Iron: the hidden element

The world at the turn of the century

Railways

Source: Steam Railways in Britain
The world at the turn of the century

Firth-of-Forth rail bridge, 1889
2.640 m, 56.000 tonnes of steel

The world at the turn of the century

Poor housing:
London,
ca. 1880

Drawing:
Gustave Doré
The best of iron technology

Cast and forged iron house, made in Russia, exposed at world fair 1887-89
(now in city museum Yekaterinburg)

Photograph: D. Hamels

Well-known names

Alexandre Gustave Eiffel
Well-known names

Sir Henry Bessemer

Source: Bessemer's autobiography

Well-known names...

Andrew Carnegie
Steel town Pittsburgh

Source: USA: Geography..., NL-America Inst., 1972
Carnegie for peace...

Palace of Peace
The Hague

Well-known names...

Alfred Krupp

Source:
Sir Henry Bessemer,
Father of the Steel Industry

Essen steel plant, ± 1910
Iron ore production per capita

Steel for electricity

Generator room of melting plant, 1895
Well-known names...

Henry Ford

Source: Time-Life World History 1900-1925

The world at the turn of the century

Titanic

Mauretania

Source: Captain Grant Tobacco Pictures
Warfare: battle ships

Hr. Ms. Brabant

Source: Winkler Prins Encyclopedia

Warfare: tank

Use of tank in the battle of Cambrai, 1917

Source: Winkler Prins Encyclopedia
Steel on sea

Hoogovens site, ca. 1925

Source:
Hoogovens Jubilee book

Warfare: battle ships

Hr. Ms. Hood

Source:
Report on the 2nd World War Amsterdam, 1970
Tall ships

Queen Mary

Queen Elizabeth

Source:
Captain Grant
Tobacco Pictures

Well-known names...

Josef Stalin

Source:
Winkler Prins
Encyclopedia
Closed to foreigners: Magnitogorsk

Source: Stephen Kotkin, Steeltown USSR, Berkeley, 1991

Female steel workers

Source: Stephen Kotkin, Steeltown USSR, Berkeley, 1991
Closed to foreigners: Yekaterinburg

Remains of old metals plant

Photographs: D. Hamels

Development of steel production in Germany

Crude steel production

Mt

<table>
<thead>
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<th>Year</th>
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<tr>
<td>1870</td>
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<tr>
<td>1875</td>
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<td>1913</td>
<td>45</td>
</tr>
<tr>
<td>1925</td>
<td>50</td>
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</table>
Production of steel in Germany

Crude steel production

Source: Wirtschaftsvereinigung Stahl, Düsseldorf 1999

Steel for Liberty

Building Liberty ships

Source: Report on the 2nd World War Amsterdam, 1970
Steel properties

Source: Winkler Prins Encyclopedia

Well-known names...

Sir Winston Churchill
The iron curtain

Source: Winkler Prins Encyclopedia
Well-known names...

George Marshall

Source: Winkler Prins Encyclopedia

Steel on sea

Hoogovens
No. 1 hot strip mill
1953

Source: Hoogovens archives
Changing philosophy of the winners

American engineers at Yawata works

Source: Iron and Steel Institute of Japan

Employment effects

Production (o) and employment (x) in the Japanese steel industry
(175 = 100)

Source: The steel industry in the new millennium (Inst. of Materials)
Well-known names...

Robert Schuman

Source: Hoogovens Jubilee book

ECSC R&D expenditure

Source: ECSC, Bruxelles
Silicon age, 1968 -

Source: S. Sze, L.C. Feldman, private communication

Publications on silicon and iron

Year

Publications/Year
Well-known names...

Lady Margaret Thatcher

Source: PPI Photoagency, London

Scarce natural resources

Club of Rome report
1972
Relationship GNP and steel consumption

Source: Club of Rome report

Steel consumption per capita

Source: Club of Rome report
Recycling potential of Steel

Source: IISI Web page

Get the oil where it is!

North Sea drilling platform

Source: Winkler Prins Encyclopedia
Get the oil where it is!

Tanker port and refinery near Rotterdam

Source: Rotterdam 650 years

Energy consumption per tonne of finished steel

Source of data: EUROFER
Employment effects

Employment in the steel industry in various countries (1975 = 100)

Source: The steel industry in the new millennium (Inst. of Materials)

World crude steel production in the 20th century

Source: IISI Web page
Shifting the limits: cars

ULSAB prototype car

Shifting the limits: ships

Nuclear submarine Nautilus

Source: Captain Grant Tobacco Pictures
Shifting the limits: bridges

Forth road and rail bridges
Source: ‘Bridges’ by D.J. Brown, London 1996

Golden Gate bridge
Source: ‘Bridges’ by D.J. Brown
London, 1996
Shifting the limits: bridges

Akashi Strait Bridge (Japan)
3.910 m long
centre span
1990 m

Source: 'Bridges' by D.J. Brown
London, 1996

Shifting the limits: bridges

Kurushima Kaikyo Bridges:
3 linked bridges with centre spans of 600, 1020 and 1030 m

Source: Nippon Steel news
Steel for fun

Source: Meccano catalogue

Steel for fun

Photograph: Ed Louwen, Corus R&D
Steel for fun: the London Eye

Source: PPL Photoagency, London

Iron: the key element