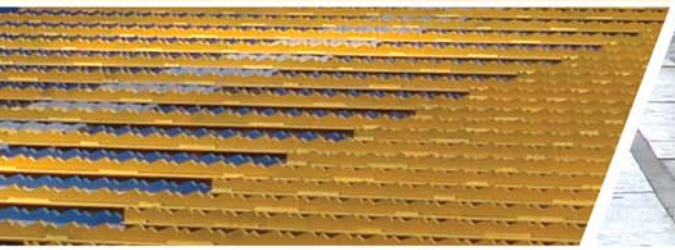
Hot Rolling Mill

from concept to commissioning



UGI ENGINEERING WORKS PVT. LTD.

We Design and Deliver Hot Rolling Mill

COMPANY PROFILE

Year 1973 saw the inception of UGI Engineering Works Private Limited which stands today as a preferred manufacturer-exporter-service provider and supplier of different types of hot rolling mill - **TMT Mill, Wire Rod Mill, Section / Structural & Narrow Strip Mills**. Gear Box and Industrial Equipments for Steel, Sugar, and Cement Industry. The company under the inspiring mentorship of P. C. Kapoor and his son Vishal Kapoor, having vast experience, constant motivation and his support have helped in carving a unique niche in this domain.

UGI undertakes the supply of Rolling Mills of 20,000 - 6,00,000 tones per annum capacity on turnkey basis - from conception of commissioning - to suit the specific needs of the customers. UGI designs the plant on the basis of tonnage output and product mix desired, size and type of input material and the extent of automation required by the customer, be it a Wire Rod, Bar Mill, Section Mill or Strip Mill.

UGI has technical collaboration with an European company to manufacture Rolling Mil Machinery to produce TMT of 2,50,000 - 6,00,000 tones per annum capacity. The technique used for production of these high production machines is called 'Slit Technology', a proven process in European countries but a new concept in India. The collaboration includes technical backup for manufacturing, erection and commission and achieving the target production of the designed mill.

Projects designed by the company are cost effective with reasonably short payback and attractive ROI (Return On Investment), thus helping the rolling mills to attain better quality standards with higher productivity and reduced cost of production & special emphasis on fuel consumption and ensuring environment friendly & pollution free facilities.

The Art of Designing

UGI possess a bunch of qualified and experienced Engineers, AutoCAD/Mechanical Draftsmen, Production & Inspection Team who all merge forward with preparation of layouts and drawings with most optimum calculations and conforming to strict quality standards.

Starting with the requirements based on production rate & size, calculations are done. If the total plant is required or either a single equipment is required, then taking into consideration, rest of the equipment(s) with which the proposed equipments is to be installed, the design is made which is best suited to the current requirements and technology and not according to the existing old age designs.

Technical Know-How

UGI Engineering Works Pvt. Ltd. provides a wide connotation as much as technology is concerned . These are :

UGI designs complete turnkey solution for Hot Rolling Mills for TMT, Sections, Wire Rod, Sections / Structural Mill & Strip Mill.

European design, for the design and engineering of projects and equipment for rolling mills up to 6,00,000 tons per annum.

Tempcore Technology for TMT bars through the authorized representative in India of CRM Belgium , the controlling authority for Tempcore brand of high yield strength weld able concrete reinforcing bars from mild steel.

UGI takes up modernisation, revamping and refurbishing of existing mills.

TMT MILL

WIRE ROD MILL

SECTION MILL

STRIP MILL

Infrastructure

UGI Consultancy Services division also undertakes technology up-gradation and modernization of existing mills for productivity, better quality, fuel efficiency with desired automation and robotics along with reduction in environment pollution.

UGI also take up engineering job work as per customer's drawings and specifications to utilize spare machining capacity.
Installation of individual new mills and production lines for stand –alone Greenfield sites.
Professional excellence and commitment to work safety and the integration of sustainable-development principles during process design.
UGI has a strong team of technical personnel and it is associated with reputed Consultancy Organizations to provide total engineering support.

Production Capabilities

UGI own a series state of art machineries including horizontal boring machines, floor type boring machines, gear hobbing machine, VTL's, center lathes, planning machines and plano milling machines, CNC VIL, with facing/ grinding shaping/radial drilling and slotting machines etc.

Additional equipments available are MIG welding, ARC welding sets (air cooled), gas cutting sets, profile cutter, hack-saw machines, EOT crane (20/15/10/8/5MT), and complete testing & measuring facilities.

After Sales Service

UGI has an expert technical team having cosmic experience to correct the troubles arising out of UGI supply machines/plants. The company provides complete backup for smooth & proficient working of plant & machinery supplied by us.

Quality Policy

UGI Engineering takes up each project as benchmark to set a high standard. Satisfaction is guaranteed to customers through best quality control and timely deliveries. The company provides uniform quality products by observing standard work practices, and through constant training and education of its workforce. With defect reduction to achieve 'minimum rejection' levels, quality improvement is a continuous process in improvement. UGI offers 5 years warranty for their products in place of normal 1 year warranty available in the industry.

ENGINEERING CAPABILITIES

UGI Engineering Works Pvt. Ltd. has designed and manufactured , more than a hundred Hot Rolling Mills in India and abroad, starting with the design and configure to eventually become the mill life cycle partner, with the entrepreneur.

With the large numbers of conflicting variables like input material and their variants, market dynamics of the product mix from the desired mill, country and its environment, skill availability, availability of power, etc., no two rolling mills can be just exactly identical in terms of configuration, layout or in the detailing of the equipment. We design and configure the mill with the best and the optimum equipment size through our in-house design & engineering facility, an expertise evolved and honed through years of delivering the mills and thereby delighting a long list of happy customers; and we are enjoying continually bonding, long term association with them.

After having the mill designed and configured in the most innovative way, our in-house CAD facility generates the layout of the mill, and through the formative process, interacting regularly with the buyer, seeking and freezing various input norms for the mill, be them technical or techno-commercial, to design and install the most user friendly and the state of art hot rolling mill.

We design, engineer and fabricate / manufacture the mill stands, pinion cum gear boxes, shears and automation equipment for various application points in the production flow line, the cooling bed and conveyor automation – all of them are vital organs in the hot rolling process - to maintain the production and the process flow at the optimum level to roll out the product with the mandatory and also some specially desired quality attributes while the cost of production must remain well below the industry average without affecting the productivity.

We also engineer the up-gradation and modernization of hot rolling mills, refurbish old mills by injecting the latest and innovative technologies, the search for which never ends in UGI, with the minimum requirement for re-zig and realignment of the production flow line and at the minimum capex level; and that is one of our engineering marvels.

We also design and manufacture gear boxes and gear trains of the specification supplied by the user and for applications in engineering industries, sugar mills, cement plants, ship building, etc.

We provide the end to end solution, starting from the Steel Melting Shop >> Billet Caster or CCM / Billet Reheating Furnace >> Rolling Mill, for you to roll out the Product you desire.

ENGINEERING CAPABILITIES

Design For Hot Rolling Mill

UGI has been under taking design and supply of Rolling Mill for the last 3 decades from Concept to Commissioning of TMT Bar, Wire Rod, Strip and Section Mills.
We design, manufacture the rolling mill with close interaction of the customer needs, sales, services and further aspirations.

UGI Consultancy

UGI provides integrated consultancy services to clients for successful layout of plant. The services include:

Feasibility Study and Project Reports:
The feasibility study being the preliminary study is exercised to determine the viability of a project. If the project for steel plant construction is feasible, preparation of the project report is done in a structured and logical format.

Plant and Equipment Designs:
Design of Turnkey re-rolling and Design of Turnkey rolling mill & integrated steel plants, along with new equipment design & development of custom built machinery , parts and process.

Complete Integration:
Integration is a process of combining or accumulating. When it comes to complete integration in our steel plants, our vast capabilities enable us to design any sized plant, build it, disassemble it and ship it directly to client's site.

Expansion/Modernization for increasing the Capacity:
The expansion and modernization program continues even after the final execution of the project.

Turnkey Erection and Commissioning:
Erection & commissioning of the plant as per the design with proper sequence to achieve the rated production

Personnel Training:
The efficiency of our turnkey steel projects can be vastly accelerated by training the employees towards their respective projects.

Successful Running: Along with installation and designing of plants we are also responsible for successful running of the plant for specific periods.

Supervision:
UGI have group of experts who are constantly supervising every phase and module of turnkey steel plants so that end result will meet with the client's expectation.

Equipment Servicing:
Servicing of various tools and equipments are performed being used in steel plants from initialization phase to completion phase.

Development of Spares:
Indigenous development of spares etc. by design & proper selection of materials is exercised.

Waste Management:
Effective care in waste management is also carried out.

Emergency Service:

- UGI provides a set of emergency services as well, for which relevant details will have to be furnished by the concerned unit in advance. These include:
  Plant & Machinery breakdown handling services on call round the clock.

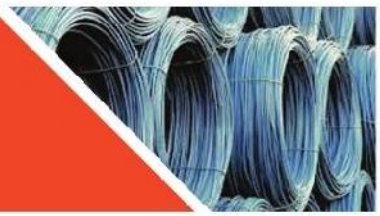
- Arrangement for spares to handle the breakdown in shortest possible time.

- Preparation of assemblies for breakdown handling in rolling mills.

RANGE OF PRODUCTS

Rolling Mill Plant on Turnkey Basis
Fully Automatic and Semi-Automatic Mill

TMT Bar Mill / Wire Rod Mill

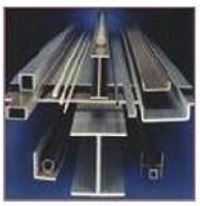


TMT : 8 to 40mm
Wire Rod : 5.5 to 10mm

Mill Size : 10,000 to 50,000 TPA
50,000 to 200,000 TPA
200,000 to 600,000 TPA

UGI designed TMT Bar Mills has a varied range of production & each mill is designed & customised as per the customer requirement. We engineered the TMT plant in accordance with the desired Tonnage and product mix, size of Input material and degree of automation.

Our technical collaboration with SEAD Steel Technologies is for SLIT Rolling for production of TMT Mills beyond 200,000 TPA capacity. This collaboration for technological enhancement, engineering, process knowhow, operational support required for the mill.



Section Mill / Structural Mill

Large & medium Structural Mill,
Angle, Channel, H/I Beam, Joist, Round, Square, Hexagon
T-Section, Window Section

Mill Size : 100,000 to 200,000 TPA

With the help of our distinguished professionals, our company has been able to mark its strong presence in the market as one of the well-known manufacturers and exporters of Modern Section Mill. These section mills are used in various production industries. Our offered range of section mills is appreciated for its user friendly operations and easy installation. Modern Section Mill is manufactured as per the industrial norms and standards for best and optimum standards.

RANGE OF PRODUCTS

Narrow Width Strip Mill

Thickness	:	0.8 mm to 8.0 m
Width	:	upto 50mm
Coil Weight	:	1.50 MT
Mill Size	:	10,000 TPA to 200,000 TPA

Narrow strip mill, designed by us, assures desired thickness & edge of strips through using horizontal & vertical stand, is a standout in both local and international markets. The coil weight & width designed in order to meet the requirement of the pipe mill. Narrow strip mill is designed in a configuration that assures uniform tension distribution across the strip in order to dimensionally homogenous strip products.

UGI Engineering provides all inclusive solution of narrow strip mill equipment, components, utility, drives, electrics and automation systems to suffice demand of the optimal performance, premium product quality and tremendous operational flexibility.

Rolling Mill Equipments :

- **Mill Stand - 2 Hi, 3 Hi &4 Hi**
- **Horizontal, Vertical, Conventional, Housingless, Pre-stressed, Roller Bearing Stand,**
- **Multi Row Roller Bearing Stand, Convertible Stand**
- **Gear Boxes & Pinion Stands**
- **Gear Coupling - Triple Crowned Barrel Shaped**
- **Spindle Coupling, Universal Cross Joint**
- **Cooling Bed - Rake Type, Turnover & Breaker Type with Twin Channel**
- **Shears - Crop & Cobble, Cold shear, Cut to Length, Rotary shear, Flying, Mechanical & Hydraulic**
- **TMT Line - With Pinch Roll, Braking Pinch Roll**
- **Billet Pusher, Billet Ejector**
- **Tilting Table, Y Table, Charging Table, Roller Table, Chain Transfer, etc.**
- **Automation**
- **Steel Melting Shop / CCM equipment**

Latest designs & trouble free operation

MILL STANDS

CONVERTIBLE STAND

CONVERTIBLE & UNIVERSAL STAND

- 2 Hi - 3 Hi - 4 Hi upto 750mm PCD
- Fibre Bearing - Roller Bearing
  Multirow Roller Bearing
- Convertible Stands for Horizontal &
  Vertical Configuration
- Housing Less / Pre-stressed Stands
- Quick stand changing through Robots
- Automatic screw down System
- Hydraulic system for axial adjustments
- Self balancing support for Spindles

MILL STAND

UNIVERSAL STAND

Housing Less stands are the latest in modern Hot Rolling Mills. Multi Row Roller Bearings used with self aligning chocks for backlash free operation under load.

HOUSING LESS STAND

MILL DELIVERED TO CONCAST

GEAR BOX & PINION STAND

ROBUST EFFICIENT SMOOTH

In order to meet the challenge of designing, manufacturing and supply of Double Helical Gear Boxes, Double or Triple Output Gear Boxes, Gear Box cum Pinion Stands and Case Hardened & Ground Gear Boxes, we emphasize on quality, raw material, heat treatment and considering the desired service factor to sustain shocks and impacts of Rolling Mill duty Gear Boxes. All our Gear Boxes are designed as per BIS & DIN Standards. Due to our utmost quality, perfect design, we provide Running Guarantee of 5 years for our Gear Boxes & Pinion Stands and the allied equipments. Rugged and generously proportioned steel housing of rigid structure, precisely machined to maintain the alignment of gears and bearings, duly annealed and with adequate stiffeners underneath the bearing seating for free and noise damping design.

All the antifriction bearings used are of SKF / FAG / NTN make.

Gear boxes are provided with splash lubrication / forced lubrication in accordance with the horse power and life duty Operation. Dual lubrication system with Geared Pumps, Valves, Regulators, Heat Exchangers and all other fittings are provided.

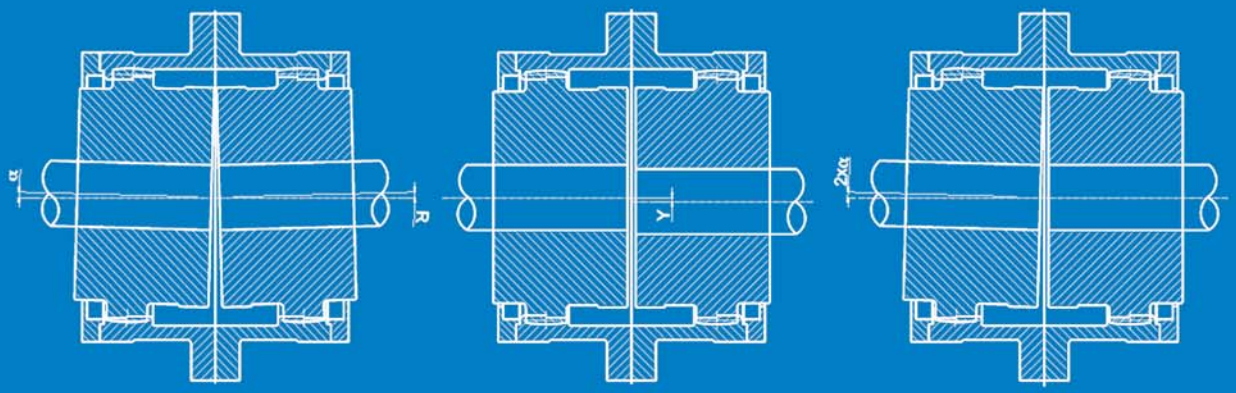
The gears are manufactured only out of ultrasonic quality alloy steel and duly heat treated. In case of Ground and Hardened gears, they are manufactured from high alloy case hardening steel and are profile ground to provide a highly efficient drive.

The shafts are all manufactured from ultrasonic quality C45 Grade steel, toughened to 240 BHN and precisely machined between centre. Positive Seals, SKF make, prevent oil leakage at both high speed and low speed shafts. In few cases double Oil Seals are provided also for prevention of oil leaks.

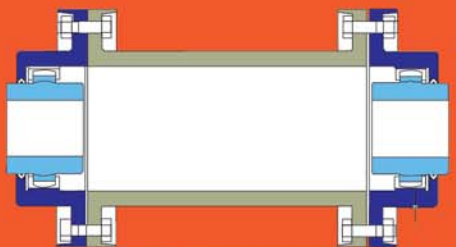
We also design and manufacture custom made Gear Boxes for Engineering, Sugar, Power and Allied Industries.

GEAR COUPLING

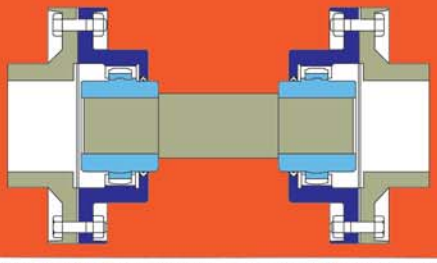
The necessity and the advantages thereof, of using Geared Coupling on all directly coupled rotary machines are now recognized and appreciated by engineers and the mill operation people. Gear couplings compensate for the usual and unavoidable deviations in alignment and they allow for free lateral flow to the coupled shafts. Even when favorable conditions permit perfect alignment of the two shafts, there is no assurance that they would remain so. The vibrations, the sinking of foundation, wear of bearings; inaccuracies in machining increasing over period of time in operation, are all common enemies to the safe and efficient operation of coupled rotary equipment. When transmitting torque, the need is for a perfect selection of the correct type and size of coupling to achieve the optimum efficiency and system reliability. UGI designed Gear Couplings, barrel shaped with Triple Crowned tooth, are the right solution for coupling.



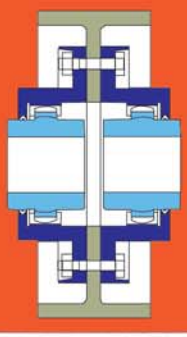
These couplings in assembled condition are ready to take care of the axial and radial misalignments for all the directly coupled rotary machines to increase the life of the system, smooth transfer of power and torque and therefore increased profit.



SPACER TYPE COUPLING

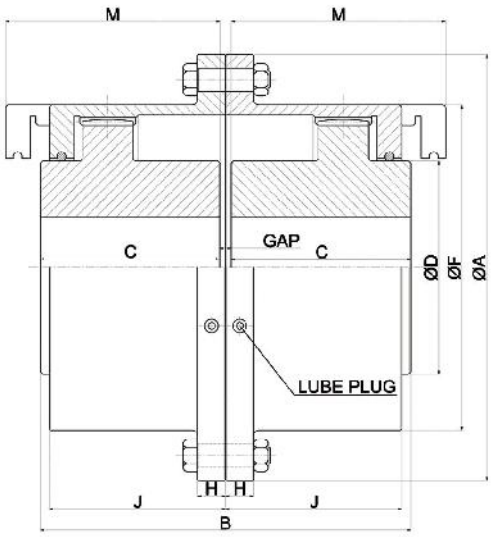


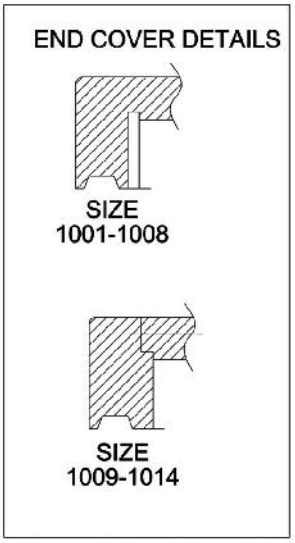
GEAR COUPLING WITH FLOATING SHAFT



BRAKE DRUM COUPLING

GEAR COUPLING





SIZE	HP per 100 rpm	Torque max rpm	Speed max rpm	Bores in mm			DIMENSION IN mm									Weight
				Flax mb max	Mn	Pilot	A	B	C	D	F	H	J	M	GAP	
1001	14.5	105	6300	45	20	15	170	115	55	65	110	17	49	65	5	10
1002	31.5	225	5000	60	30	20	185	145	70	85	125	17	62	80	5	15
1003	67	485	4000	75	40	20	220	175	85	105	150	20	78	105	5	26
1004	121	870	3350	90	45	25	250	215	105	130	175	20	96	125	5	40
1005	167	1200	2800	110	50	25	290	230	110	155	200	25	106	140	10	63
1006	258	1850	2500	125	65	25	320	260	125	175	230	25	125	150	10	86
1007	419	3000	2120	140	80	25	350	290	140	200	265	25	140	170	10	122
1008	524	3750	1900	160	95	25	390	330	160	235	300	28	152	190	10	160
1009	628	4500	1700	180	105	25	445	340	165	260	355	30	164	205	10	200
1010	1075	7700	1400	220	120	100	490	370	180	300	405	30	176	220	10	300
1011	1535	11000	1250	260	130	100	545	410	200	340	460	30	196	235	10	475
1012	2430	17400	1120	300	140	120	590	490	240	380	500	35	225	275	10	640
1019	3255	23300	1000	330	180	160	680	535	260	440	560	35	250	300	15	885
1014	4455	31900	900	355	230	210	730	575	280	480	610	35	270	320	15	1110
1015	5540	39650	800	385	270	250	780	655	320	540	660	40	310	340	15	1430

Procedure for selection of couplings

Selection for Gear Couplings between driver and driven

HP Per 100 RPM = HP of the Motor ∗Service Factor 100/RPM of the Shaft

LOAD	SAFETY FACTOR			
	Driver Equipment	Moto or Turbine	TYPE DRIVER Hydraulic Drive	Reciprocatng Engine
UNIFORM	Centrifugal Pumps, Conveyor, Excitor, Fans and blowers, Generators, Mixers Liquid.	1.0	1.25	1.50
LIGHT SHOCK	Centrifugal Pumps, Generators - Pulsating Load, Grinders, Hydraulic Pumps, Kilns, Line Shafting, Machine Tools, Oscillating Pumps, Textile Machinery, Wood - Working machinery.	1.5	1.75	2.0
MEDIUM SHOCK	Air Compressors - Multi - Cylinder, Ball and Rod mills, Cranes, Elevators, Hoists, Punch Presses, Reciprocating Pumps, Shears, Ship Drivers, Welding Generators.	2.0	2.25	2.5
HEAVY SHOCK	Air Compressors - Single Cylinder, Dredges, Drilling rigs. Mine Machinery, Rolling Mills Drivers, Rubber Mixers.	2.5	2.75	3.0
EXTREME SHOCK	Ore Crushers, Barstock shears, Vibrating conveyors.	3.0	3.5	4.0

SHEARS

FLYING SHEAR	**Start & Stop type / Cut-to Length** To cut finished bars /Angles / flats at the desired length Max PCD – 1000mm, Max. Stock size -32mm
CROP & COBBLE SHEAR	**Start & Stop type / clutch type / crank type** To cut front and tail end, cobble up Bars Max PCD – 1000mm, Max. Stock size – 100mm
COLD SHEAR	**Mechanical / Hydraulically operated** To cut finish product TMT/Structural Sections Max. capacity – 500 MT
ROTARY SHEAR	**Fixed & Swivelling** To cut front and tail end, cut-to-length Max PCD – 610mm, Max. Stock size – 50mm
BILLET SHEAR	**To cut upto 150 x 150mm billet**
CONTINUOUS SHEAR	**For cutting 8,10 and 12 mm**
HOT SAW	**For cutting Section / Structurals / Rounds / Squares**

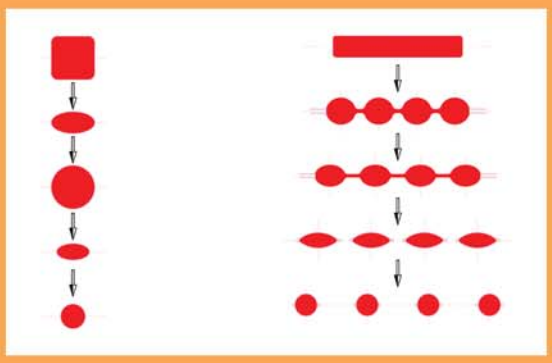
ALLIGATOR SHEAR / PENDULUM SAW / SNAP SHEARS / CUT-TO LENGTH SHEARS

SLIT ROLLING

Basic Method of Slit Rolling

In the conventional rolling process of bars, the billet is passed through rolls having various grooves and a single bar is obtained. In the Slit Rolling Process, however, rolling is performed using special roll passes and rolled bar is then longitudinally divided into two or more parts by a special slitting device so that two, three or four bars are produced from one billet.

The diagram below shows the process of Slit Rolling and comparison between conventional rolling and the Slit Rolling, respectively.



Advantages of Slit Rolling

Benefits are attainted in terms of productivity, rolling cost and accuracy.

- Rolled pieces is divided into 2 or more parts thus omitting the need to roll the final products from stock having double the section area
- High productivity at a relative low speed
- Less no. of stand a low speed hence avoiding high speed strands
- Building space required is substantially less in case of SLIT Rolling
- Reduction in electric consumption for the same production
- Roll consumption per ton can be reduced.
- Lower rolling cost.
- Benefit in product accuracy.

SLIT ROLLING IN BAR MILL

Process Flow

BILLET
(130x130x6000mm – 780kg
130x130x12000mm – 1560kg)

↓

Billet receiving and charging

↓

Billet reheating in the furnace (pusher type)

↓

Pinch roller discharge from the furnace

↓

Hot billet transfer by inlet roller table

↓

Toggle shear with pinch roll

↓

3 high roughing mill
(4 stands h-v configuration in future)

↓

Intermediate mill
(6 stands h-v configuration)

↓

Flying crop shear

↓

Finishing mill (6 stands h-v configuration)
Including Slitting mill stand

↓

T M T

↓

Cut-to-length flying shear

↓

Cooling bed

↓

Cold bar shear

↓

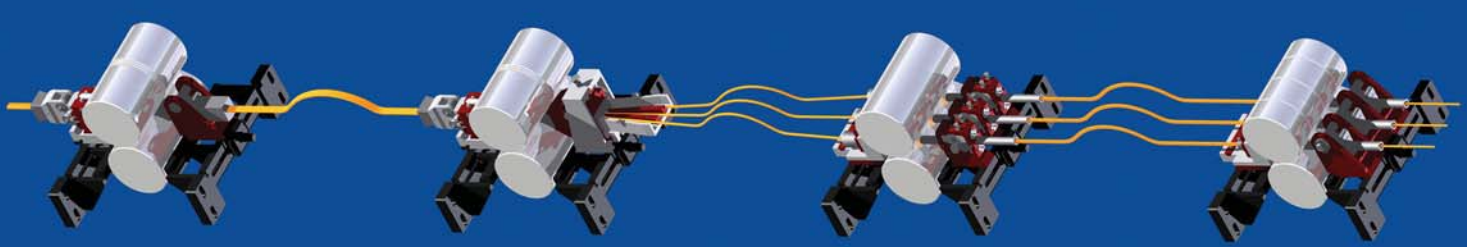
Bar bundling and counting

↓

Tying

↓

BUNDLES WEIGHING AND DESPATCHING



Proven Technology with Quality Assurance

BILLET PUSHER BILLET EJECTOR COOLING BED

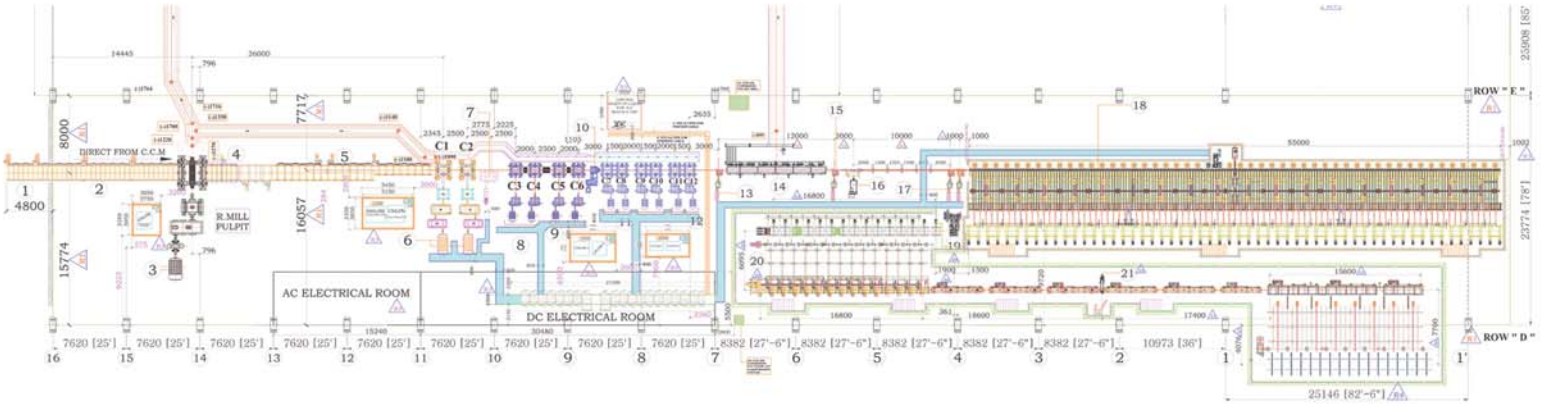
BILLET PUSHER - is provided for charging the Billets into the furnace (Double Row / Single Row) upto a capacity of 75MT/Hour. Billet Pushers are designed to suit the furnace,and can be either Mechanical or Hydraulically operated.

BILLET EJECTOR - is provided opposite to the furnace discharge door for pushing the billets out of the furnace. The Billet withdrawing device is usually mounted on a trolley specially designed to withstand the furnace heat. The travelling trolley operation can be Manual / Motorised / Hydraulic.

COOLING BED - naturally cools the materials as well as cross shift them towards the discharge end. In the case of Coil / Wire Rod, the controlled cooling conveyor enables uniform cooling and for fast cooling it can be fitted with fans, while for retard cooling insulated hoods can be fitted. Cooling beds can be simple as manual handled to Automatic Rake type, Turn-over type, Twin Channel, Mechanized chain carry over, etc.

Delighted customers

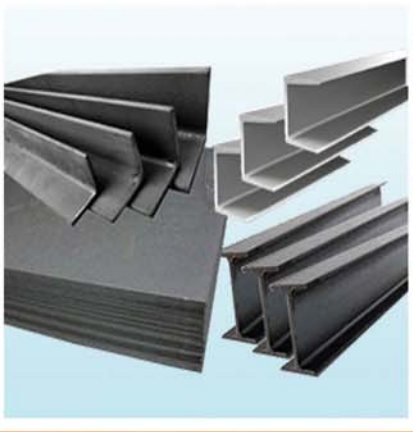
OUR CLIENT LIST



UGI ENGINEERING WORKS PVT. LTD.

23/F/K/J, K.B. Sarani (The Mall Road), Kolkata - 700080, India
Ph: 91-33-25591304, 25512263, Fax: 91-33-25595924
Email : admin@universalgears.com
Website : www.universalgears.com, www. universalsteelmills.com

Wire Rod Mill	TMT / Re-Bars Mill	Structural Sections Mill	Narrow Strip Mill
Upto 2,00,000 TPA	Upto 5,00,000 TPA	Upto 2,00,000 TPA	Upto 2,00,000 TPA



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