BRIEF INTRODUCTION

- Advanced Facilities
- Integrated series of products
- Leading products and application field
Advanced facilities
Specialized production line

- Short flow continuous rolling line: 90t EAF+90t LF/VD+CCM+continuous rolling line for alloy steel bar, the production capacity per year is 50,0000 tons (Beiman)
- Continuous rolling line: 60t EAF+60t LF/VD+CCM+ continuous rolling line for alloy steel bar, the production capacity per year is 40,0000 tons (Fushun)
- Special steel wire line: to produce stainless steel, bearing steel (Dalian)
- Die flat steel line: to produce high quality die flat steel (Fushun /Dalian)
- Bright steel and cold drawn steel line: alloy steel deeply-processed (Dalian)
- Special metallurgical line: heat-resisting super alloy, titanium alloy (Fushun)
- Precision alloy line (Dalian)
- Forging facilities: 3500t and 3000t (Beiman/Fushun)
Six producing bases

- Automotive steel base (Fushun).
- Bearing steel base (Beiman).
- Tool and die steel base (Fushun, Beiman).
- Super alloy base (Fushun).
- Stainless steel, bearing steel, alloy spring steel wire rod base (Dalian).
- Deeply-processed special steel base (bright steel, cold drawn, special steel wire) (Dalian).
Advanced facilities — Electric arc furnace

- 1 × 90t/CONCAST
- 1 × 60t/FOCUS
- 1 × 50t/KRUPP
- 1 × 45t/KRUPP
- 2 × 40t
- 8 × 25t
UHP EAF : 90t / CONCAST ( Beiman )
UHP EAF: 60t /FOCUS; 50t /KRUPP（Fushun）
Advanced facilities — refining furnace

- 90tLF/VD  *CONCAST*
- $2 \times 60tLF/VD$  *DANIELI*
- 30t/60tVOD/VHD  *LEVSOLD-HERAEUS*
- 25tAOD; 25tVOD
VOD/VHD:30t/60t/LEVSOLD-HERAEUS（Fushun）
AOD: 25t (Dalian)
Advanced facilities —— concaster

- R12m × 4 strain / CONCAST
  180 × 180, 240 × 240 mm
- R12m × 4 strain / DNNIELI
  200 × 200, 240 × 240, 280 × 320, Φ450 mm
- R8m × 2 strain
  150 × 150, Φ180 mm
Concacer: low alloy steel/four units with four strands / CONCAST (Beiman)
concaster: stainless steel/two units with two strands（Dalian）
Advanced facilities —— special remelting

- **VIM**
  - 12t, 3/6t, 2.5t

- **VAR**
  - 12t, 7t, 1t

- **ESR**
  - 10t × 1 ;
  - 15t × 1 (26.5t);
  - 5t × 11;
  - 3t × 6;
  - 2t × 4;
  - 1t × 7.
VIM: 12t/ALD (Fushun)
VAR
12t/ALD
(Fushun)
ESR
15t(26.5t)
(Beiman)
Advanced facilities —— forging

- Hydraulic forging press
  30MN/PAHNKE
  20MN/DEMAG MEER
  35MN/DEMAG MEER

- Fine forging press
  10MN/GFM

- Hydropress
  30MN
  12.5MN
Hydraulic forging press
3500t
DEMAG MEER
(Fushun)
Fine forging press : 1000t/GFM (Fushun)
Advanced facilities—bar and wire rod rolling mill

- Bar and wire rod rolling mill
  H-V × 20 stand + Block × 10 stand
  /SMS
- Bar rolling mill
  - H-V × 24 stand / POMINI
  - H-V × 23 stand / POMINI
  - H-V × 10 stand
Bar and wire rod rolling mill: H-V × 20 stand + Block × 10 stand / SMS (Dalian)
Bar rolling mill: H-V×24 stand/POMINI (Fushun)
Bar rolling mill block: H-V×23stand/POMINI (Beiman)
Big diameter round bar rolling mill block: H-V×10stand (Dalian)
Advanced facilities——GFM rolling mill

- WF5-40 rolling mill with high precision
- Flat steel rolling mill with big sizes
Advanced facilities—deeply-processed facilities
Advanced facilities—Ultrasonic and Surface test
R&D and testing facilities

The instrument and facilities for technical development whose initial value 82.67 million RMB. In recent years, the three bases had imported several advanced analyzers and testing facilities from USA, Japan, Germany, Switzerland. The condition for researching and testing facilities has been in the leader in China.

- Chemical analyzer
- Physical analyzer
R&D and testing facilities — Chemical analyzer

- Emission spectrograph  **ICP USA**
- Infrared carbon and sulphur analyzer  **CS600C USA**
- Spectrometer  **ARL4460 Switzerland**
- Oxygen analyzer  **RO600C USA**
- Nitrogen analyzer  **TN600C USA**
- Hydrogen analyzer  **RH600C USA**
- Photoemissive direct-reading spectrograph  **PDA-5500 II Japan**
- ICP emission spectrograph  **Intrepid USA**
- Carbon and sulphur tester  **CS-444、CS-344 USA**
- Oxygen and nitrogen tester  **TC-500、TC-436**
R&D and testing facilities — Chemical analyzer

- Atomic absorption spectrophotometer PE-4000 USA
- ARL4460—Direct-readingspectrometer ARL Switzerland
- X-fluorescencespectrometer Japan
- ICP spectrometer PE USA
- Emission spectrograph Hilton England
- R0-600 Oxygen analyzer LECO USA
- Oxygen and nitrogen tester LECO USA
- Infrared instrument444 CS LECO USA
- 621W Hydrogen analyzer Japan
- Infrared instrument 8200CS Japan
R&D and testing facilities— Physical analyzer

- Metallographic microscope Neophot2 Germany
- Metallographic microscope Epittp2 Germany
- Metallographic microscope NEOPHOT32 Germany
- LECO300 microscope LECO USA
- vertical microscope AXIOVERT2 Germany
- Quantitative metallographic microscope EPLQVANT
- LEJCA Metallographic microscope DMRME
- X diffraction instrument Netherland PW1700 automation
- Scanning electron microscope Netherland SEM505
- JSM-35C Scanning electron microscope Japanese electronics
R&D and testing facilities—Physical analyzer

- Torsion testing machine **NJ-100B**
- Fatigue tester with high temperature and speed **PWC510WG**
- Pure bend Fatigue tester **PQ1-6 (PWC-600)**
- Mechanical tension tester **LJ-500**
- Electronic universal tester **AGIOOA**
- Electronic tension tester **USA INSTRON**
- Jominy hardness meter **USA INSTRON**
- Contact fatigue tester **JP-52**
Integrated series of products
Integrated series of products

- High Quality carbon steel
- Alloy structural steel
- Automotive steel
- Bearing steel
- Die steel and Tool steel
- Stainless steel
- Super alloy
- Special metallurgical commercial products (precision alloy, corrosion-resistant alloy, electrothermal alloy)
Integrated series of products

- We can make bearing steel, stainless steel, automotive steel, tool & mould steel and special material for Hi-Tech field.
- We have full sizes, including steel bar, wire, square, flat, sheet, strip and heavy forgings.
- The products are widely used in aerospace, electronics, machine manufacture, petrochemical, automotive, communication, transportation and medical instruments.
Integrated series of products——alloy steel wire rods

- Φ5.5~20mm
Integrated series of products—hot-rolled steel bar

- Φ10~310mm
- □12~250mm
Integrated series of products——
forged bar

- Φ60~1000mm
- □60~1000mm
Integrated series of products—
hot-rolled flat steel

- 6~130 ×
  60~610mm
Integrated series of products—
forged mould block

- 180~800 × 300~1300 × 350~6000 mm
Integrated series of products—forged discs and hole discs

- Φ300~2000 × ≥100mm
Integrated series of products
forged tube

- Φ450~1800 × 200~750 × 1000~3000 mm
Integrated series of products—
forged roller and shaft

- Φ 450~800
  × 250~500
  × 200~500
  × 2000~600mm
Integrated series of products ——
bright steel bar

- Φ10~280 mm
Integrated series of products——
cold –drawn steel wire

- Φ1~18mm
Integrated series of products——
cold-drawn bar

- Φ6~19mm
Integrated series of products——
precision alloy strip

- 0.05~3.0 × ≤ 400mm
Fourth part

Leading products and application field
Product and application—stainless steel

- cold-heading stainless steel
  - 302HQ, 304Cu,
  - 316 (L), 304M,
  - 304M4, 304EST,
  - 201Cu, 200Cu, 321
  - 410 (1Cr13), 420F,
  - 430 (1Cr17),
  - 431 (1Cr17Ni2)
Product and application—stainless steel

- welding stainless steel
  - H308(L)、ER308LHSi、H316（L）ER316LHSi、H309（L）, ER309LHSi
  - ER310、H1Cr21Ni10Mn6
  - HS367、D605
  - H1Cr13、H2Cr13
Product and application——stainless steel

- cutlery, knife and cooking
  stainless steel
  420, X50CrMoV15
  440A, 440B, 440C
  304, 304HC
Product and application—stainless steel

- fiber, mesh and cleaning ball stainless steel
  - 304 (L), 304HC, 316 (L), 430 (L), 409 series, 434, 309S, 310S, 304EST, 446
Product and application—stainless steel

- **Precision shaft stainless steel**
  416, T416, T416MS, 420J2 (3Cr13), 420F (Y3Cr13), 3Cr13Mo, T420, 4Cr13, 4Cr17Mo, 440A, 440B, 440C, 5Cr13 (Mo), 6Cr13Mo, DSR7B, 303, 303Cu, Y130M, D661, D662, D663, (202, 205)

- **High-strength spring stainless steel**
  304H, 302 (TH), 321, 631 (17-7PH), 304M

- **Medical apparatus stainless steel**
  317L, 00Cr18Ni14Mo3, 00Cr18Ni15Mo3N, 1-3Cr13 (Mo), 305
Product and application—stainless steel

- Valve steel
  4Cr9Si2, 4Cr10Si2Mo, 5Cr8Si2, 5Cr21Mn9Ni4N, 6Cr21Mn10MoVNbN

- turbine blade steel and mould steel
  1Cr13, 1Cr12, 1Cr12Mo, 1Cr11MoV, 1Cr12W1MoV, 1Cr12Ni2W1Mo1V, 2Cr13, X20Cr13, 2Cr12NiMo1W1V, 2Cr12NiWMoVNb, 2Cr11NiMoNbVN, 0Cr17Ni4Cu4Nb, B50A789, 3Cr17Mo, 3Cr13
Product and application—stainless steel

- The stainless steel for aerospace special remelting methods are used to maintain high purity and high toughness and high corrosion-resistant in order to keep international standard stainless steel products. We have more than 50 stainless steel products and over 300 sizes, each year we provide over thousands tons of material for aerospace. We have complete sizes, including steel bar, wire, square, flat, sheet, pipe, strip and heavy forgings.

  - martensitic hot strength steel
  - Oxidation-resisting and heat-resisting steel
    - S310，2520Nb

- corrosion resistant steel
  - 904，316L，1Cr21Ni5Ti，0Cr21Ni5Ti;

- high strength stainless steel
  - 17-4PH，15-5PH，17-7PH，PH13-8Mo，00Cr14Ni6Mo2AlNb
Product and application——stainless steel

- Non-magnetic stainless steel
  - 40Mn18Cr3N (V), 1Cr18Mn12NiSiN, 50Mn18Cr4V, 1Cr13Mn18NiMoNbN

- super- stainless steel
  - 0Cr13Ni4Mo, 00Cr13Ni5Mo, 00Cr13Ni6MoNb, 00Cr14Ni5Mo3A, 0Cr15Ni5 (Ti)
Product and application—automotive steel industry

- **Product category**
  gear, linking rod, crankshaft, alloy spring, quality carbon steel, low alloy steel.

- **sizes**
  wire rod: Φ5.5~20mm.
  bar steel: Φ12~310mm, Φ60~1000mm (forged).
  bright steel bar: Φ10~280mm.
Product and application—automotive steel industry

- Gear box and rear gear box steel
  
  Cr series: SCr420H, 20CrH
  
  Cr-Mn series: 16—28MnCr5
  
  Cr-Mo serie: SCM420H, SCM822H, 20CrMoH, 22CrMoH, SAE4130RH
  
  Cr-Ni-Mo serie: 8620RH (H), 8627RH (H), 8720H, SAE4320H, 17CrNiMo6H, SAE8822H, 20CrNi2MoH, 20CrNiMoH, 21CrNiMoH, 16NiCrMo12, SNCM420H-K
  
  Cr-Mn-Ni serie: 14CN5, 19CN5
  
  Cr-Mn-Ti serie: 16—20CrMnTiH (S)
Product and application—automotive steel industry

- Crankshaft and connecting rod

  non-quenched and tempered steel
  48MnV, 49MnVS3, 35MnVS, 50MnVS, C38, C38N2, 40MnV, SAE1045, 35Mn2Q, 40MnS, C70S6, CM35, YF35MnVS, S48C, SC38, 38MnVS6, FAS2230, S45CVS

  quenched and tempered steel
  42CrMo, 40CrAH, 20CrMo, 40MnB
Product and application—automotive steel industry

- front shaft

  non-quenched and tempered steel
  - 16Mn2VB
  - 12Mn2VB
  - 25-35Mn2CrV

  quenched and tempered steel
  - 42CrMo
  - 40Cr
Product and application—automotive steel industry

- Drive shaft steel

- 18CD4, CF53, 27CD4, 36CrMn4, CM45, SCM17, S53, S48, SMn40, SCM17, SVdH20S1, SAE4135H, SAE1541H
Product and application——automobile steel industry

- other automotive steel
  - 30MnVS
  - SAE1045
  - 18CrNi3Mo
  - 42CrMo4
  - AF70
  - 37CrS4HL
Quality management system
ISO/TS 16949: the system approved in November 2005 (BVQI approved by authentication institution)
The approved Certs by the second or third parts

- **Mn-Cr series of gear steel** — it is approved by Volkswagen, and which is used in Jetta cars.
- **50CrV4** — it is approved by First Automotive Group, which has become standard supplier for suspension spring in Hongqi car.
- **C70S6** — it is approved by First Automotive Group.
- **48MnV** — it is approved by Second automobile Cummins generator.
- **CM35** — it is approved by Shanghai Volkswagen, and has become exclusive supplier.
- **42CrMo4** — it is approved by Italy SEW, which becomes standard supplier for torsion bar spring in car.
- **S48C, S53C, SCM420H, S12C, SMn40** — it is approved by Toyota, has become standard supplier for CVJ steel in Tianjin Forging Factory.
- **18CD4, 27CD4** — it is used in Natiefu drive shaft steel in Shanghai.
- **8620RH, 8627RH** — it is approved by Eaton USA.
- **SCR420** — it is approved by Hyundai Korea.
Product and application——tool and mould steel

- Product category
  - hot work die steel, cold work die,
  - plastic die steel, razor steel.

- sizes
  - wire rod: Φ5.5~20mm
  - steel bar: Φ10~150mm, Φ60~1000mm (forged)
  - bright steel bar: Φ8~280mm
  - forged block: 180~800 × 300~1300mm
  - flat steel bar: 6~130 × 60~610mm
Product and application—tool and mould steel

- Hot work Die steel
  H13 (4Cr5MoSiV1)
  3Cr2W8V
  5CrNiMo
  5CrMnMo
  4Cr2MoVNi
Product and application——tool and mould

- Cold work Die steel
  - D2 (Cr12Mo1V1)
  - D3M(Cr8), Cr12, Cr12Mo1V1
  - DC53 (C8Mo2WSiV)
  - A18, O1, O2, S2
Product and application—— tool and mould

- Plastic mould steel
  - prehardening plastic mould steel P20, 718
  - mirror plastic mould steel P80R, NAK80 (10Ni3MnCuAl)
  - non-quenched and tempered plastic mould steel P120, P20M
Product and application——tool and mould

- Corrosion resistant mould plastic steel
  - 3Cr17Mo, FS136,
  - 1.2083, 1.2316
Product and application—tool and mould

- cutting tool steel
  - CrWMn,
  - 5Cr8Mo2WSiV,
  - 6Cr5WMoV,
  - 7CrWMoV。
Product and application——tool and mould

- Mould block
  - FS136:
    - $\leq 1200 \sim 1300 \text{mm} \times \\n    - $\leq 600 \text{mm} \times \geq 2000$ (ESR)
    - $\leq 1400 \text{mm} \times \leq 600 \text{mm} \times \geq 2000$ (refining)
  - P20:
    - $\leq 1300 \text{mm} \times \\n    - $\leq 300 \text{mm} \times \geq 2000$ (refining)
  - 718:
    - $\leq 1400 \text{mm} \times \leq 550 \text{mm} \times \geq 2000$ (refining)
718 718 MOULD BLOCK : 510×1200×2230/10960k (Fushun)
Product and application——heat resisting superalloy and titanium alloy

- It is China’s biggest base for studying and developing heat resisting superalloy and titanium alloy, and 70% superalloy materials were provided for China’s aerospace and the materials for aviation motor for China’s aerospace are supplied by Dongbei Special Steel.

- Complete deformation high temperature superalloy material system: Nickel-base, iron-base, cobalt-base alloy, solution, precipitation strengthening alloy. We have control of more than one hundred technologies for making heat resisting superalloy. Normally batch production produce 40 kinds of superalloy each year.

- Dongbei is the earliest special steel enterprise for developing titanium alloys in China. It produced more than 10 titanium alloy such as Ti-6Al-4V, meanwhile it made forged bar and discs, rolled bar, furthermore its turbine blade TC11 had attained National First Class progressive awards.

- Its products include turbo plate die forgings, turbo-rotor blank, rolled bar for blade, forging bar for installation edge, plates for combustion chamber.
Product and application—heat resisting super alloy and titanium alloy

- Material for turbo plate
  - A-286
  - Inconel718
  - GH4133B
  - Incoloy901
  - Waspaloy
  - Udimet500
  - Rene41
  - Inconel706
  - ЗИ 698
  - ЗП 742
Product and application——heat resisting superalloy and titanium alloy

- Material for turbo blade
  - Nimonic80A, Nimonic105, ЗИ 929, ЗИ 826

- Turbo outside ring and installation edge
  - Incoloy903, Incoloy907, ЗИ 696
Product and application——heat resisting superalloy and titanium alloy

- Material for combustion chamber

In 2005, Dongbei Special Steel Group was approved by ROLLS—ROYCE for heat resisting superalloy and stainless steel products.
Product and application——bearing steel

- With such prestigious customers as SKF、TIMKEN、INA、NSK into Chinese market, the bearing steel is purchased increasingly.
- Dongbei Special Steel Group has the cutting-edge in technological innovation, and positively attracts advanced technology and talented people to ensure that bearing steel products are made complying with international standards in order to enhance the real product quality.
- Dongbei Special Steel Group integrated the advantages from three bases, and makes great effort to adjust the product mix, division of labor, development, to promote the formation of bearing steel series. In 2004, our output of bearing steel was 0.48 million tons. In 2005, 0.51 tons, it has become a leading product in the development of enterprise.
## Product and application—bearing steel

<table>
<thead>
<tr>
<th>year</th>
<th>National output of bearing steel /million ton</th>
<th>Dongbei Output of bearing steel /million ton</th>
<th>Output amount to national output/%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>1.34</td>
<td>0.48</td>
<td>32.84</td>
</tr>
<tr>
<td>2005</td>
<td>1.58</td>
<td>0.51</td>
<td>32.28</td>
</tr>
</tbody>
</table>
INA attestation

- In 2005, IMS was approved by INA for bearing steel products.
Product and application—special alloy and forged products

- Resistance alloy
- Precision alloy
- Heavy and section forging
- Bimetal strip
- Bimetal saw
- Steel pipe
Product and application——
special alloy and forged products

- Precision alloy

  It was produced in 1961, and was the first enterprise for studying and producing precision alloy, and the first set of technical specification were drawn up and issued by it. The precision alloy including soft-magnet, permanent magnet, elastics, expansion, thermal bimetal, resistance heating, thermocouple, are also called metal functional material. The category includes bar, plate, strip, wire and tube.

  It is widely used in aerospace, navigation, weapon and petrochemicals, precision machinery and instrument, and light industry, which is the key material for national defence, military and hi-tech. Dongbei has made a great contributions for national defence construction and social economic development.
Product and application——
special alloy and forged products

- electro thermal alloy

The advanced methods is applied to make Fe-Cr-Al, maximum weight is 1000Kg, it is sole company that can make heavy coil in China. Reliable quality and winning high praise from customers.
Product and application—special alloy and forged products

- Heavy and section forging

3000t and 1250t water press is used to produce heavy and section forging, (barrel, ring and disc), they are high added value products with advanced technology, for example, cannon barrel, 925A submarine structural element, big caldron with high pressure.
Forged barrel: outside diameter 1800mm (Beiman)