area Equipment
- Furnace Billet Feeding Station
- Charging Roller Table
- Billet Charging Pushers
- Furnace Discharging Machine
- Furnace Exit Pinch Roll
- Furnace Exit Roller Table
- Billet Rejecting System

REHEATING FURNACE AND HEATING TECHNOLOGIES

Each mill stands complete with;

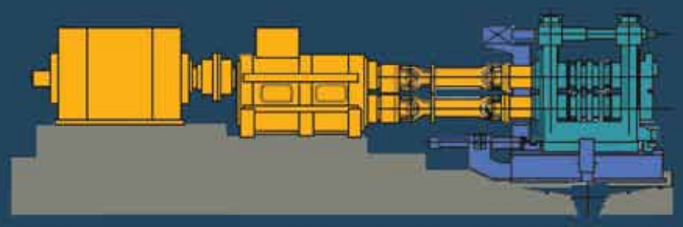
• Gearboxes (at intermediate group four stands are driven by roughing area groups' motor and gearbox) All the supplied gearboxes are; Housing in welded, annealed steel plate. Gears and pinions in alloy steel, hardened and heat treated mounted on shafts and roller bearing designed to support the instantaneous overload due to rolling torque. Equipped with on-board items required for lubrication and cooling.
• Shafts
• Couplings
• Base plates
• Stand bodies
• On-board equipment according to design.

All kind of rolling stand for rolling long products:
• Breakdown Mill, Two and Three High Stands.
• Conventional and Housingless Cartridge Stands.
• Universal Stands for sections.
• High speed finishing monoblock units for wire rod in modular design.

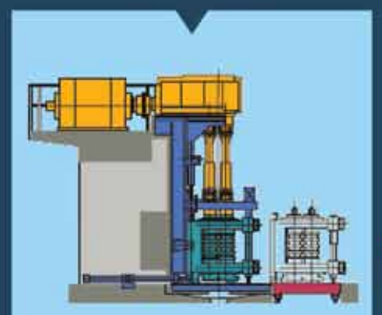
The rolling stands guarantee:
• Minimized yielding and low roll deflection module that results in better tolerances and low noise level.
• High rolling torque.
• High operation flexibility by the interchangeability of the units.
• Easy maintenance by standardised components.
• Reduction of downtime by
  • Robot equipment for automation during cartridge changes
  • Fast groove-changing systems

ROLLING MILL STANDS

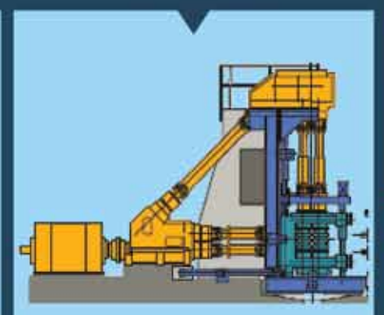
HORIZONTAL MILL STANDS;
- Multigroove rolls
- Grooves changed by shifting the stand
- Stands changed by shop crane

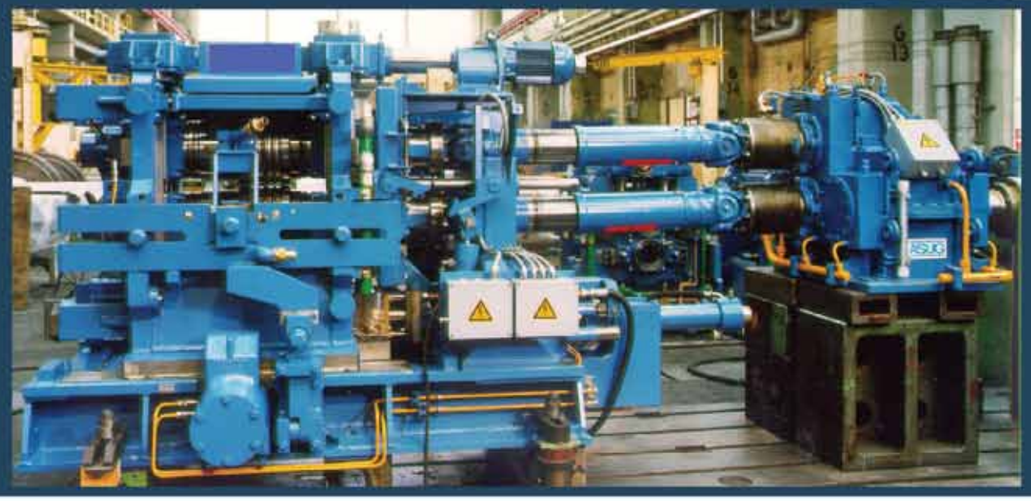


VERTICAL MILL STANDS
- Top-driven rolls
- Multigroove rolls
- Stands changed on stand changing rig
- Use of concrete supports



HORIZONTAL/VERTICAL STANDS
- Multigroove rolls
- Grooves changed by shifting the stand
- Stands changed on stand changing rig
- Use of concrete supports





ROLLING MILL STANDS

Housingless mill stands implies that, during the forming process, the separating force is not absorbed by a housing. On the modern mill stands of an extremely rigid design, the separating force is taken up by tie rods between the chocks.

The rolls are supported in antifriction bearings. Tapered roller bearings are used for designs without provision for axial positioning of the rolls, whereas mill stands featuring axial roll positioning come with cylindrical-roller radial bearings in combination with grooved thrust ball bearings.

The rugged construction we have furnished traditionally is complemented by a guide frame which, while accommodating the rest bars and the screwdown gear drives, retains the chocks in place even at the highest loads. Hydraulic clamping mechanisms are provided to mount the guide frame firmly to the roll unit during the rolling process.

Housingless (HL) mill stands are the backbone of modern rolling mills. They stand for the closest form and dimensional tolerances, fast stand changing and minimum maintenance costs. The modular design permits the use of HL stand cassettes in all possible configurations: Horizontal, vertical, tiltable and universal. The HL concept is thus suitable for roughing, intermediate and finishing trains. The stand sizes differ, depending on the necessary dimensions of the rolls and roll journals, pass schedule, pass form as well as the gearbox and motor characteristics. CTS identifies the relevant process variables with special computation models and thus determines the optimum stand size for the particular layout. With HL mill stands, plant owners achieve optimum results in bar steel mills, wire rod mills, light section mills and combination plants.

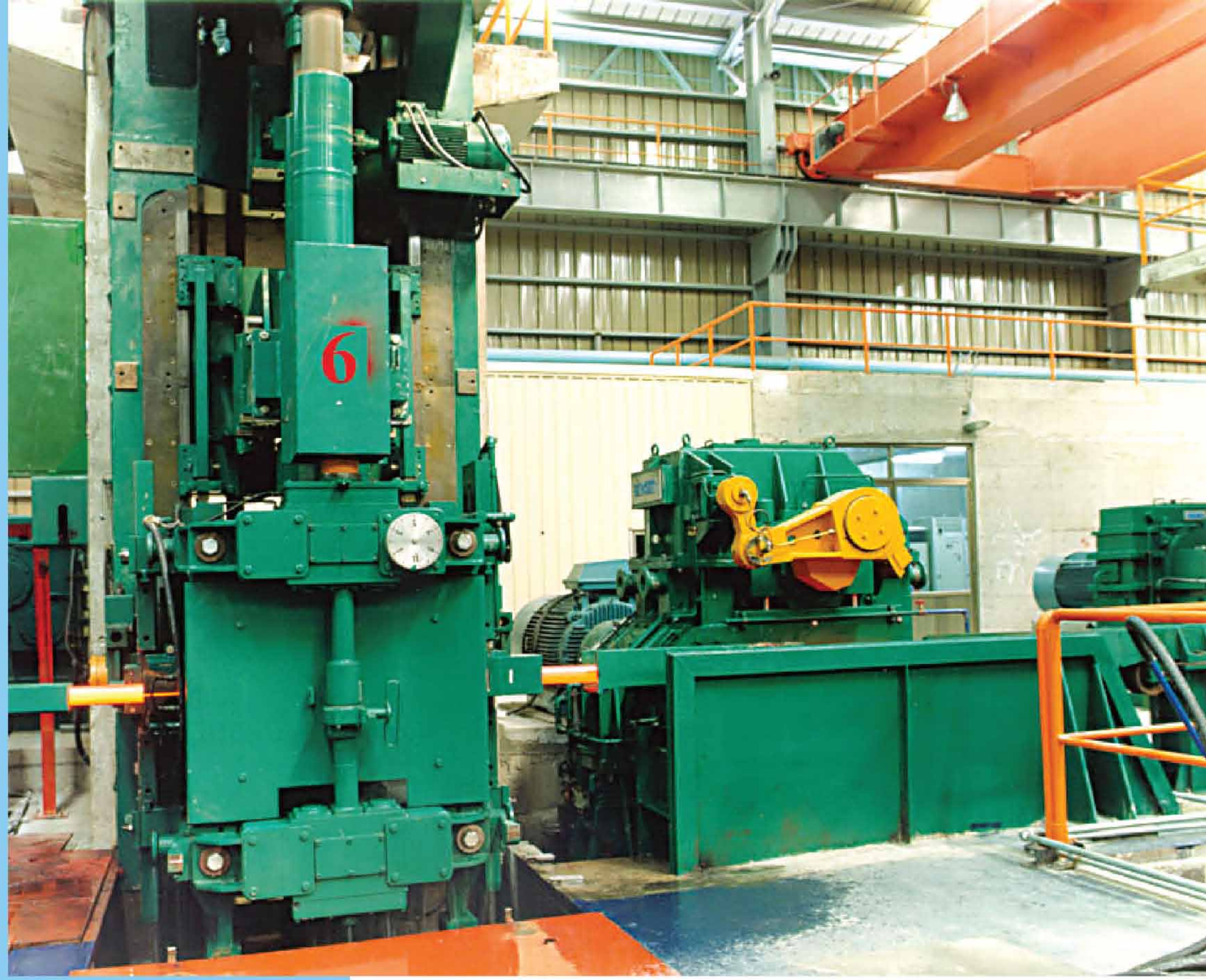
MAIN FEATURES OF THE HL DESIGN

- Compact, rigid design of the parts
- Low roll bending thanks to favourable ratio of roll journal diameter to roll diameter
- Durable, multi-row roller bearings with self-aligning chocks under load
- Backlash-free balancing of the chocks
- Simple and precise adjustment of the guides and guards

HOUSINGLESS MILL STANDS

Depending on the cutting application,
the following types of shears are available:

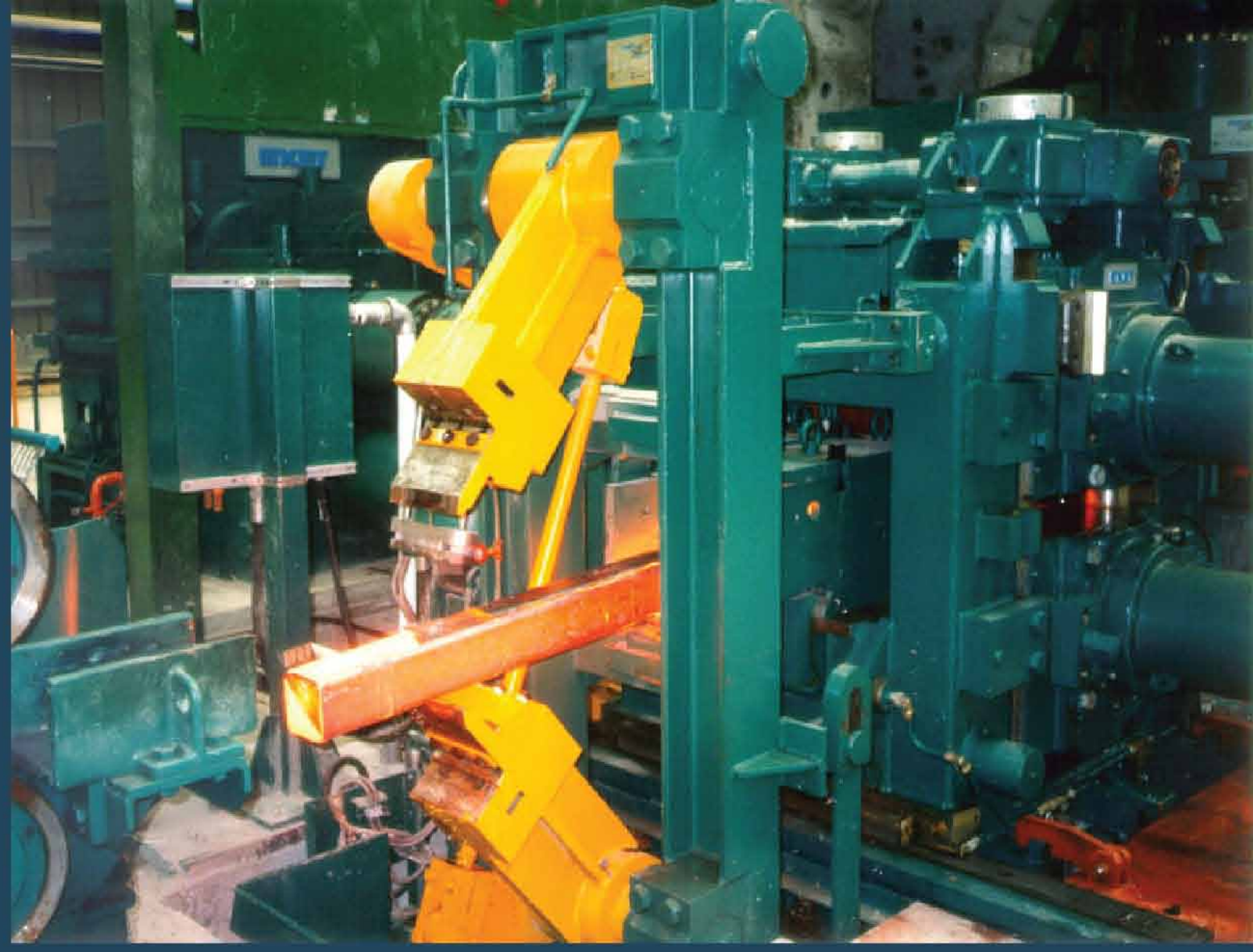
- Snap shears
- Pendulum shears
- Crank lever shears
- Crank (rotary) shears
- Double crank shears
- Universal shears
- Dual system shears



SHEARS

COLD SHEARS

- To cut layers of cooling bed lengths into commercial lengths
- Installed downstream of the coolin bed exit roller table

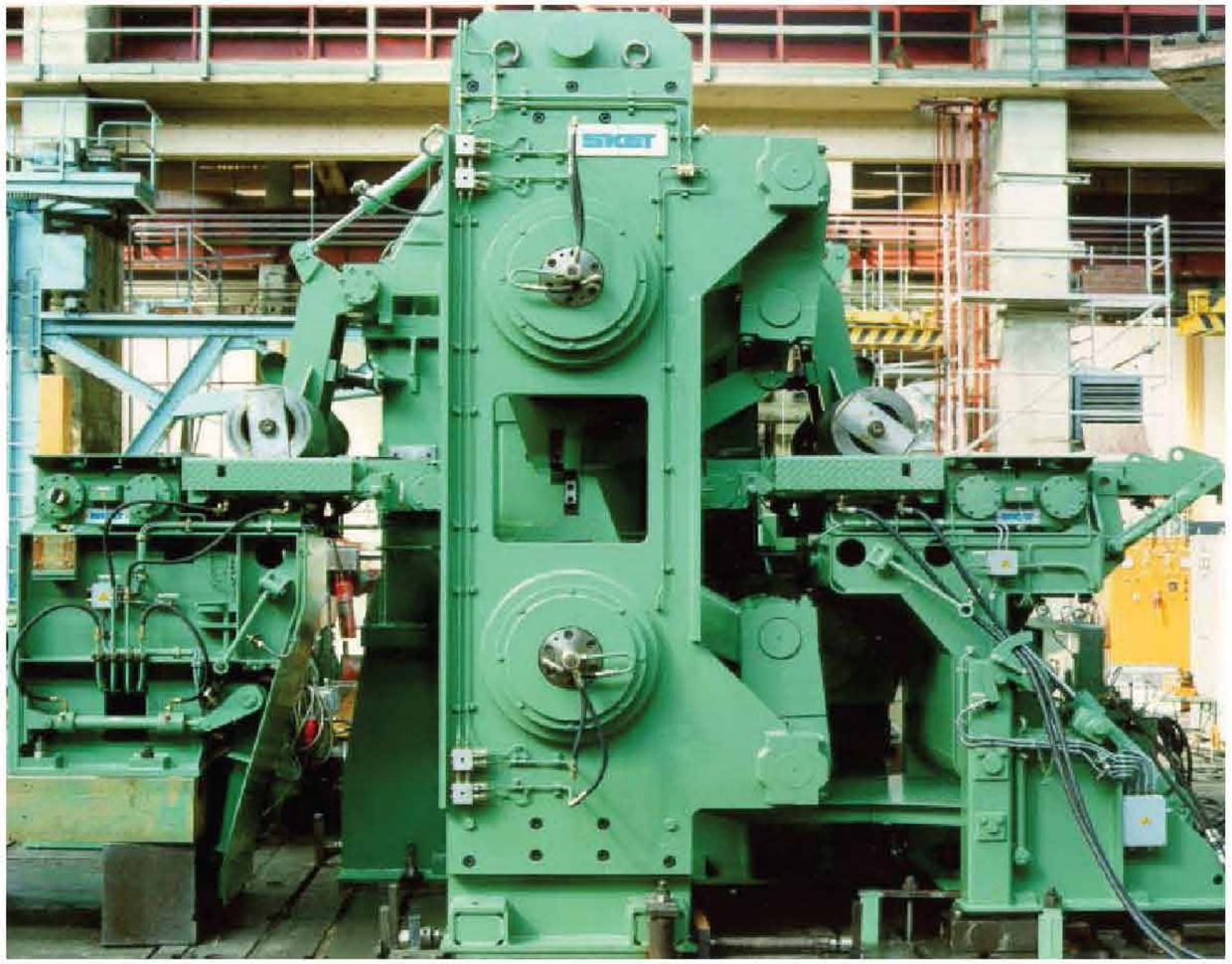


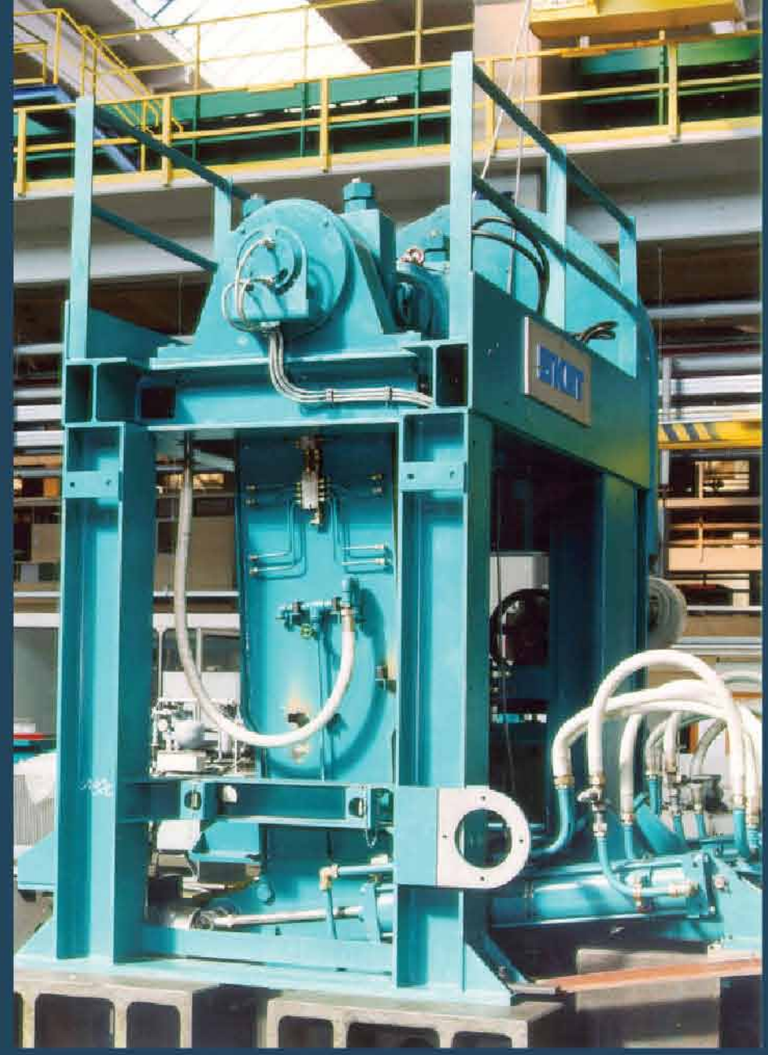
Snap shears arranged at stand #1 entry side.
• Used for dividing of hot billets.•
• Snap shears can be designed in single strand or•
double strand arrangement.•
• Knife carrier pneumatically actuated.•
• Cutting force, max. 900 kN•

SNAP SHEARS

FLYING COLD SHEARS

- To cut layers of cooling bed lengths into commercial lengths
- Installed downstream of a multistrand straightening machine



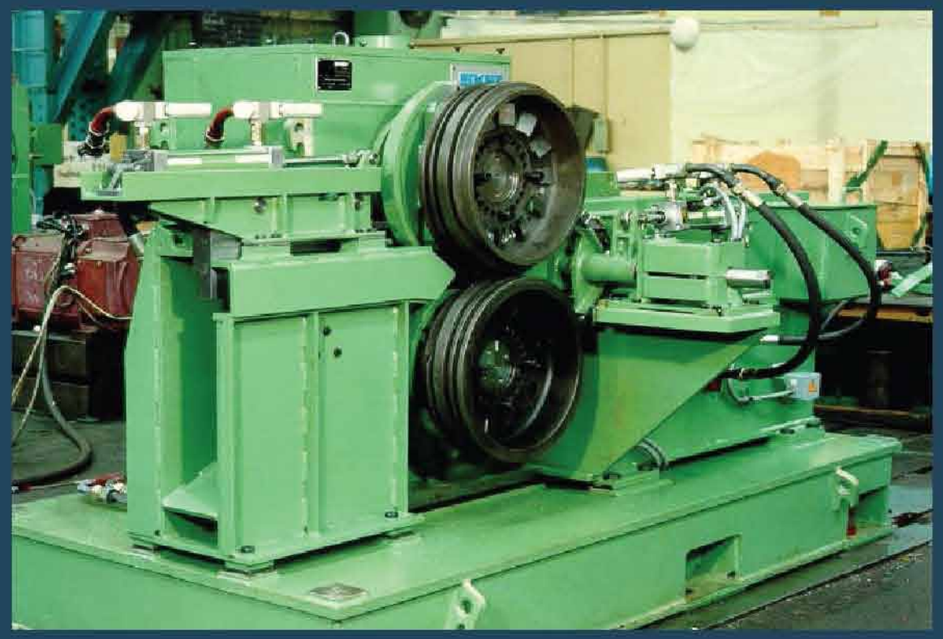


- Pendulum shears are cutting systems suspended in an "oscillating" configuration
- Cut can be performed at travelling or stopped material
- Used to crop billet heads and tails and divide billets as may be necessary.
- Drive by continuously running motor via clutch and brake combination (hydraulically or pneumatically actuated).
- Drive of pendulum mechanism pneumatically.
- Cutting force 1,600 kN
- Material speed, max. 1.4 m/s
- Knife stroke, max. 300 mm

PENDULUM SHEARS

UNIVERSAL SHEARS

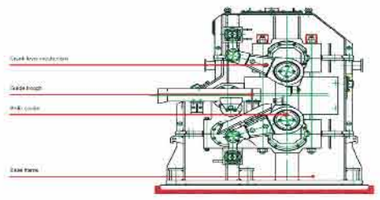
• Proven design for higher product speeds.
• Used for head and tail cropping as well as cobble cutting in front of rod mill block
• Cutting initiated by automatic pulse
• Universal shear continuously running
• Cutting force 80 kN
• Max. material speed 25 m/s



• Dual system shears are normally used as cooling bed shears.
• They are equipped with two cutting systems:
• Crank (rotary) system
• Crank lever system
• The crank lever system will be used mainly for cutting sections.
• The shear is movable perpendicular to the rolling direction,
in order to bring the used system in line.

DUAL SYSTEM SHEARS

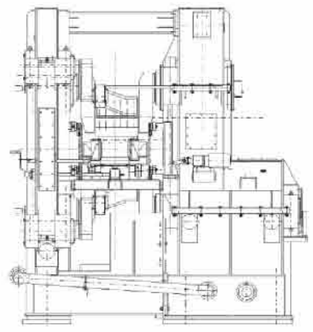
CRANK LEVER SHEARS

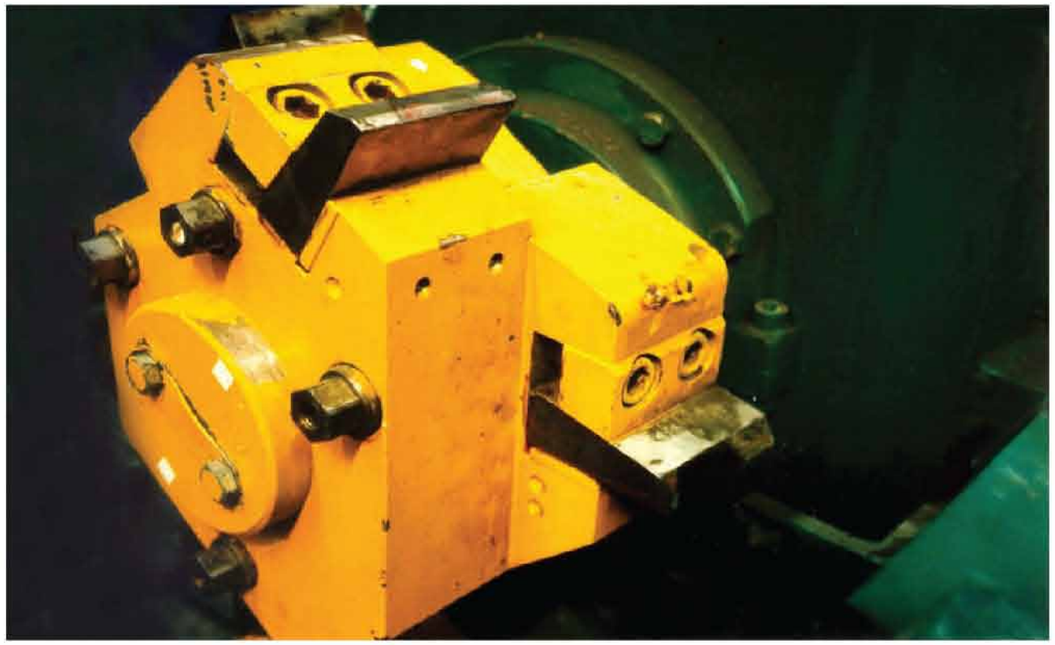


Type of cooling bed shear to be used depends on:
- Diameter/ dimension of the rolled material,
- Shape of rolled material Types:
- Crank shears (for small rounds etc.)
- Crank lever shears (for sections, bigger rounds)
- 'Two-system'-shears (for both: rounds and sections as well)
- Crank lever shears working as start-stop-shears and adopt the crank-and-rocker principle of operation.
- Whilst performing the shearing operation the knives are almost perpendicular to the stock to be cut.
- This shears are suited to crop, cut sections and cooling bed lengths as well as for emergency cutting

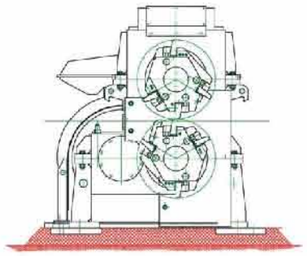
DOUBLE CRANK SHEARS

- Double crank shears are designed such that knives are perpendicular to the product whilst the cut is being performed.
- Shears of this type are used to cut medium size and large size sections.
- Profiled knives will be used.





CRANK SHEARS



Crank shears can be designed as;
- Start-stop-shears
- Continuously running shears
- Coupling shears (with coupling-brake combination)

The design of knife carrier will be adopted to the required application, e.g.:
- One knife track, one knife: cropping, dividing (e.g. cooling bed lengths)
- One knife track, two knives: cropping, emergency cutting
- One knife track, various knives: short emergency lengths
- Two knife tracks, with additional switch:
- 1st track one knife: cropping, dividing
- 2nd track various knives: short emergency lengths

Shear start is initiated by pulse generator (billet head end).
Cut according to chosen crop length.
After cutting, the shear is stopped again.
Crop end diverted into scrap disposal system.

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CONTROLLED QUENCHING SYSTEM

The Controlled Quenching System is located between finish stand and dividing shear for inline cooling and self-tempering of rolled bars. The controlled quenching line gives improvements on the mechanical properties of re-bars in order to obtain:

- High yield of strength of material
- Better welding of materials than to low carbon content without adding alloy in the melt furnace (like vanadium or niobium)
- Lower costs of material as a result of the above
- High plasticity of bars after treatment
- Better stiffness of the bars

Water Quenching Line Treatment composed of;

- Supporting frame mounted on base plate to the assembly of the cooling line having different cooling nozzles.
- Thermal photocell to detect and control bar's temperature at cooling treatment exit/entry.
- Bar drier system,
- Supporting base plate.

WATER QUENCHING LINE

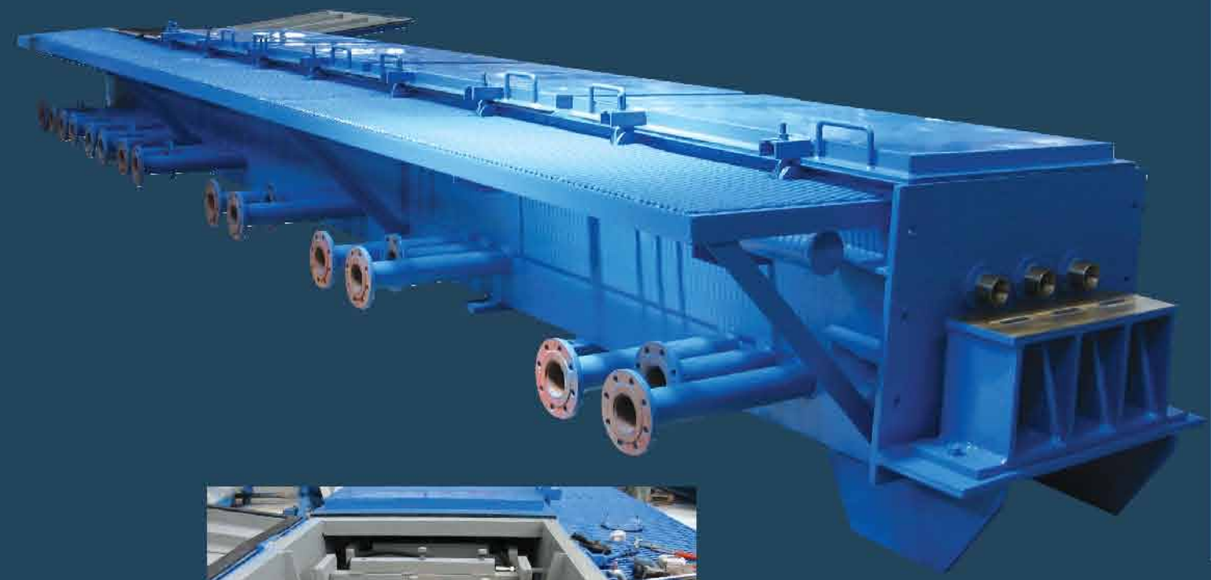
The quenching line for treatment of metallurgical phases consists of:

- Supporting frame mounted on base plate to the assembly of the cooling line having different nozzles
- Thermal photocell to detect and control bars temperature at cooling entry/exit
- Series of manual valves for each nozzle
- Bar drier system
- Supporting base plate

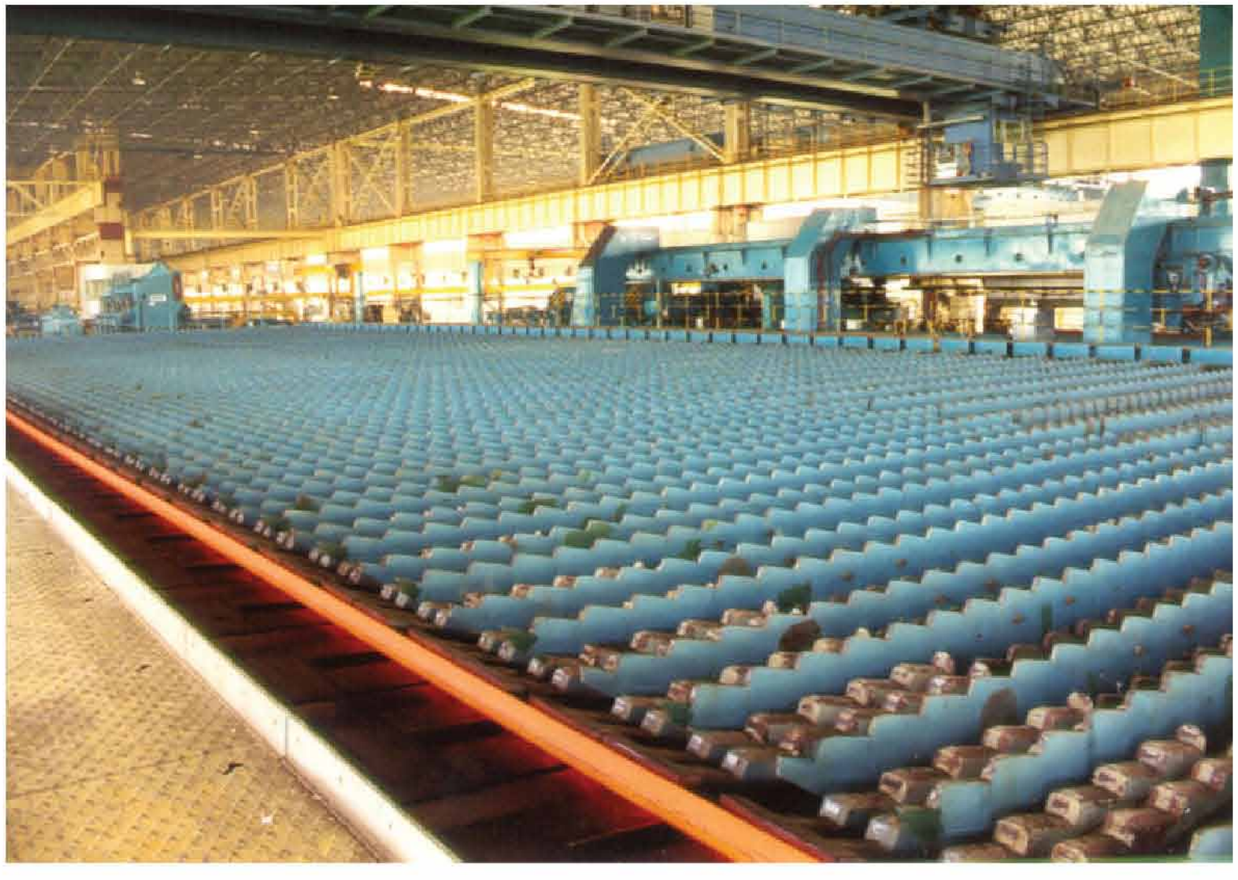
TRANSFER CAR

Transfer car for supports and shifting of the cooling box complete with:

- Support with wheels for accommodation of equipment to be shifted
- Manual shifting
- Locking system via manual operated pins



COOLING BED GROUP



CONTINIOUS FINISHING SHOP

The continuous finishing shop has the task to adjust the rolling stocks - which supplied from the cooling bed group - dimension -specific and in the appropriate amount to shippable units.

The adjust includes the following technological processes:
• Single-core straightening of profiles supplied from the cooling bed
• Collection of straightened profiles to drag of bars for further processing
• Cropping of the drag of bars, parting to finished length, sampling, tail end cropping, separating the rest ends dependet on structural shapes with cold saws
• To separate of short lengths from the last layers of finished length of a cooling bed length
• Process and prepare the finished length dependency of material transfer performance and batch purity for feeding the stacker and packet assembling
• Stack of structural shapes into rectangular packages
• Setting rectangular stack by means of binding wire and drill closure
• Weighing the packets and embossing package tags with manual fixing of signs
• Collecting the packets on a grate for removal with a crane

Equipment of the continuous finishing shop is designed to:
• Cut the rolled material into final lengths
• Straighten the rolled material, if required
• Collect the rolled material into bundles, stacks or piles depending on material dimensions and customer' demands
• Weigh the bundles etc. and to collect them for further shipping

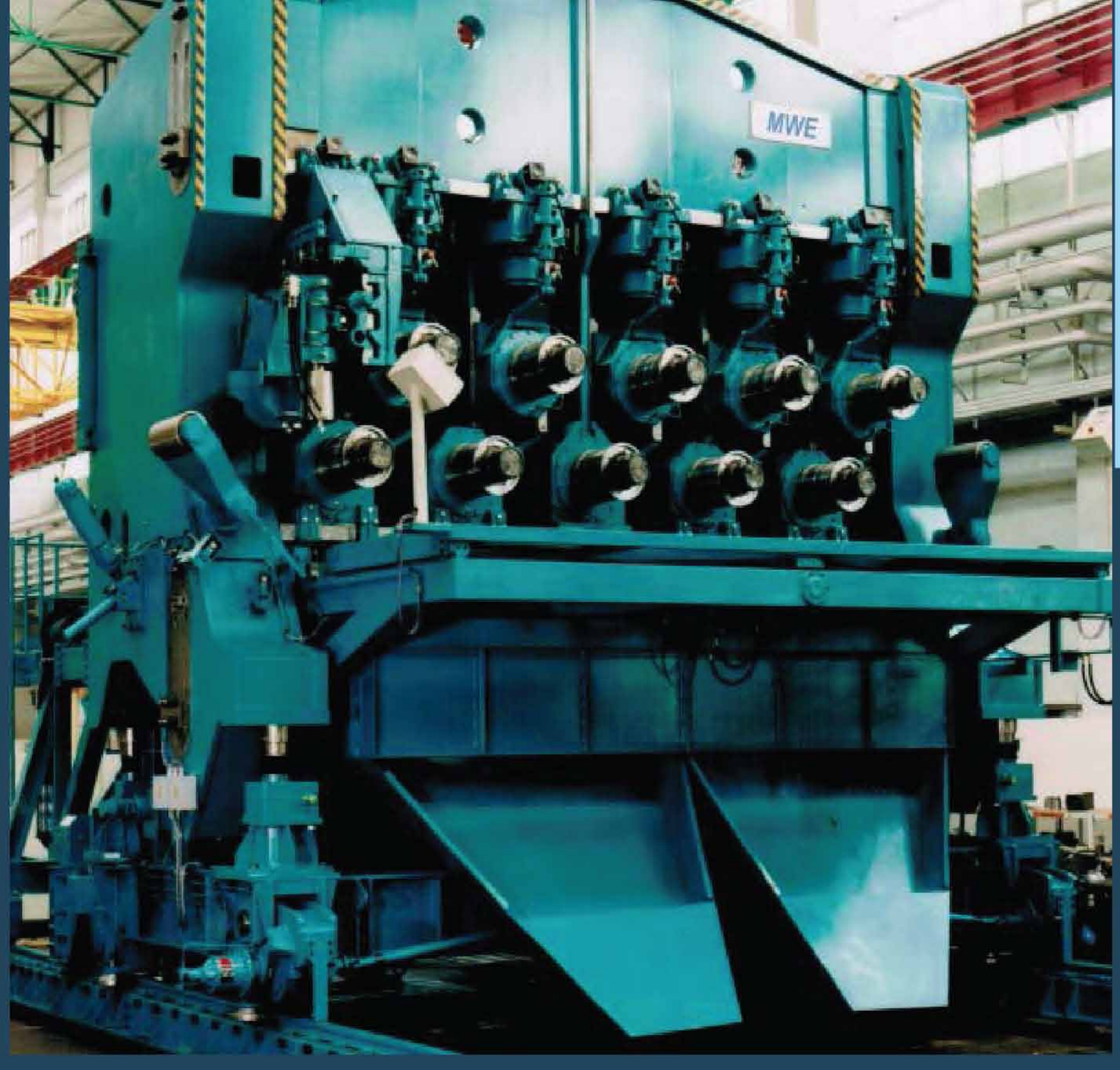
Adapted to the technological processes in the continuous finishing shop is divided into four control areas.
• Control area 1 straightening and collecting
• Control area 2 sawing
• Control area 3 collecting and stacking
• Control area 4 binding, weighing and loading

The focus of our technology in this very demanding area is on the reduction of manpower. In fact, all operations have been mechanised and automated, such as the removal of short bars or the labelling in ideal scanning position of tags with all relevant information. Particular care is given to the final shape of the bundles, with optimum arrangement of the bars and sections, even in very small sizes.

Stackers have different designs, depending on the customer needs:
• For precise stacking of light sections, the overhead pendulum system
• For light-medium sections, the stacking system with magnets underneath

COLD SAW

PACKING
AND BUNDLING AREA
BUNDLE FORMING STATION



PACKING
AND BUNDLING AREA

SPARE PARTS SERVICES

In CTS MAKINA workshop we perform following actions with care in order to present you best quality spare parts and machineries;
•Supply of rough materials from the market and pre-manufacturing processes such as coating fully in accordance with customer demands,
•Machining of the parts under requested tolerances and specifications,
•Post manufacturing processes such as sand-blasting, stress relieving are performed accordingly customer's technical specifications,
•Work shop assembly and post assembly tests in order to ensure performance of the equipment,
•Fully support customer as per its' demands during the whole project.

CTS Makina's spare parts offers plant owners security, durability and cost efficiency for all the machines we supply, regardless of when they were built or for how long they are in use. The high-quality products ensure that the plant can continuously operate at full performance, while always keeping the range up to the latest technical standards. After all, technical innovations and improvements are applied to spare parts, too.

Short response times, fast delivery and high on-time delivery performance are the principles on which the supply of CTS Makina spare parts is based. The right spare parts are in the right place at the right time only in this way is the availability of the machines assured. By concluding a framework agreement or bonus agreements with volume orders, plant owners can optimize their spare parts management considerably and cost-effectively.

CTS Makina also offers spare parts management service for turn-key project basis. CTS identifies the customer's needs and devises an individual inventory concept. This ensures that the customer orders all the necessary spare and wear parts in time and that they are available in the factory as and when required. As a result, downtimes are kept to a minimum.








DESIGN
ENGINEERING
MANUFACTURING
ERECTION
TRAINING
CONSULTING
SITE MANAGEMENT

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