

# STEEL MAKING

## FROM RAW MATERIALS TO FINISHED STEEL PRODUCTS

A ORE MINES

A THREE PRINCIPAL RAW MATERIALS FOR STEEL MAKING - IRON ORE, COAL AND LIMESTONE. IN NORTH AMERICA, ABOUT 85 PER CENT OF ORE IS MINED IN LAKE SUPERIOR DISTRICT.

B ORE VESSELS TRANSPORT ORE FROM MINES TO BLAST FURNACES.

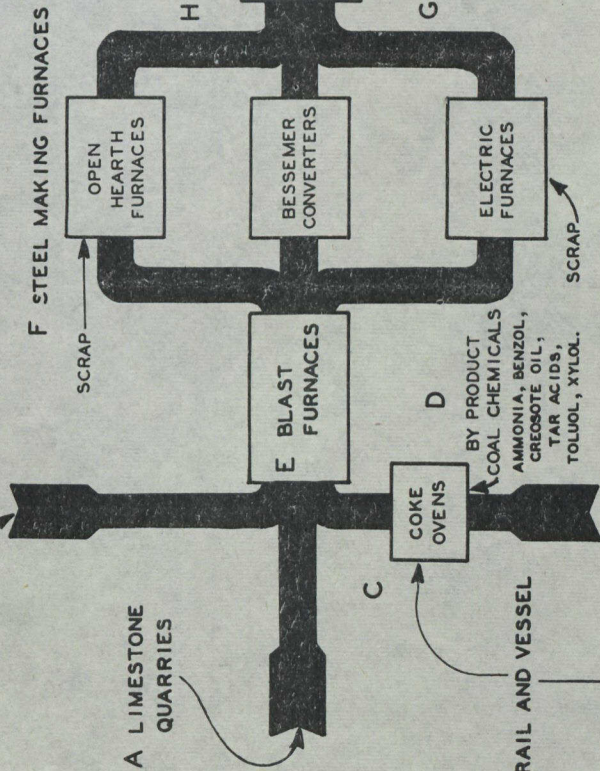
B ORE VESSELS

C IN COKE OVENS COAL IS MADE INTO COKE FOR BLAST FURNACE.

A LIMESTONE QUARRIES

RAIL AND VESSEL

A COAL MINES



### F STEEL MAKING FURNACES

OPEN HEARTH FURNACES

BESSEMER CONVERTERS

ELECTRIC FURNACES

E BLAST FURNACES

BY PRODUCT  
COAL CHEMICALS  
AMMONIA, BENZOL,  
CREOSOTE OIL,  
TAR ACIDS,  
TOLUOL, XYLOL.

D GASES FROM COKE OVENS ARE CONVERTED INTO COAL CHEMICALS.

E ORE, COKE AND LIMESTONE ARE CHARGED INTO BLAST FURNACE WHICH SMELTS THE ORE INTO MOLTEN PIG IRON.

F PIG IRON IS REFINED INTO STEEL IN THREE TYPES OF FURNACES - BESSEMER CONVERTERS, OPEN HEARTH AND ELECTRIC FURNACES. SCRAP IS USED IN LAST TWO.

G MOLTEN STEEL FROM THE FURNACES IS TEEMED INTO INGOT MOLDS, WHERE STEEL SOLIDIFIES INTO INGOTS.

### H INGOT STRIPPERS

H STRIPPER CRANES REMOVE MOLDS FROM INGOTS. INGOTS ARE HEATED TO UNIFORM TEMPERATURE FOR ROLLING MILLS IN DEEP FURNACES CALLED SOAKING PITS.

J WHERE FIRST ROLLING OPERATIONS ARE DONE. PASSED BACK AND FORTH BETWEEN POWERFUL STEEL ROLLS, HOT INGOT IS FORMED INTO BLOOMS, SLABS AND BILLETS.

### J SEMIFINISHING MILLS

BLOOMS

SLABS

BILLETS

K IN FINISHING MILLS, BLOOMS, SLAB AND BILLETS ARE MANUFACTURED INTO FINISHED STEEL PRODUCTS AS SHIPPED FROM MILLS - PLATES, SHEETS, STRIP, RAILS, STRUCTURAL STEEL, BARS, WIRE AND WIRE PRODUCTS, PIPES, TUBES AND SO FORTH.

L SOME STEEL MILL FINISHED PRODUCTS, SUCH AS RAILS, RAILROAD WHEELS AND AXLES, NAILS AND WIRE FENCE ARE READY FOR USE. BUT MOST PRODUCTS SHIPPED FROM STEEL MILLS ARE MANUFACTURED BY OTHER INDUSTRIES INTO THOUSANDS OF PRODUCTS.

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### SOME MANUFACTURED STEEL PRODUCTS

RAILS AND STRUCTURAL STEEL  
RAILS, BRIDGES, BUILDING,  
SHIPS AND MACHINERY,  
ELECTRICAL TRANSMISSION TOWERS,  
RAILROAD CARS AND LOCOMOTIVES

PLATE, SHEET, STRIP AND  
TIN PLATE

AUTOMOBILES, SHIPS, OIL  
REFINERY TANKS, REFRIGERATORS,  
WASHING MACHINES, STOVES,  
DRUG, CHEMICAL AND PAPER  
MANUFACTURING EQUIPMENT,  
AIRCRAFT, FURNITURE, TOYS,  
LICENSE PLATES, TOASTERS,  
FARM MACHINERY AND IMPLEMENTS,  
SURGICAL, MEDICAL, DENTAL  
EQUIPMENT, TIN CANS,  
GALVANIZED PAIRS, DRUMS,  
ROOFING, RURAL MAIL BOXES,  
TERNE PLATE ROOFING,  
AUTO FUEL TANKS

BAR, ROD AND WIRE  
(BARS)

AUTOMOBILES, MACHINERY,  
HARDWARE, TOOLS, FARM MACHINERY,  
REINFORCED CONCRETE, TIRE RIMS  
(WIRE)

WIRE, SPRINGS, FENCE, NAILS,  
NUTS AND BOLTS, SCREENS,  
ROPE AND CABLE, COAT HANGERS,  
PAPER CLIPS, PINS AND NEEDLES,  
STRINGS FOR PIANOS AND  
OTHER MUSICAL INSTRUMENTS

PIPES AND TUBES

AUTOMOBILES, AIRCRAFT,  
OIL WELL EQUIPMENT, OIL  
REFINERIES, OIL, GAS AND WATER  
LINES, REFRIGERATION PLANTS,  
BOILERS IN SHIPS AND  
LOCOMOTIVES, FURNITURE,  
SHIP MASTS, BICYCLES,  
BEARING RACES, FLAG, TELEPHONE AND  
TELEGRAPH POLES