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FORGING CUTTING UNIT

The cutting unit performs the cutting of all raw materials and cuts the parts built based on the control program regularly and 24 hours a day. Cutting is done in two methods of saw and guillotine.

The cutting machines are as follows:

1. Wagner saw including 6 machines
2. Bandsaw including 3 machines
3. 750 tons guillotine machine
4. 500 tons guillotine machine

In addition, the tool sharpening unit, sharpens the cutting tool.

The cutting unit development program is being prepared and in order to increase its capacity, new machines have been predicted



FORGING FORGING WORKSHOP

The production unit is equipped with 20 production lines from 200 tons to 8000 tons press and all lines include 1. Induction furnace, 2. Forming press, 3. Trimming press, and most of the lines have rolling machines, too.

This part of the factory is located in the main hall under a ceiling and includes the following lines:

1. 200 tons horizontal press line
2. 900 tons horizontal press line
3. 0.6 MN press line (2 lines)
4. 0.8 MN press line
5. 10MN press line (3 lines) along with automatic & manual rolling machine
6. 13 MN press line (2 lines)
7. 14.5 MN press line
8. 16 MN press line along with manual rolling machine
9. 20 MN press line along with manual rolling machine
10. 25 MN press line (4 lines) along with automatic & manual rolling machine

11. 40 MN press line along with automatic rolling machine (2 lines)
12. 80 MN press line along with automatic rolling machine

Capacities of the Production Unit:

1. Existence of production lines with full equipments and their variety and employing experienced and expert forces have made the products of the company incomparable from the viewpoint of volume and quality.
2. Producing more than 1400 kinds of different parts weighing between 200 gr to 100 kg including the parts of the agricultural machineries, oil and gas industries, railway and rail industries parts, textile industries, cement industry, electricity equipments, automobile industries parts such as front suspension and motor and also aviation industries.
3. In automobile industries different kinds of front suspension parts that are of great importance are produced regularly and sent to the customer after different controls such as overlap, crack and weight.

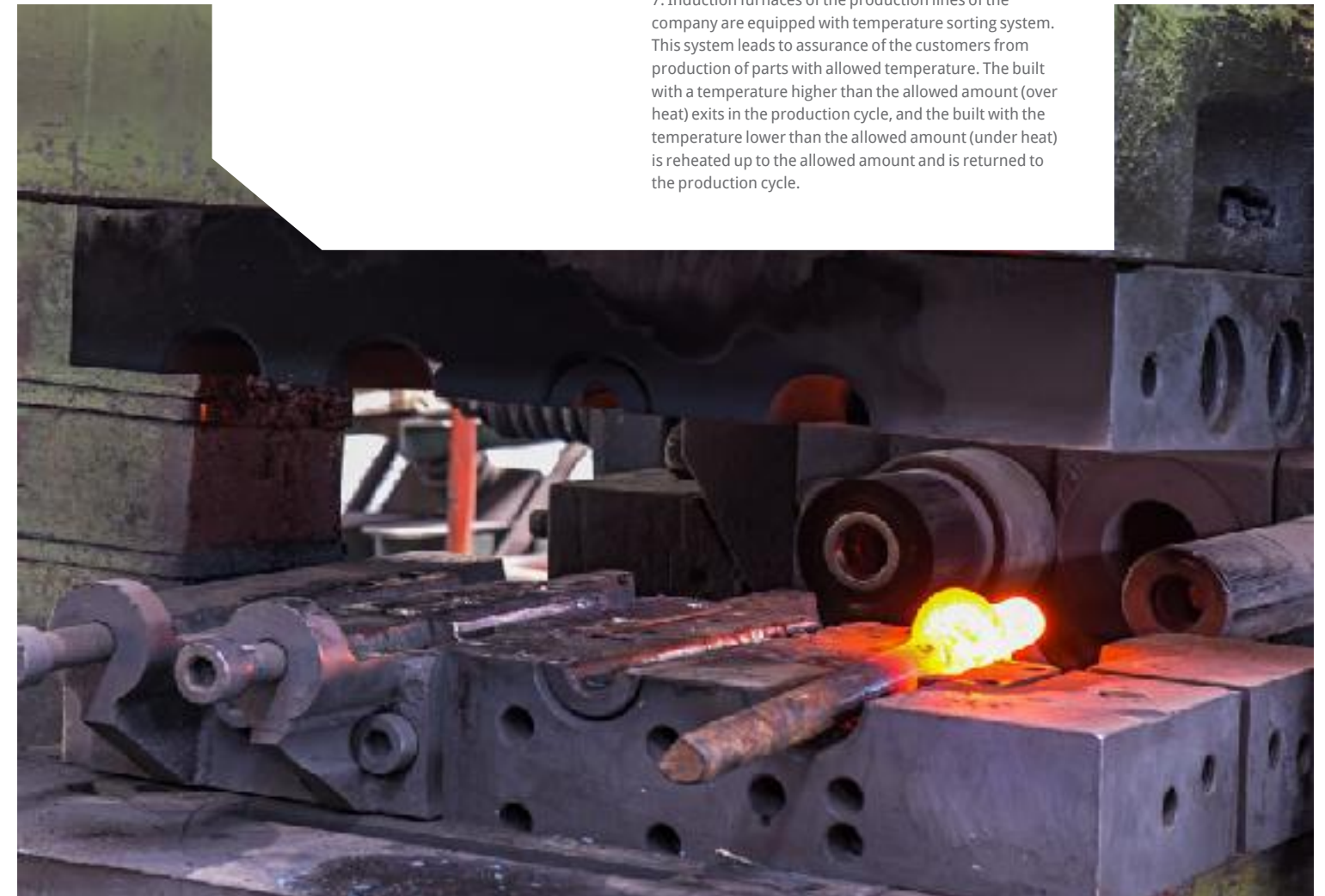






FORGING FORGING WORKSHOP

4. The capacity of 8000 tons press and production of 3, 4, and 6 cylinder crankshafts has made this company unrivaled in the region.
5. Producing shattons of gasoline and petrol motors is in a way that includes the weight precision of ± 12 gm.
6. Different machines of rolling the parts manually and automatically allow the uniform production and operator error decrease, and reduce the waste.
7. Induction furnaces of the production lines of the company are equipped with temperature sorting system. This system leads to assurance of the customers from production of parts with allowed temperature. The built with a temperature higher than the allowed amount (over heat) exits in the production cycle, and the built with the temperature lower than the allowed amount (under heat) is reheated up to the allowed amount and is returned to the production cycle.



FORGING HEAT TREATING UNIT

This unit includes 2 sections:

1. Continuous thermal operation furnaces
2. Hardening and return furnaces

1. Continuous Thermal Operation Furnaces:

Continuous Thermal Operation Furnace No. 1

This line regularly performs thermal operation of the produced parts with anneal cycle (isothermal anneal) in order to reach the homogenous ferrite and perlite structure generally in the cemented parts in gear wheel parts of the gearbox of different vehicles, tractor and other machineries. The important points of thermal operation cycle such as temperature and the storage time of the parts are determined and inserted in the control program. This furnace can perform anneal and normalized thermal operation on the parts. The control unit does sampling from all operated parts equal to AQL and at required number and sends the samples to the laboratory.

FORGING HEAT TREATING UNIT

This line is equipped with monitoring system and records the storage time of the parts in each zone along with their temperature in different hours. This monitoring also includes the stage after fast cooling that is called the return operation (the last zone). Line monitoring by registering the record of thermal operation assures each controller from the accuracy of the procedure. Continuous Thermal Operation Furnace No. 2
This line has also been installed by an Iranian company and by removing the defects has been placed in the production line with its all capacity.



FORGING HEAT TREATING UNIT

This furnace has been designed and constructed similar to line 1 for the parts with isothermal anneal cycle and its cooling unit completely controls its cooling time using the cool air. This line has a monitoring system that registers and keeps the operation records. These furnaces are continuous contrary to batching furnaces that the parts enter the furnace from one side and exit from the other side.

2. Batching Thermal Operation Furnace (Hardening and Return)

Besides these two continuous thermal operation lines, several batching furnaces do hardening and tempering operations along with tempering furnaces. The hardening and batching return furnaces lines include 3 hardening furnaces, 3 return furnaces and one cooling tank. In these furnaces the hardening, return, normalization and anneal operations can be done on the parts. The charging capacity of the operations inside the furnaces is up to 1200 kg in each charging.



FORGING SHOT BLASTING & COINING UNIT

Shot Blast Workshop:

Includes 6 shot blast machines 2 of which are to shot the parts in a hanger way and 4 are in the form of rotary conveyor. The capacity of the shot blast workshop is more than 2000 tons per month that has the capacity to shot the parts weighing between 200 g to 100 kg.

Shot Blast Machines

1. 26GN I shot 2. 26GN II shot 3. WST-28-200 big shot 4. 15GN small shot 5. Big hanger shot 6. Small hanger shot 4. Coining Workshop:

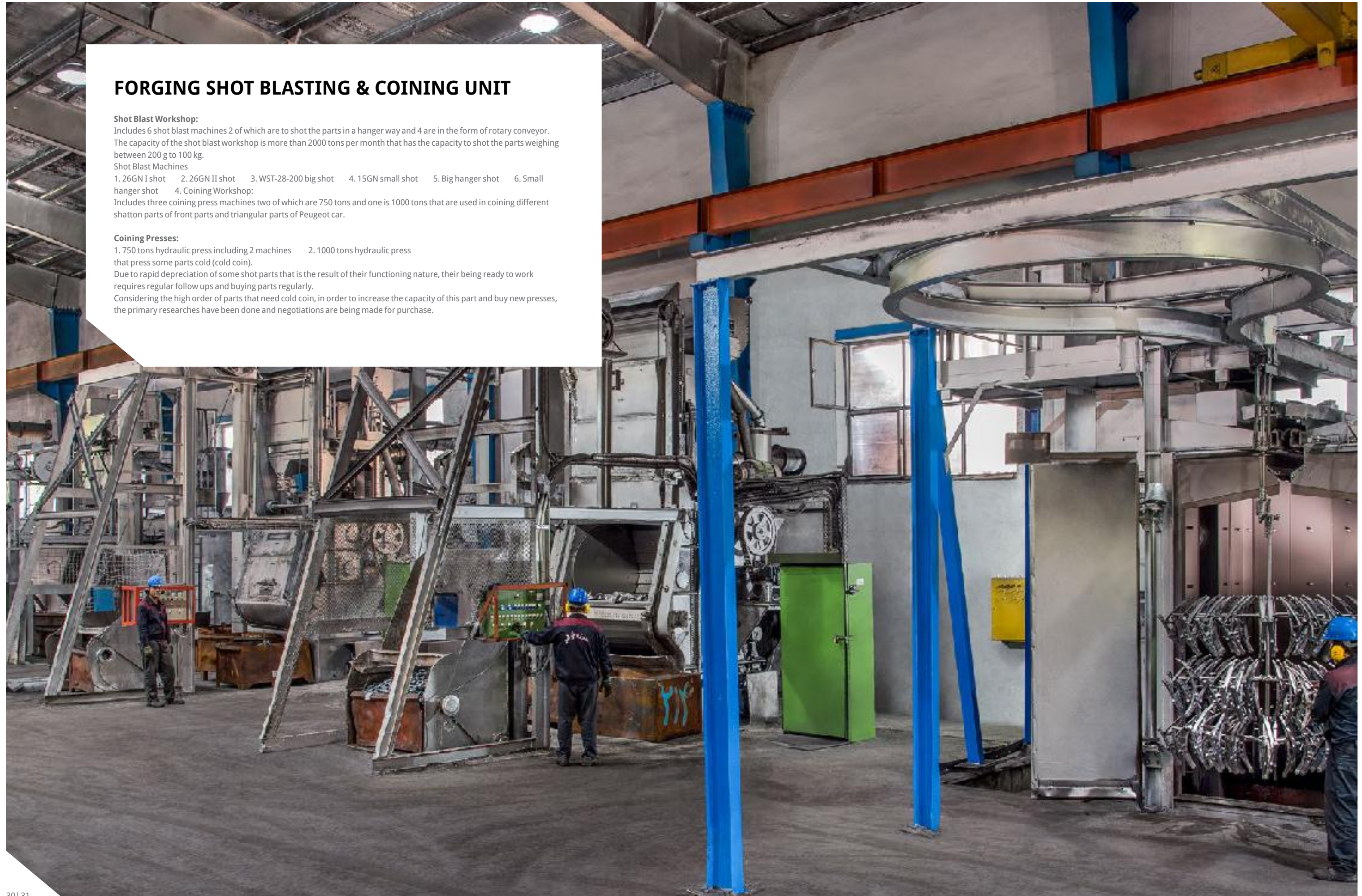
Includes three coining press machines two of which are 750 tons and one is 1000 tons that are used in coining different shatton parts of front parts and triangular parts of Peugeot car.

Coining Presses:

1. 750 tons hydraulic press including 2 machines 2. 1000 tons hydraulic press that press some parts cold (cold coin).

Due to rapid depreciation of some shot parts that is the result of their functioning nature, their being ready to work requires regular follow ups and buying parts regularly.

Considering the high order of parts that need cold coin, in order to increase the capacity of this part and buy new presses, the primary researches have been done and negotiations are being made for purchase.





FORGING QUALITY ENGINEERING

Quality Unit

The quality unit is responsible for controlling the items, imported materials, and produced products. In order to certify and provide the opportunity to use the steel imported to the company, in the first stage, dimensional control, chemical analysis, hardness and impurity investigation are done on these raw materials.

Introducing Different Sections of the Quality Unit:

Laboratory:

By having updated and advanced equipments, the laboratory of the forging company is able to perform tests such as quantometry, metallography, tension, impact, hardness measuring, microhardness, and fiber test.

Quantometry Machine: This machine is made by ARL company of Switzerland that has the ability to analyze 24 elements with the precision of 0.001%.

Tension Machine: This machine is made by Schenck Trebel company of Germany and is used for performing the tension and pressure tests on the samples with a maximum capacity of 400 kN.

Impact Machine: The mentioned machine is made by

Wolpert company of Germany and is used for impact test performing with the maximum absorbed energy of 300J. Hardness Measuring Machine: These equipments have the capability to measure the hardness of the materials and parts in Rockwell, Brinell and Vickers ranges that are used based on the hardness range.

Micro Hardness Machine: The mentioned machine is made by FUTURE-TCH factory in Japan and is used for measuring the hardness of metallography phases and also determining the amount of penetration depth of hardened surfaces using the methods such as nitriding, carburizing, etc.

Metallography Microscopes: These machines are used to determine the percentage and type of metallography phases of the parts and finally after comparing with the requested standards by the customer, the status of the parts is determined.

The Workshop of Preparing Metallography Samples: In order to the mentioned samples, different types of polishers with the mesh sizes of 180 to 1200 and aluminum oxide are used. The H Gram test is also used to observe the fibers of the parts in the mentioned workshop.

FORGING QUALITY ENGINEERING

Middle Control Unit:

This unit is responsible for controlling the produced parts in pressing workshop. All produced parts in different presses are measured based on the plan certified by the customer so that in case of observing any contradiction, the corrective measures appropriate with the appeared defect are taken.

The data extracted from this unit are registered permanently in SPC software in order to measure the status of parts production and statistical investigation. This section is also equipped with crack detection machine, digital scale and different measurement tools that based on the data received from the customer (plan – control design and other documents) the produced products are verified in the beginning of production and the parts are also controlled with defined periods upon production to prevent production of unmatched parts.







FORGING QUALITY ENGINEERING

Final Control Workshop:

In this workshop all produced parts are controlled based on the control plan related to each part. This workshop is equipped with different crack detection machines (MP), Eddy current, high precision scales and slipping conveyors.

Crack Detection Machines

The final control workshop is equipped with different crack detectors such as universal crack detectors, crank line crack detector, beam axle crack detector, and crack detector special for shatton line. Operators detect the cracks with Magnetic Particle method and under ultra violet light and separate the sound and cracked parts from each other. Using these equipments, safety parts such as Peugeot 206 and 405 triangular parts, suspension parts of the crankshafts and shattons are investigated from the viewpoint of crack existence.

Eddy Current Machines

This machine in the non-destructive method has the ability to separate the parts and substances with different materials and hardness in a way that in case of materials mixing or unmatched parts from the viewpoint of structure and hardness, this machine has the ability for separation and sorting.





FORGING DESIGNING AND ENGINEERING UNIT

Designing and Engineering

The designing and engineering unit as one of the most important sections of the forging company attempts to realize the policies of the company in increasing the quality of the parts and satisfying the customers by employing experienced engineers and using new designing software and methods. Producing parts with high precision based on the request of the customer in the least possible time and saving the raw materials by observing the quality of the part is one of the most important policies of the company in designing and engineering unit. For this purpose, in this unit, designing the moulds with high precision is done in CAD software and the model prepared from the primary design of the mould is used for simulating the forge process. Simulating process in this company is done by special softwares.

These software provide the opportunity to simulate the most complicated forge parts using the finite element and finite volume method with high precision. Using the simulating process, the forces required for parts production, the loads on the mould, probable defects of the part and materials flow are determined in two and three-dimensional method and designing the moulds and raw materials for removing the probable defects and production process optimization are continuously corrected.





FORGING MACHINING UNIT

Mould Making Unit

All moulds required for production line are made in the company and in order to achieve high efficiency and decrease re-working, all new or repaired moulds are examined precisely with CMM machine to be sure of the accuracy of the produced part. Benefitting from the advanced equipments in mould making unit, extensive services such as making different kinds of moulds, machining the big and complicated parts, thermal operations in vacuum furnaces and dimensions control with CMM machine are offered to the industry unit.

The Main Facilities and Capacities of the Mould Making Unit: The ability to offer technical engineering services in the field of different moulds such as software modeling, graphic and copper spark model making, simulating the forge process and mould making consultation

Machining different moulds with 3000*2000*1000 dimensions and multi-axis milling with CNC HIGH SPEED, and DNC mould, turning, spark and wire cut: High speed CNC milling machines model 2016 and 2017 (eight machines)

AGIE spark machines made in Switzerland

CNC milling machines including: Three-axis CNC milling machines – MAHO (Made in Germany) Four-axis CNC milling machines – BOKO (Made in Germany) Five-axis CNC milling machines – INGERSOLL BOHLE (Made in Germany)

Copy milling machines General milling machines Universal lathe and milling machines AGIE-CNC wire cutting machines (Made in Switzerland) Four-axis CNC milling machines – SHW (Made in Germany) – 900*2500*8000 mm CNC – GEORGE FISCHER & GILDEMEISTER lathe machines Universal lathe machines Flat and round grinding machines Sharpening and cutting tools manufacturing universal machines Repairing and rebuilding different kinds of moulds and spare parts of the machineries Automatic MIG welding line KESPAR & LINKOLN flux cored welding machines – (FCAW)

Hardening and nitrocarburizing thermal operation in Degussa vacuum furnaces with carbon cooling and gas nitriding special for moulds and tools

Polishing different moulds

A part of the records of the services offered to the customers:

1. Making different full die cast and low pressure moulds for TU5, TU3, EF7, and XU7 motors such as cylinder head, clutch shell, cylinder block, ladder frame, valve work, and bearing cap for Company



FORGING MACHINING UNIT

2. Making different die cast moulds during the recent years for Aluminum Casting Company, including body moulds to water container cylinder, clutch shell, differential shell and odometer shell
3. Making a series of moulds including pole shoes and die cast moulds for Company
4. Making the moulds for forming and cutting aluminum sheets for Optics Industries
5. Making different hot forming moulds for electric insulators used by Company for the first time



FORGING MACHINING UNIT

CMM Machine

This machine is made by DEA company that with the precision of 8 micron and with the work desk with the dimensions of 3m*1m*1m has the ability to control moulds and instrumentation.

The mould making of the forging company not only makes moulds, tools and spare parts of the presses, but also makes different die cast moulds of Iran Khodro Company. Controlling all mentioned moulds is performed with the highest precision by experiences personnel using CMM machine. The 3D files enter the machine through computer and the machine can compare the sizes of the part with the sizes of the entered nominal part and reports them on the plan.





FORGING HEAT TREATING UNIT

Degussa Unit:

Considering the significance of the thermal operation of the made moulds and with regard to existence of unique thermal operation workshop in this company, we would like to offer a brief description about it as follows:

One of the main needs of the mould making industries is the opportunity for hardening thermal operation and nitrocarburizing in vacuum furnaces that Iran Tractor Forging Company has taken a significant step towards self-sufficiency in making different forge, die cast and low pressure moulds by buying four thermal operation furnaces from Degussa Company of Germany and their installation and start-up, that the advanced technology with vacuum thermal operation furnaces is used in this workshop to optimize the life of forge and die cast moulds and steel tools. These furnaces can endure the pressure of 10-2 Microbar. Two of the four abovementioned furnaces are for hardening and two for return. The capacity of two small furnaces is 600 kg in each charging and that of the two big furnaces is 2500 kg in each charging.

FORGING TRADING UNIT

Main Duties of Procurement Section:

1. Includes preparing and supplying steel raw materials such as 27cd4 and 30msv6 to be used in production lines of the company and converting them to semi-final parts
2. Preparing and supplying the spare parts required for the companies' machineries repair, including the production lines machineries such as press machines and the machineries existing in complementary operation workshops such as thermal operation furnaces and shot blasts of complementary operations, hydraulic presses existing in final control workshops, the machineries for crack detection of the produced parts, and preparing and supplying the necessary parts for the machineries in mould making workshop
3. Preparing and supplying the used and protective tools for the workshop employees such as working gloves, safety shoes, etc. and also preparing the used materials of other parts such as constructional and industrial paints, the ironware used in the projects being constructed, and the blades used in the machineries of cutting workshop
4. Preparing and supplying the tools used in machineries in the mould making and spare parts making workshops





**FORGING
PRODUCT SAMPLE**

Spindle Knuckle RH
TF1242



Spindle Knuckle RH
TF1299



Steering Arm
TF0661



Spindle Knuckle RH
TF0885



Housing
TF0634



Socket Iec
120- 20
TF0768



Fork Shifter
TF1222



Track Rod Arm
TF1113





Hook
TF504



Diff. Spider
TF1058



Cap
TF0267



Crank Shaft
TF0413



Lenkhebel Links
TF0636



Fork- Shift Rev. b
TF0624



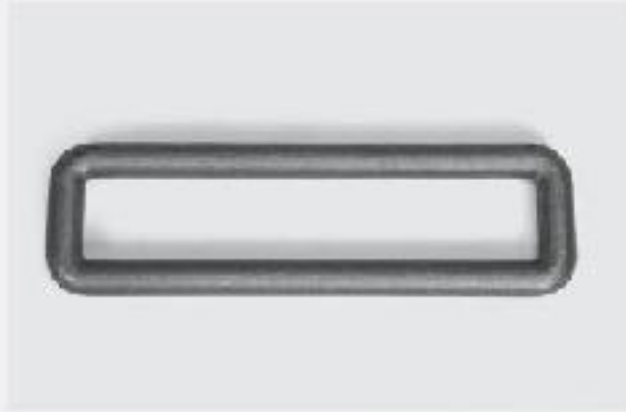
Conecting Rod Tu5
TF1248



Triangle RH
TF0929



Rod
Center
TF0956



Steering Lever
TF0938

Steering
Lever
TF1092



Rectangle
TF0418



Con.Rod (457)
TF1090



Arm- Hdy.
Lift
TF0053



Cam Shaft
TF0265



Achslenker, von
TF0770



Biyel Kolu
TF0997

FORGING DEVELOPMENT PLAN

COLLABORATING
WITH



By virtue of the agreements with senior directors of Iran Khodro and Sapco Companies and in order to reach to full self-sufficiency in design and manufacturing of types of molds required for Iran Khodro Company, this company has invested in the mentioned field as follows:

Training and transferring the design technology of types of the required and new molds through joining Tecno Mold and Bram Bila Companies of Italy and Heck & Becker Company of Germany

The required arrangements have been made for establishing, communicating, training and transferring the technologies.

Construction of a new metal production hall with the area of 1800m² adjacent to the present location. The operations related to construction and installation of all machinery and equipment were completed. It should be mentioned that the abovementioned metal production hall was constructed with cooperation and confirmation of Heck & Becker Company and established only for manufacturing of gravity and die cast molds.

Purchase of 27 CNC High Speed Milling Machine as follows. The relevant installation operations were completed:

a new High Speed CNC, DMG milling machine – Model 2016, for manufacturing of types of cylinder head

13 new High Speed CNC Milling Machines, Chevalier Model 2017 and 2016 - 1m for manufacturing types of cylinder head

6 new High Speed CNC Milling Machines, Chevalier Model 2017 with Table size 2016-1.6m Table load (6 tons) for manufacturing types of Core and Cavity of types of cylinder blocks

3 new High Speed CNC Milling Machines, Chevalier Model 2017 and 2016 – 0.80cm for manufacturing types of cylinder head

2 new High Speed CNC Milling Machines, Chevalier Model 2017 and 2016 – 1.2m for manufacturing types of Core and Cavity

a new High Speed CNC double column vertical machining center, Chevalier Vertical Model with table size (6*2*1m) table load(25 tons) for manufacturing types of frames of model 2017

a new High Speed CNC Horizontal Boring & Milling Machines, Chevalier horizontal 5-axis Model along with table load (11 tons) for manufacturing types of clutch shell of model 2017

4. Employing 100 employees among the top students of the reputable universities for working in CNC workshop and training and transferring technology for design and manufacturing of types of molds

The sample images of abovementioned activities are presented for your notification.







