

People and Product Safety in a High Risk Industry



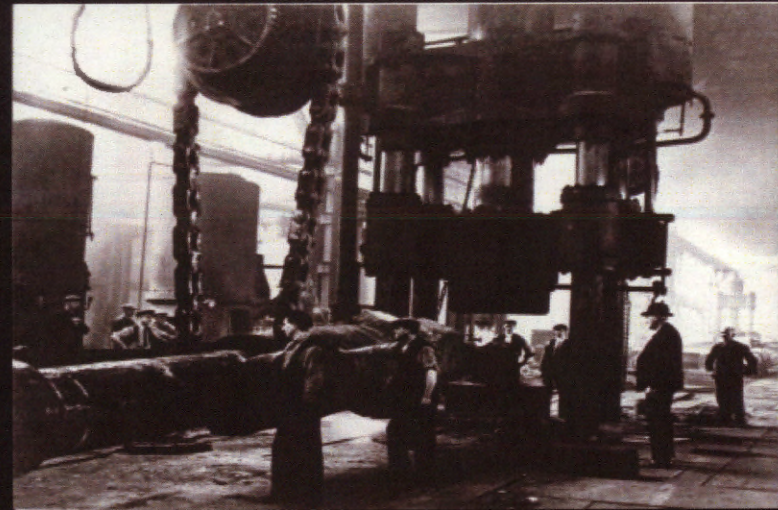
SHEFFIELD FORGEMASTERS
INTERNATIONAL



Experienced | Global | Innovative

History

- Originated 1805
- River Don works built 1864
- English Steel 1923 and British Steel 1967
- Privatised – British Steel and Firth Brown 1982
- Management Buyout 1988
- Acquisition by ACC in 1998
- Management Buyout 2005

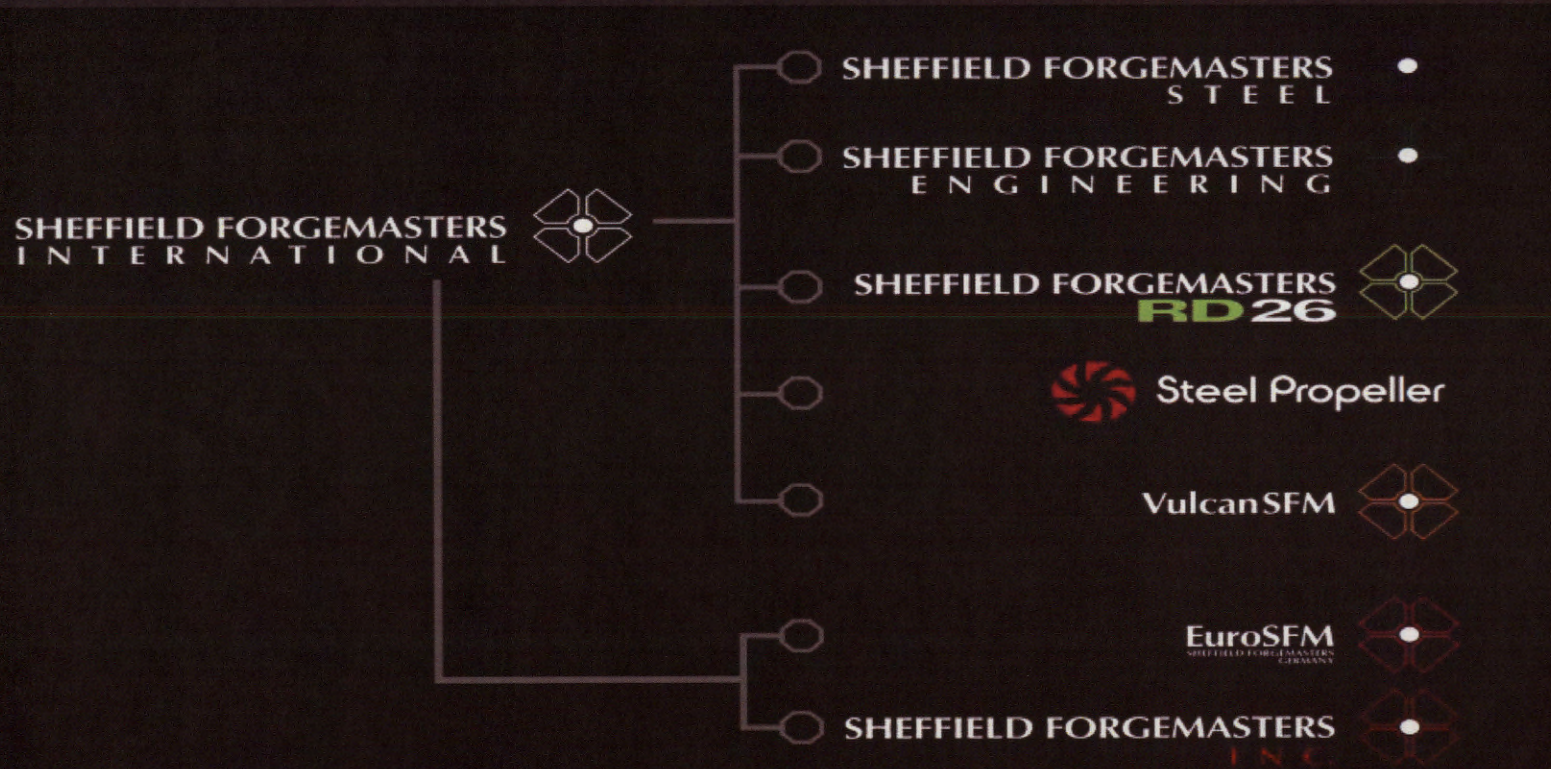


Current Shareholders

Shareholders	% Holding
SFIL Management & Workforce	100%

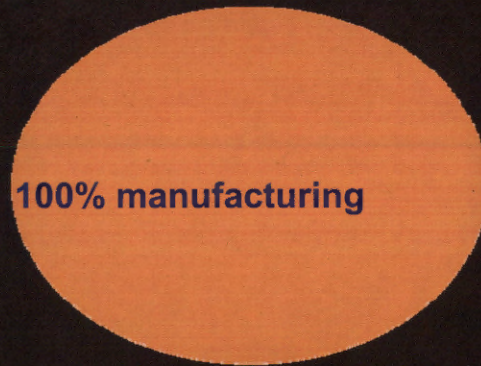


Introduction



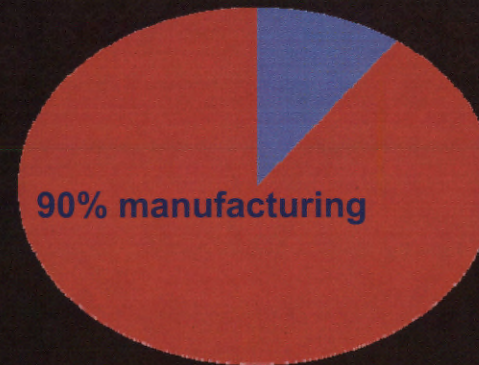
Sales Mix

Historical sales mix at the Management Buyout



Current sales mix

10% value added services



Highly cash generative service offering



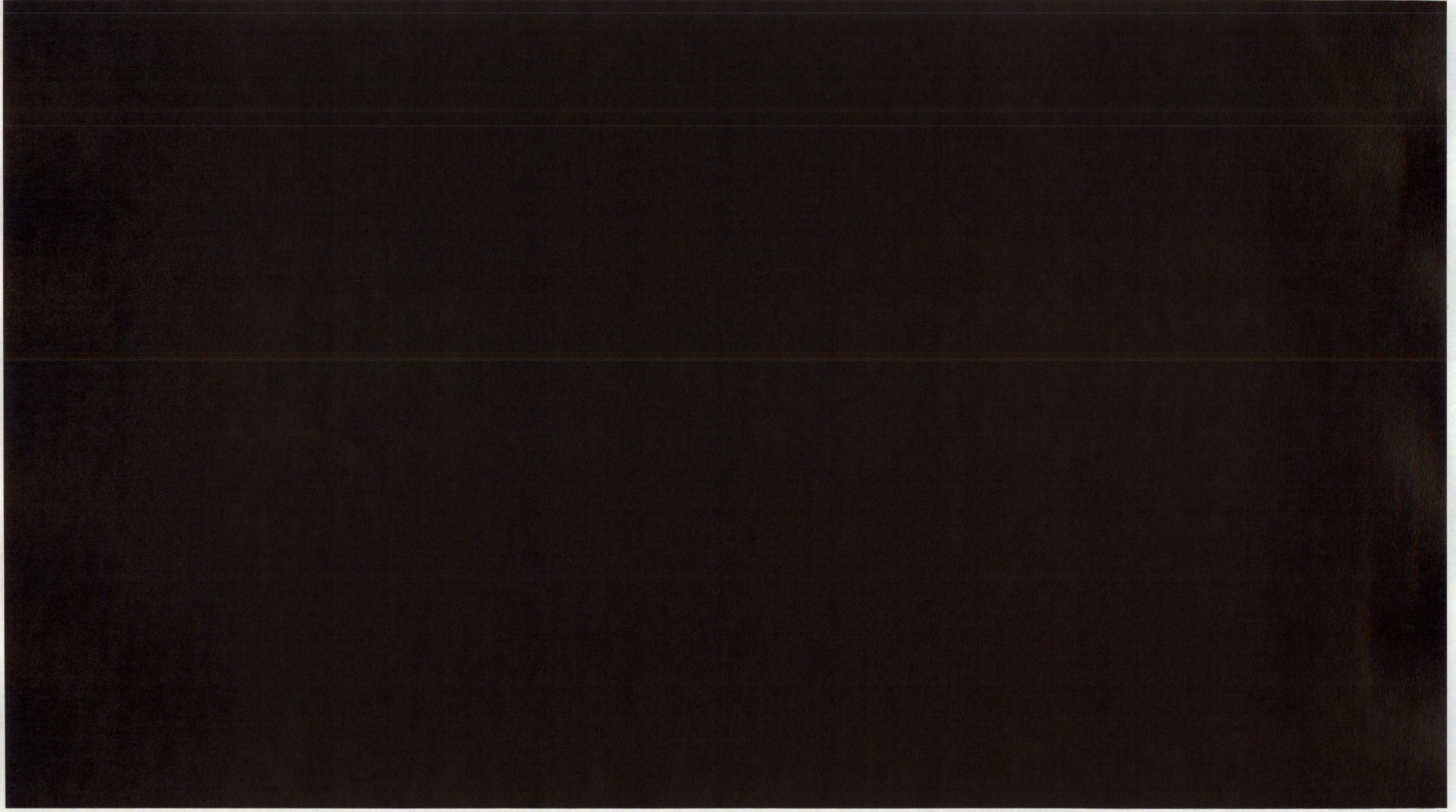
Product Mix

SHEFFIELD FORGEMASTERS
INTERNATIONAL

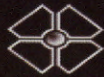
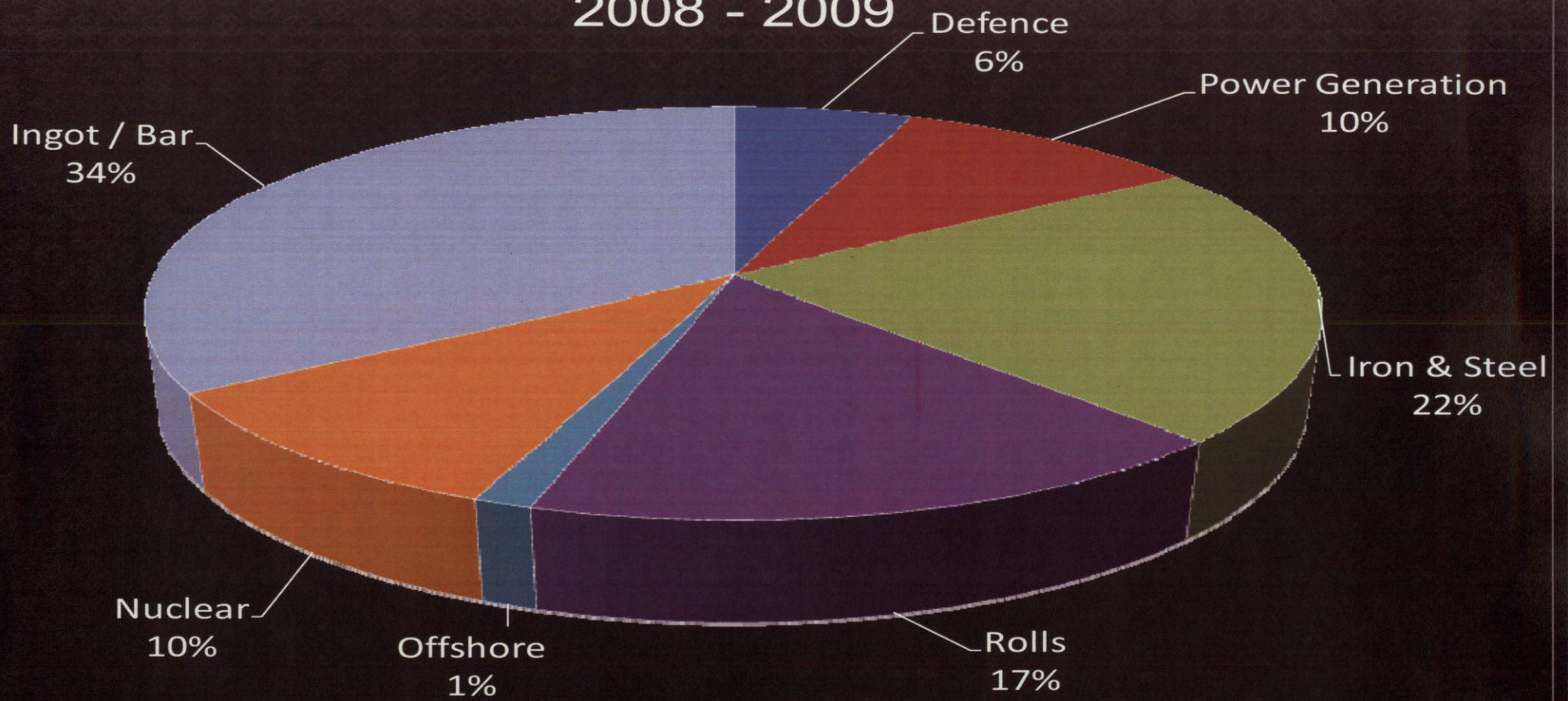


09-10 October 2013/ BC605813 / UNCLASSIFIED 6

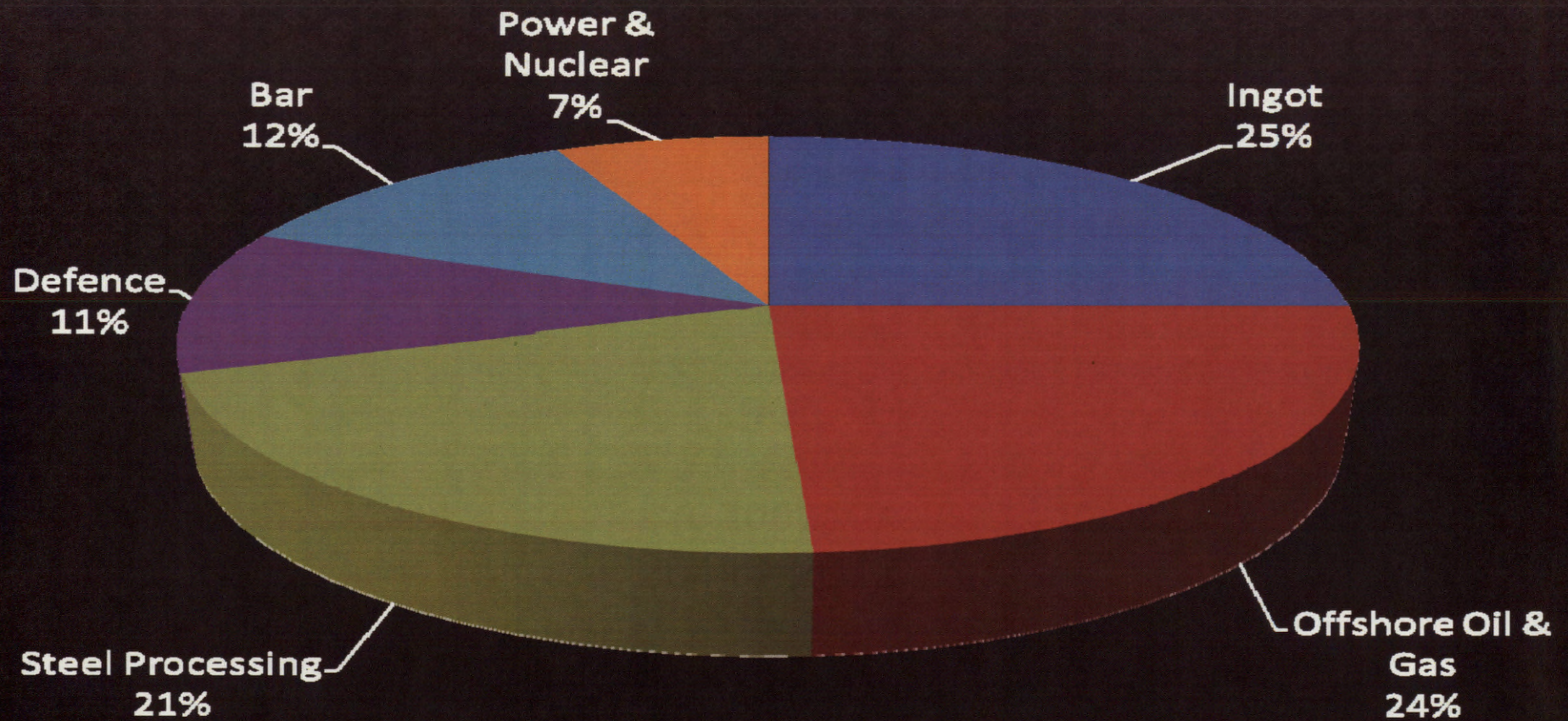
Experienced | Global | Innovative



Product Mix 2008 - 2009

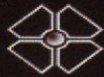


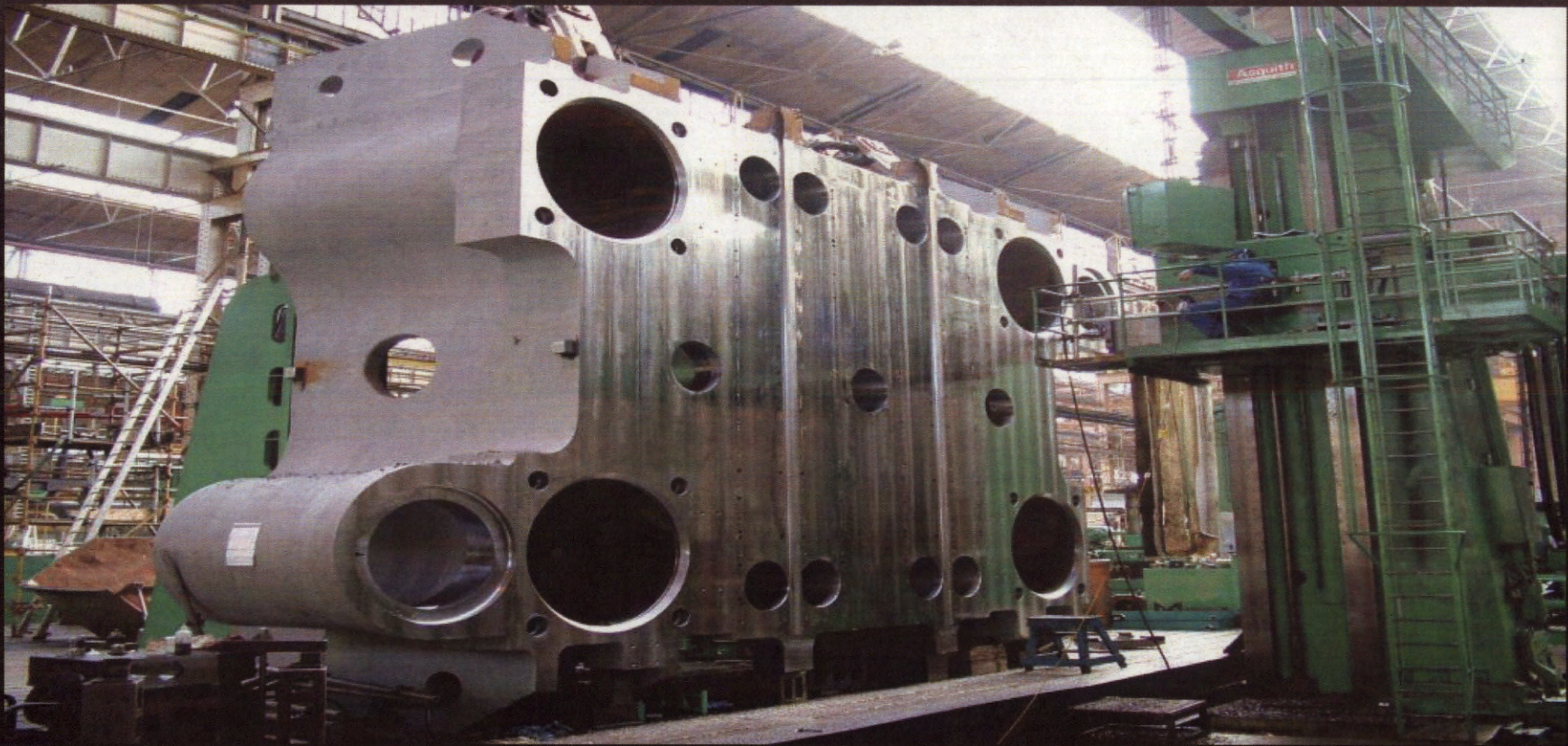
Product Mix 2011 - 2012



Markets

SHEFFIELD FORGEMASTERS
INTERNATIONAL





SMS-MEER Buderus Foundation Platen estimated finish weight 320 tonnes

**SHEFFIELD FORGEMASTERS
INTERNATIONAL**

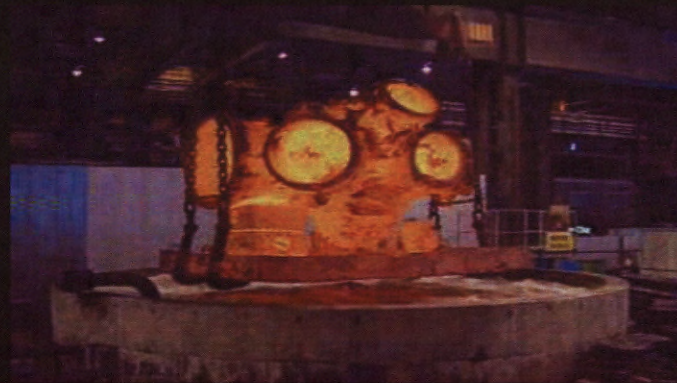
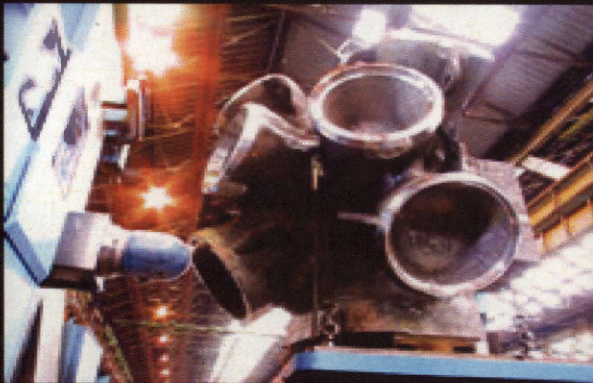
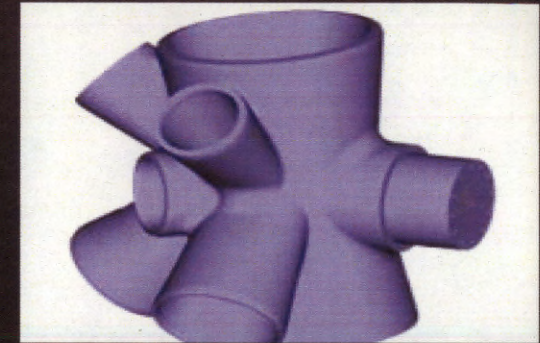


Experienced | Global | Innovative

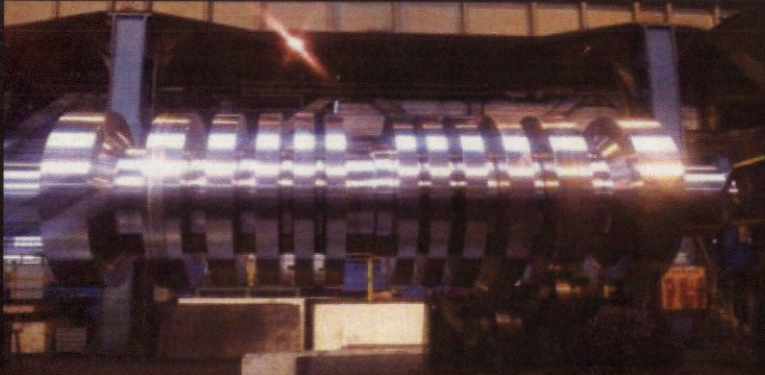
Offshore Products

Sheffield Forgemasters is the world's major supplier of heavy castings to the offshore sector. We have designed, manufactured and supplied over 50,000 tonnes of Offshore Components

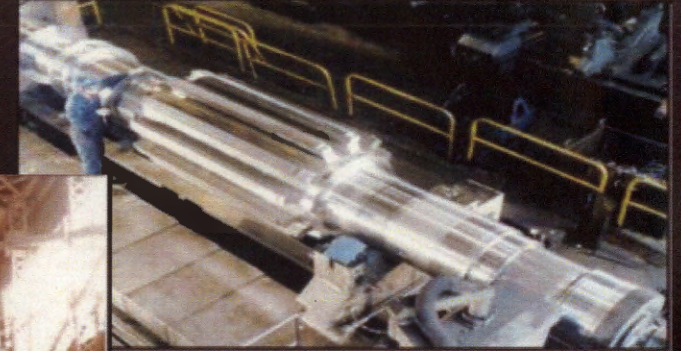
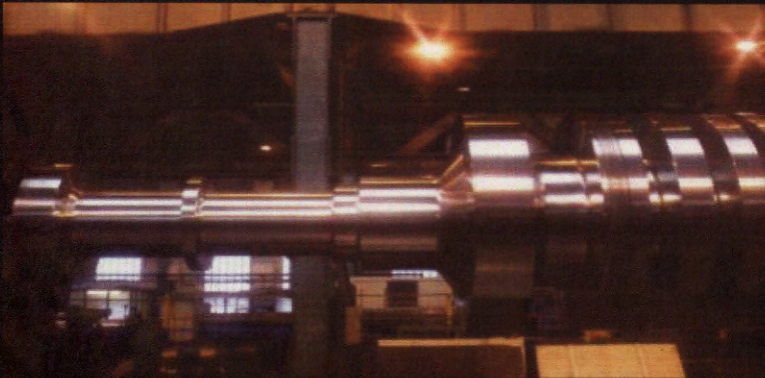
Over 80% of the tethering elements in the Gulf of Mexico have been manufactured by Sheffield Forgemasters



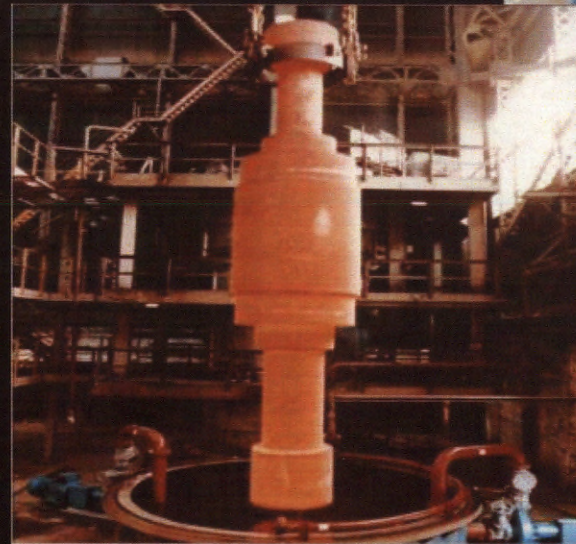
Power Generation



LP Rotor



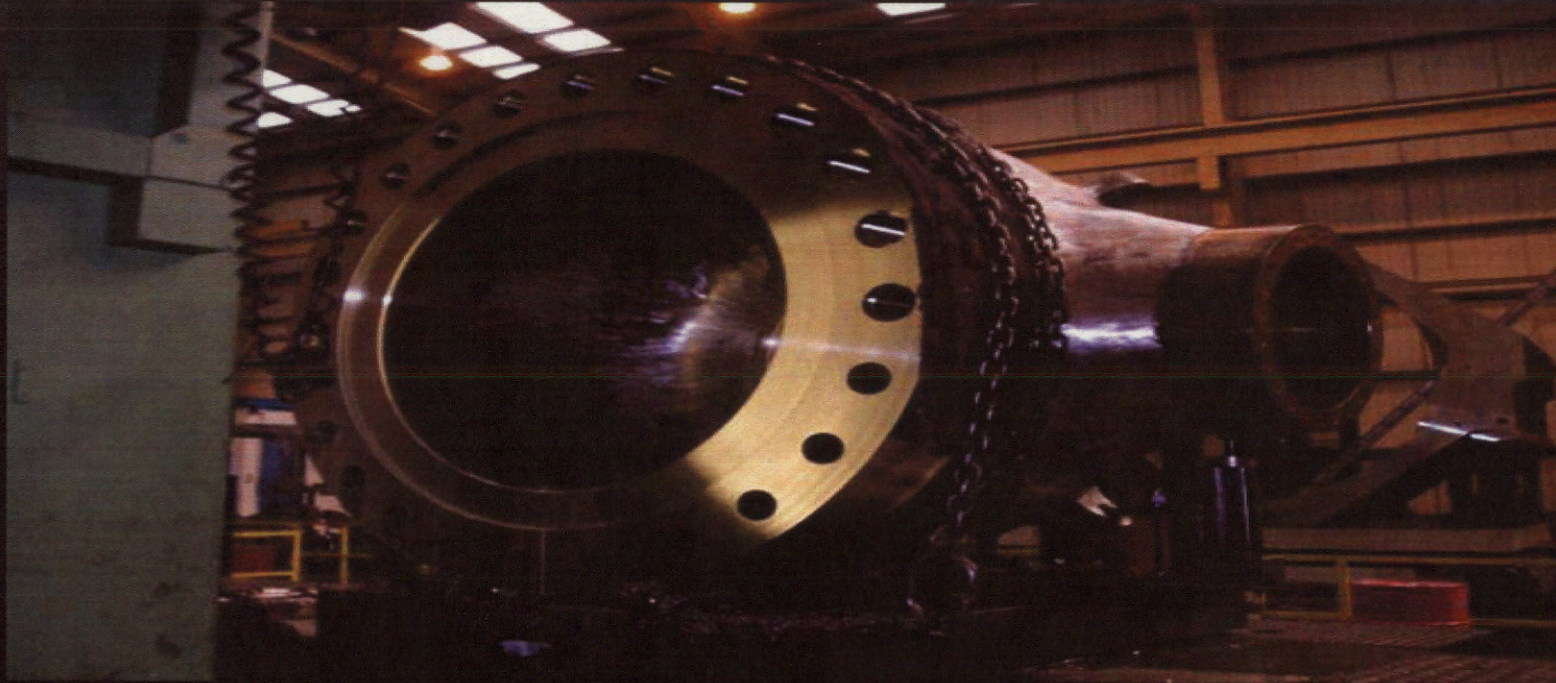
Motor Shaft



Vertical Heat Treatment



Nuclear Castings



Westinghouse AP1000 Pump Casing

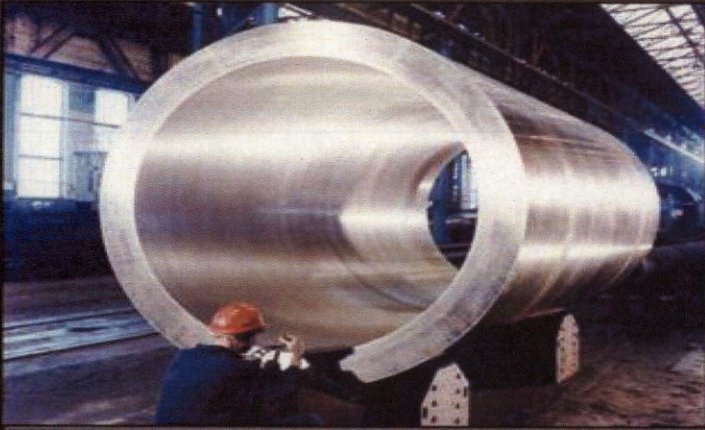
Stainless Steel for Safety Critical Application

SHEFFIELD FORGEMASTERS
INTERNATIONAL



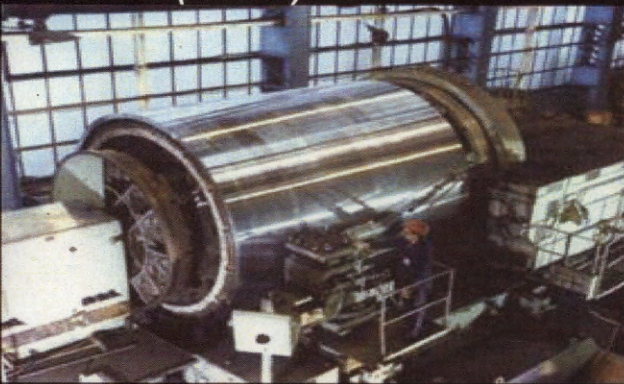
Experienced | Global | Innovative

Civil Nuclear



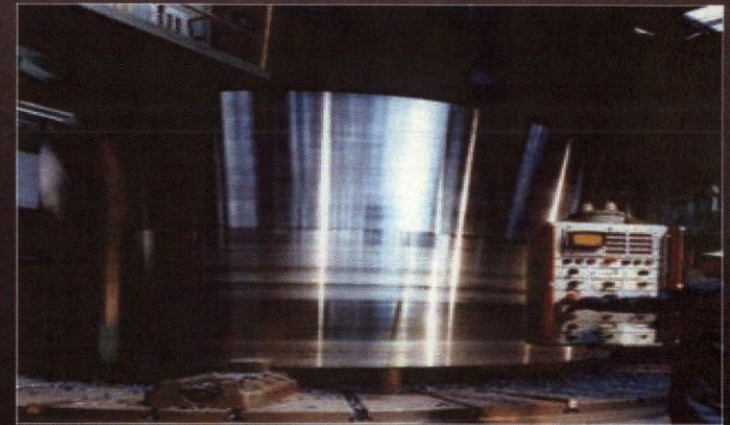
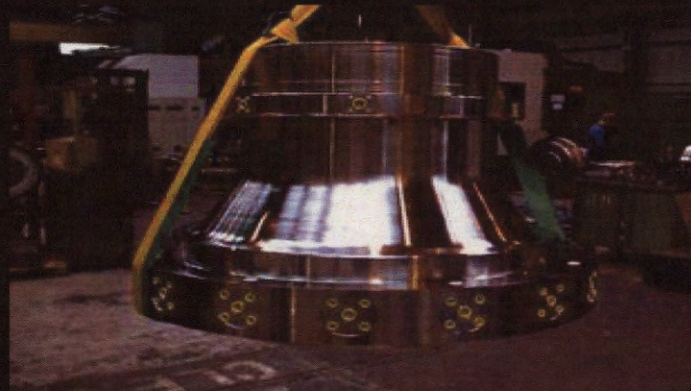
Nuclear Cask (Above)

SG Shell (Below)



Tubesheet (Above)

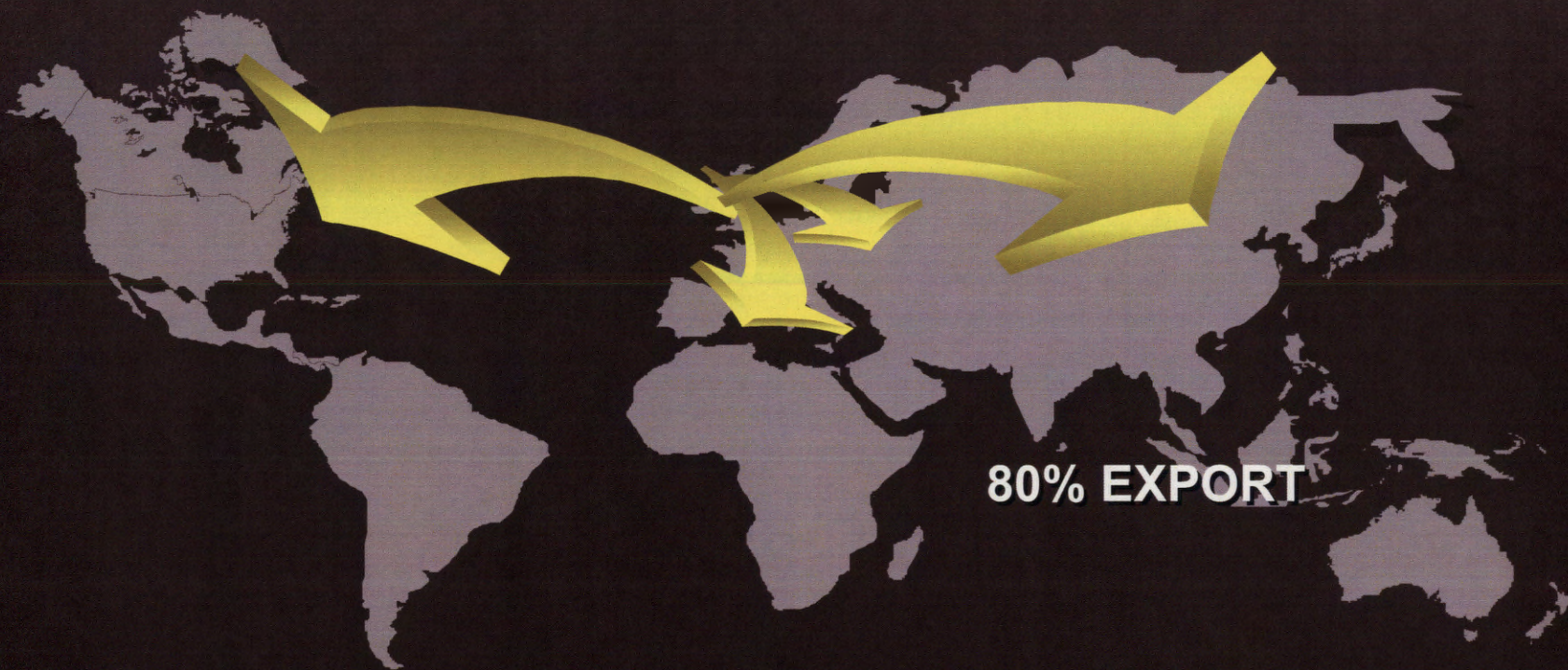
Seal Housings (Below)



Transition Cone (Above and Below)



Serving a Worldwide Business



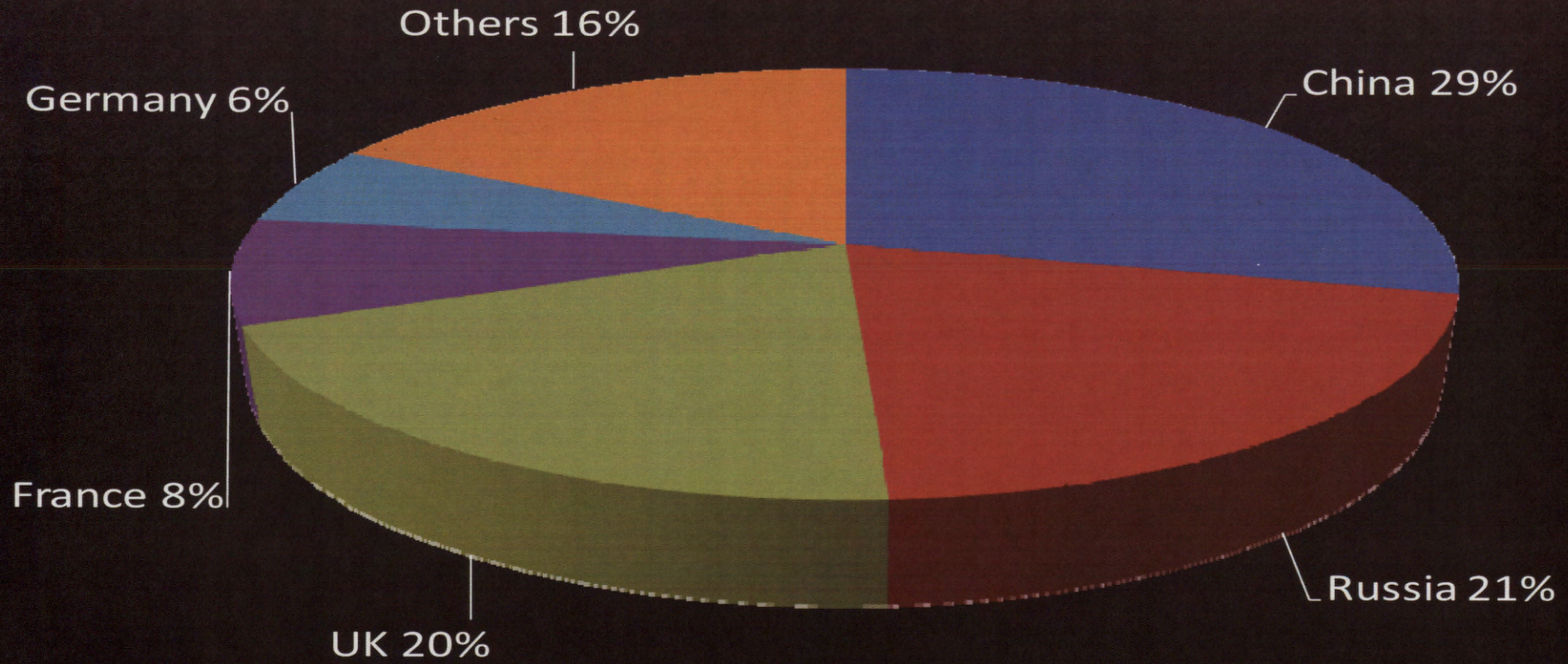
80% EXPORT

**SHEFFIELD FORGEMASTERS
INTERNATIONAL**



Experienced | Global | Innovative

Sales 2011 - 2012



Defence



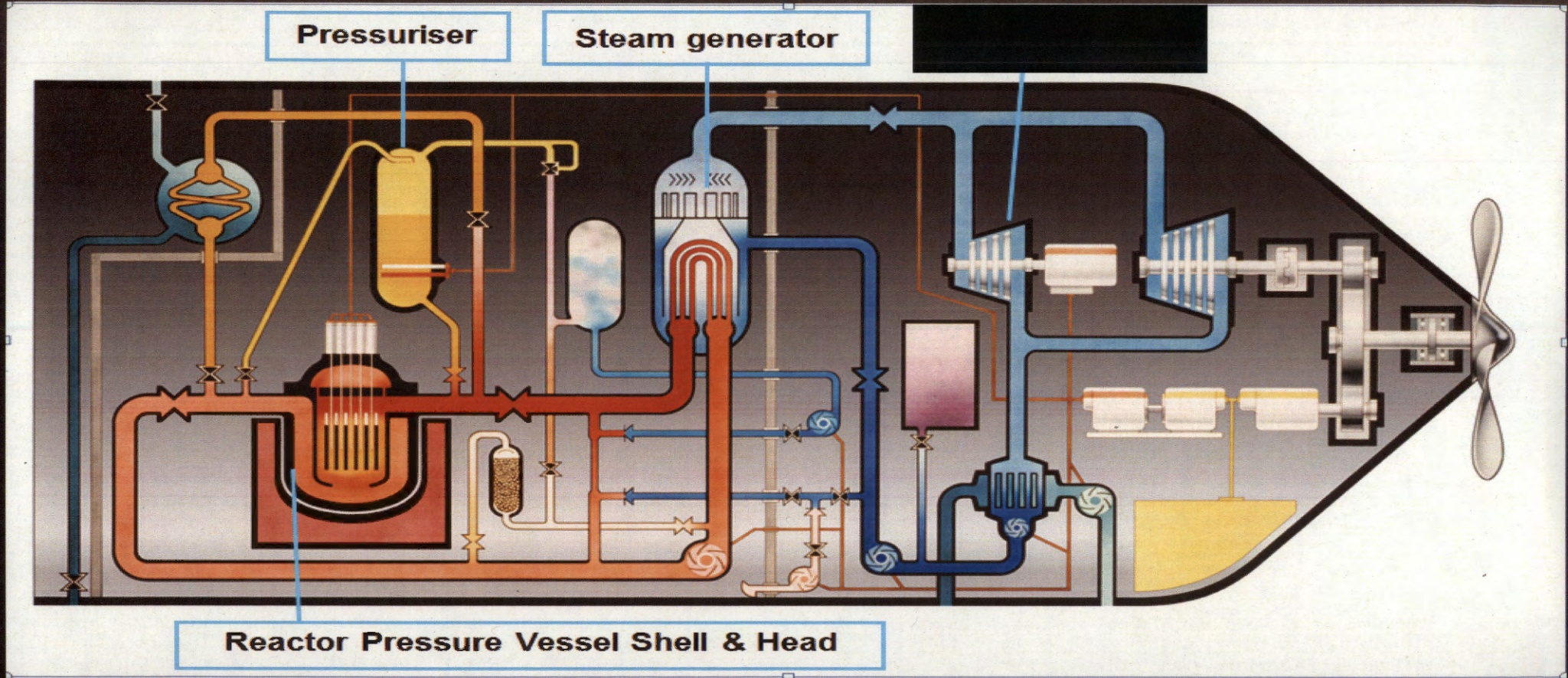
Defence



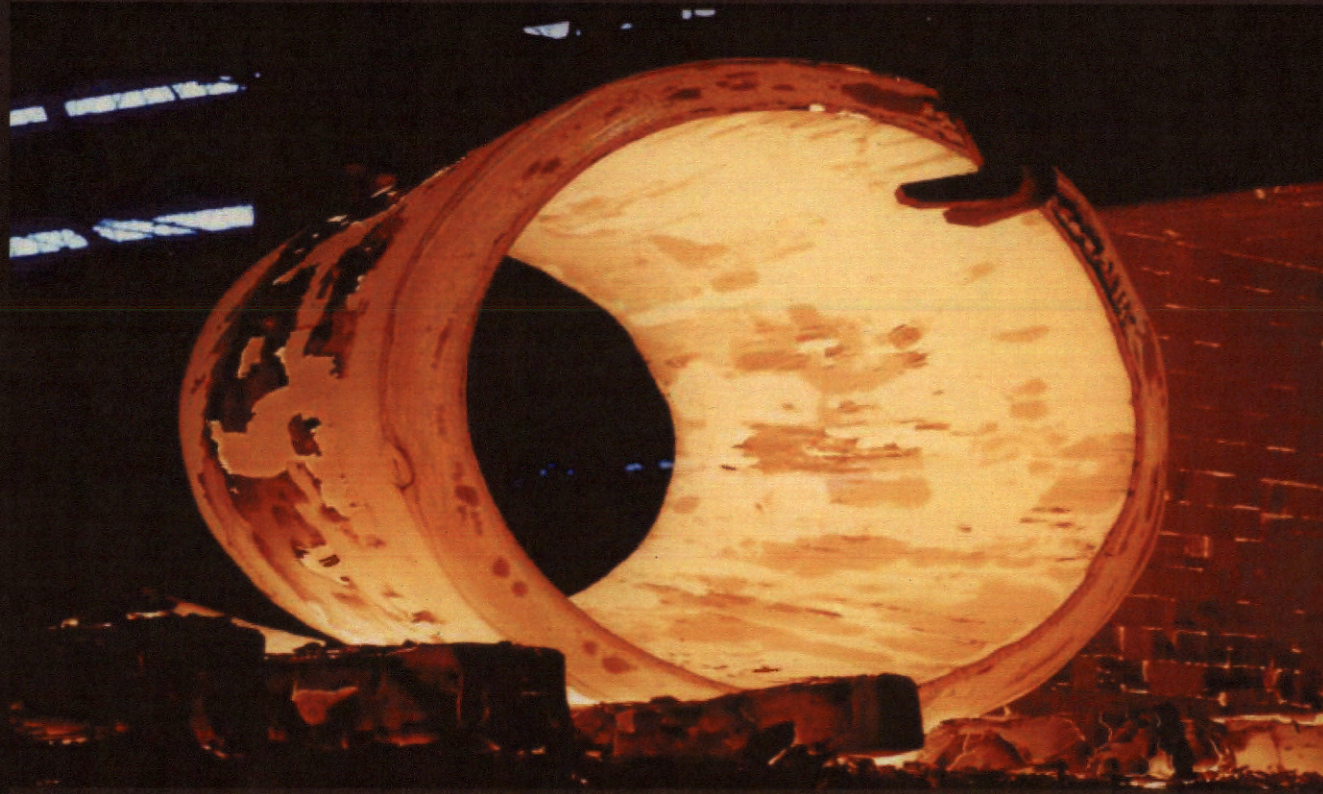
SHEFFIELD FORGEMASTERS
INTERNATIONAL



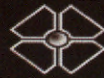
Experienced | Global | Innovative



Heat Treatment of Nuclear Shell

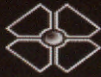
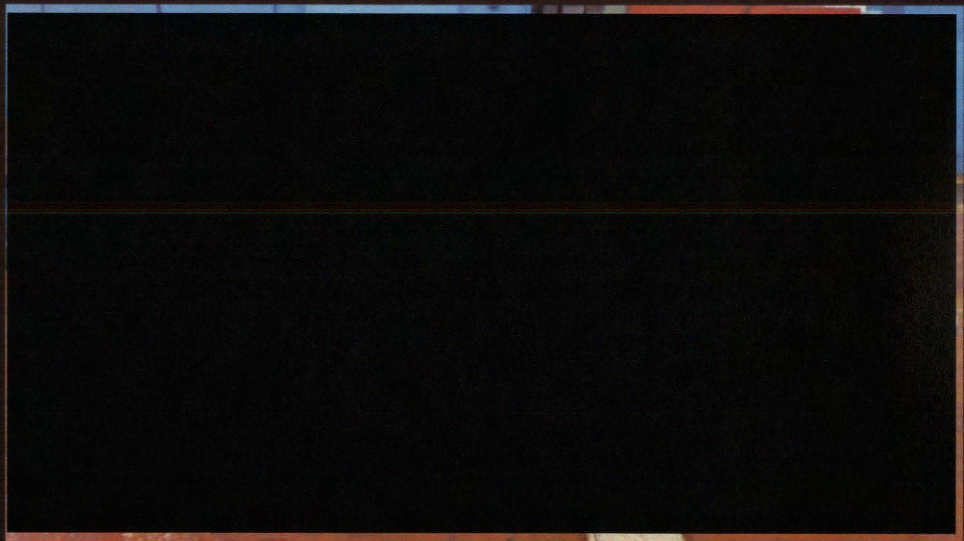
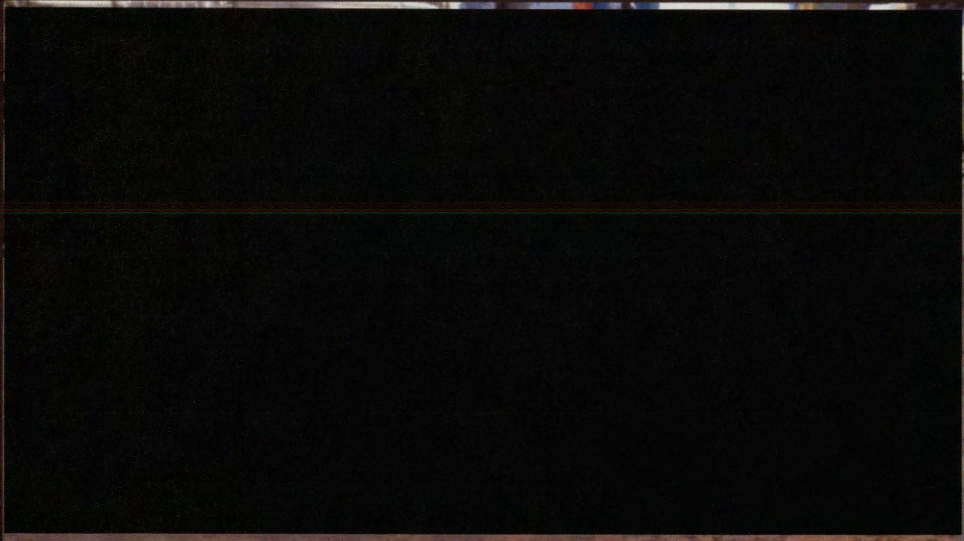


Pressure Hull Insert

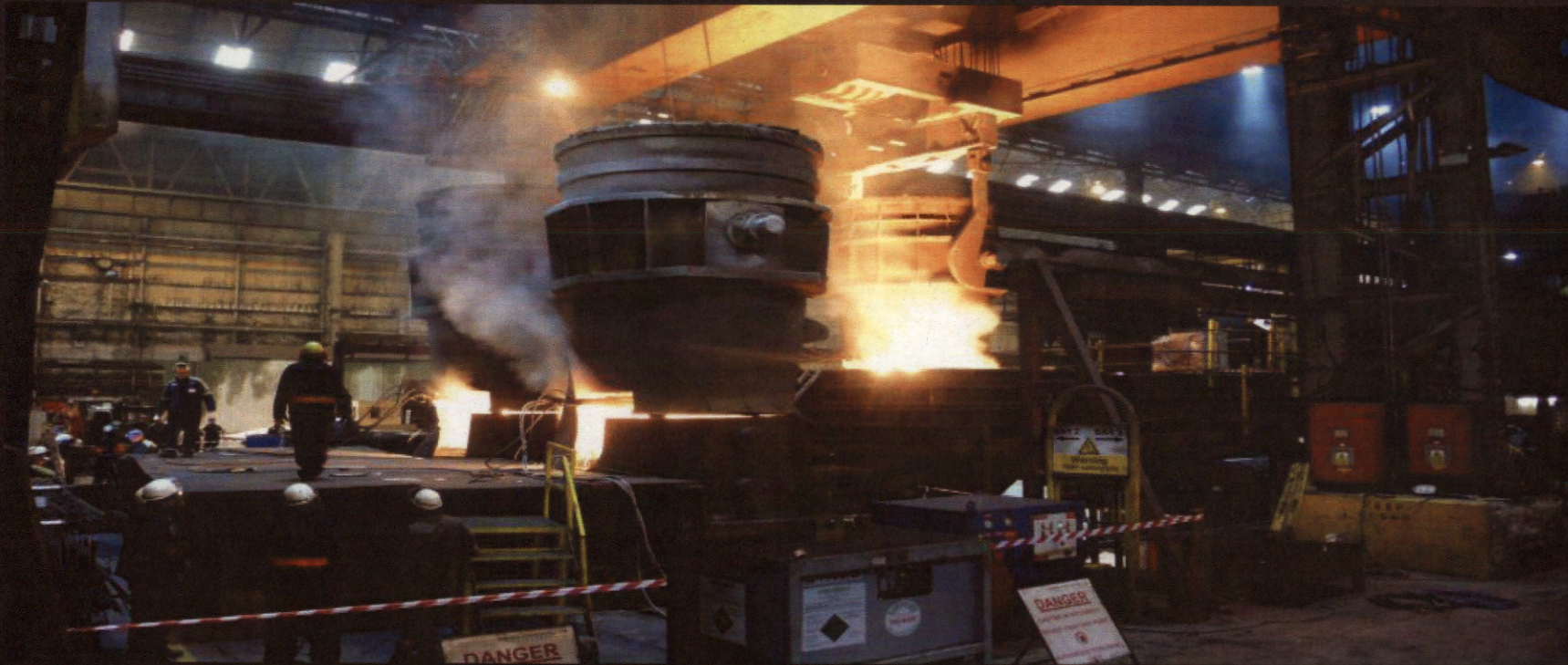




Rotors



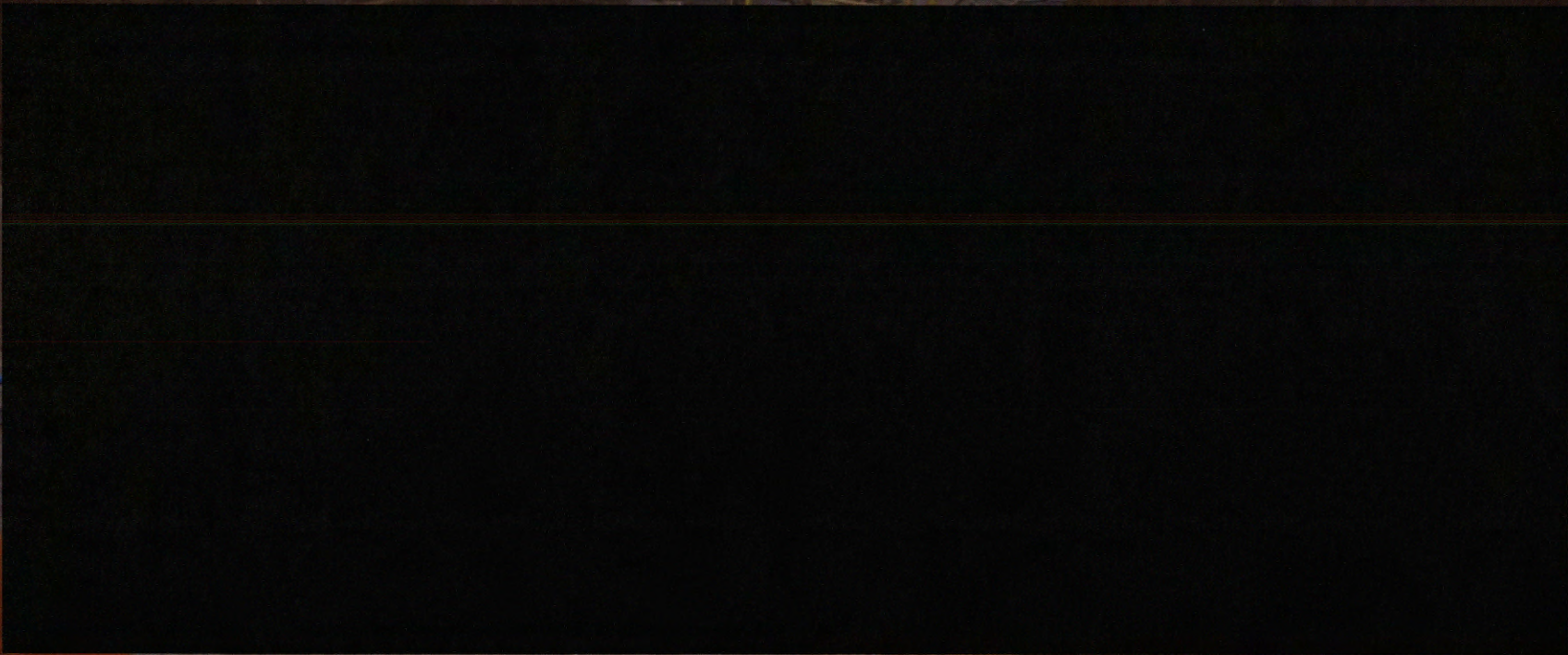
Pouring of Tank Top



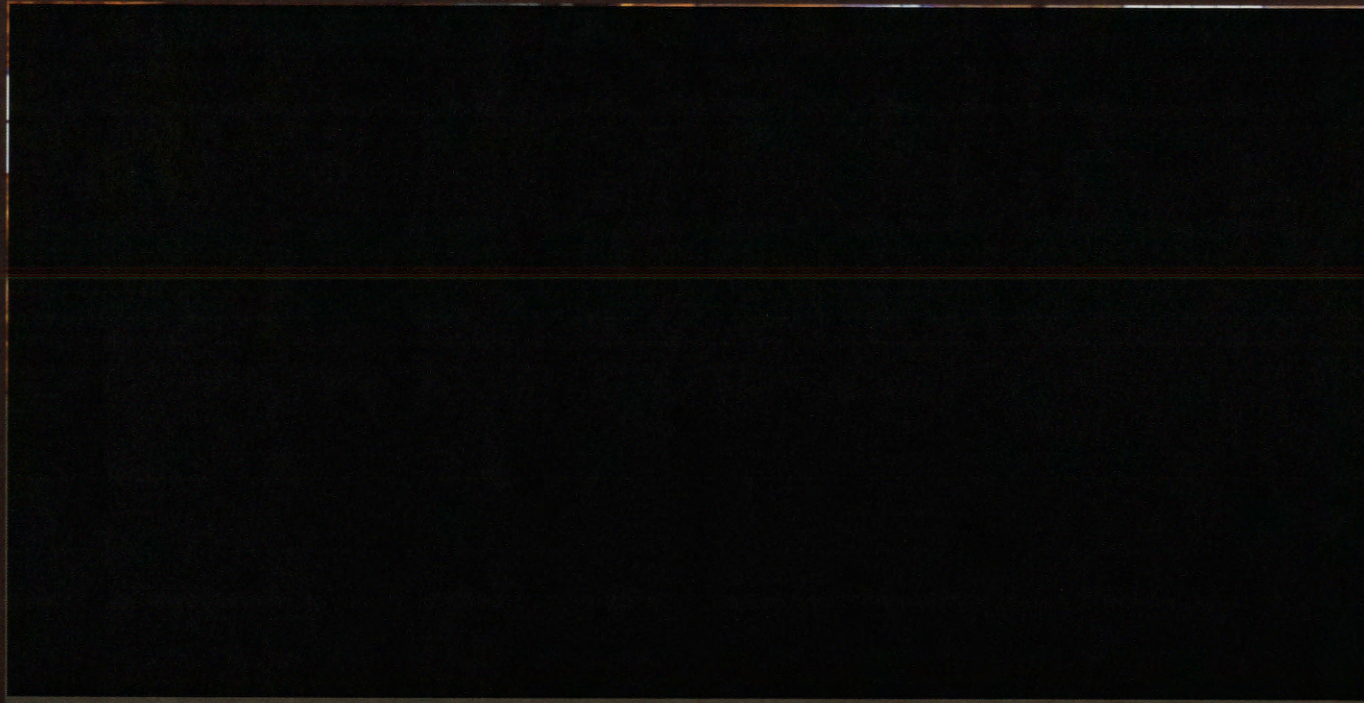
Tank Top



Torpedo Tube Hatch



Astute Torpedo Tube



Nuclear Island Forgings



Non Nuclear Island Forgings

YOKES

HYDROPLANE STOCK

LET LOCKING RING

ACTUATOR MOUNTING BRACKET BASE

ACTUATOR MOUNTING BRACKET TOP

ACTUATOR BRACKET BASE

ACTUATOR BRACKET CAP

ACTUATOR MOUNTING BRACKET BASE

ACTUATOR MOUNTING BRACKET CAP

ACTUATOR MOUNTING BRACKET CAP

ACTUATOR BRACKET CAP TO ACTUATOR BRACKET BASE

PENETRATION FORGINGS

PUMP COVERS

MAIN TUBE LENGTHS

FORWARD PORT & STBD FORGINGS

AFT LENGTHS

ASTUTE ROTOR SHAFTS



Non Nuclear Island Castings

COAMING HATCH LET LOWER (1208MM X 1208MM X 241MM)

FORWARD ESCAPE TOWER PRESSURE HULL

SHAFT TUBE CASTING

TORPEDO TUBE PORT

TORPEDO TUBE STARBOARD

AIR TURBINE PUMP

ANCHOR HOUSING

MAIN ACCESS PRESSURE HULL

SHORE SUPPLY CABLE PEN AC DC

GLAND BOX FOR ANCHOR SLIP ASSEMBLY

PRIMARY SHIELD TANK TOP

WEAPONS EMBARKATION HATCH

254MM UPPER STARBOARD MAIN CIRC CW203

254MM UPPER PORT MAIN CIRC CW204

254MM LOWER STARBOARD MAIN CIRC CW201

254MM LOWER PORT MAIN CIRC CW202

254MM SNORT INDUCTION RA BALL HULL VALVE

203.2MM VEX RA BALL HULL VALVE

57MM SNORT INDUCTION FLOOD & DRAIN

127MM DIESEL COOLING WATER BALL BUTTERFLY VALVE-OUTLET

127MM DIESEL COOLING WATER BALL BUTTERFLY VALVE-INLET

180MM SW/FW BALL BUTTERFLY HULL VALVE SW201

180MM SW/FW BALL BUTTERFLY HULL VALVE SW202

180MM SW/FW BALL BUTTERFLY HULL VALVE SW203

PH INSERT

180MM SW/FW BALL BUTTERFLY HULL VALVE SW204

127MM EMERGENCY SEA WATER COOLING BALL VALVE INLET ESW 600

127MM EMERGENCY SEA WATER COOLING BALL VALVE OUTLET ESW 601

57MM BILGE & BALLAST BALL HULL VALVE BS201

57MM BILGE & BALLAST BALL HULL VALVE WS401

57MM LET ST BALL HULL VALVE

76.2MM RA BALL HULL VALVE SANITARY SYSTEM UPPER

76.2MM RA BALL HULL VALVE SANITARY SYSTEM LOWER

38MM SEA CON MS 7401

57MM CHALFONT FLOOD & DRAIN VENT VALVE

57MM CHALFONT FLOOD & DRAIN HULL VALVE

127MM HOVER SYSTEM MB BALLAST HULL VALVE

230MM COMBINED DIESEL EXHAUST HULL & BACK-UP VALVE ITEM A

230MM COMBINED DIESEL EXHAUST HULL & BACK-UP VALVE ITEM B

230MM COMBINED DIESEL EXHAUST HULL & BACK-UP VALVE ITEM D

230MM COMBINED DIESEL EXHAUST HULL & BACK-UP VALVE ITEM E

230MM COMBINED DIESEL EXHAUST HULL & BACK-UP VALVE STOOL

230MM COMBINED DIESEL EXHAUST HULL & BACK-UP VALVE CYL BODY

230MM COMBINED DIESEL EXHAUST HULL & BACK-UP VALVE ITEM C

LILLO

HYDROPLANE HUB

ROTOR CASTING, MSFC, FORWARD DRIVING

ROTOR CASTING, MSFC, FORWARD DRIVEN

ROTOR CASTING, MSFC, AFT DRIVING

ROTOR CASTING, MSFC, AFT DRIVEN

SHEFFIELD FORGEMASTERS
INTERNATIONAL



Experienced | Global | Innovative

Health & Safety



Sheffield Forgemasters
International

ISO 9001:2000

International quality
management system
requirements

Sheffield Forgemasters
International

ISO 14001:1996

International environmental
management system
requirements

Sheffield Forgemasters
International

**BSEN OHSAS
18001**

Occupational Health and Safety

Sheffield Forgemasters
International

ASME NCA 3800

Nuclear metallic material
supplier quality programme
requirements

Sheffield Forgemasters
International

Bureau Veritas

Rules for classification for ingot
supply

Sheffield Forgemasters
International

DNV – Steel Forgings

Det Norske Veritas – offshore
classification rules for forgings

Sheffield Forgemasters
International

DNV – Steel Castings

Det Norske Veritas – offshore
classification rules for castings

Sheffield Forgemasters
International

TUV

TUV conditions for proper
fabrication to Ad Merkblatt 2000
technical rules

Sheffield Forgemasters
International

**Lloyds Register of
Shipping**

Lloyds register of rules for
steelmaking, forging and casting
manufacture

Sheffield Forgemasters
International

Ministry of Defence

Approved supplier to the Ministry
of Defence

Sheffield Forgemasters
International

Germanischer Lloyd

Approval for manufacture of
ingot, billet and bar

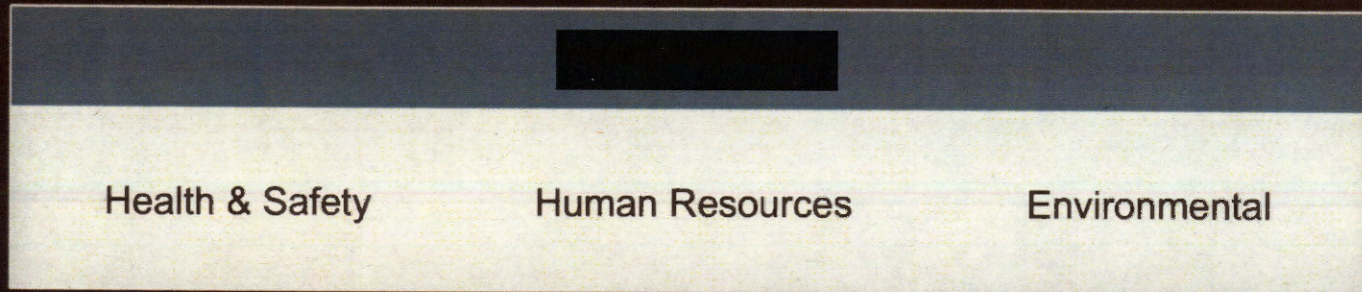
Sheffield Forgemasters
International

ABS

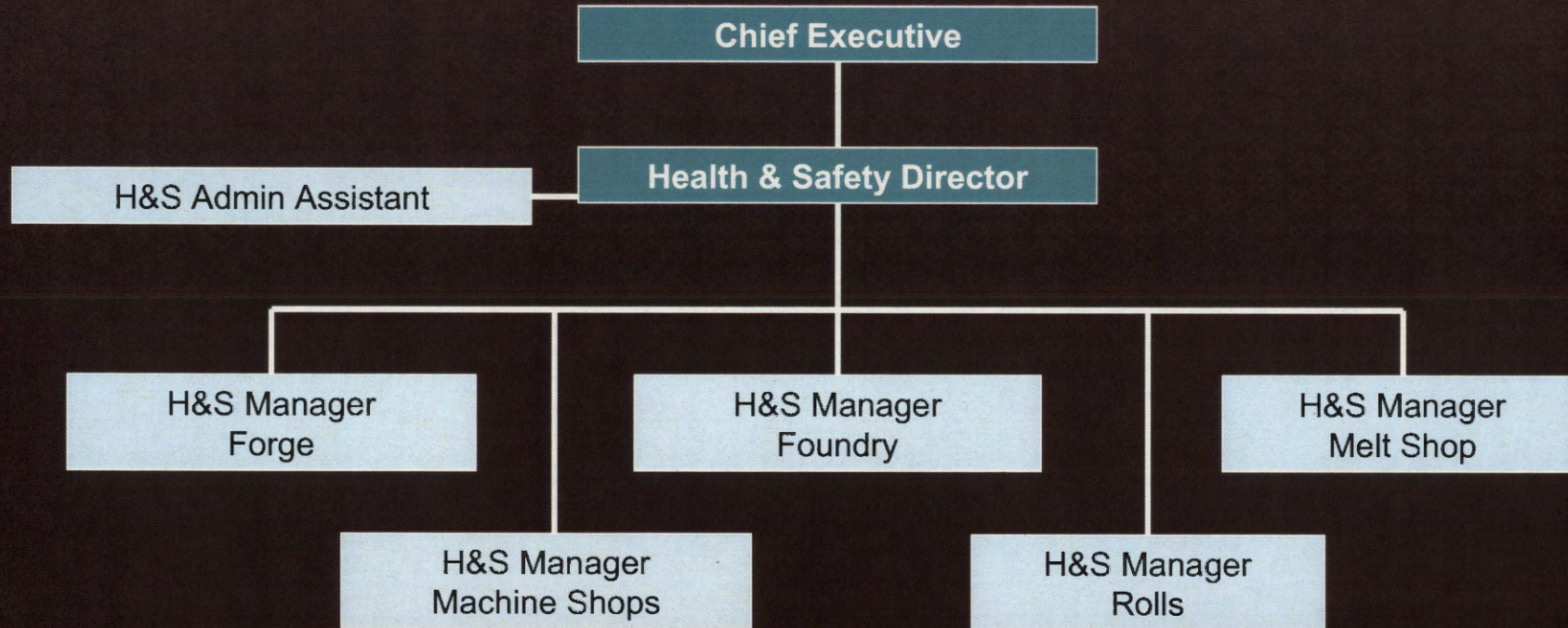
American Bureau of Shipping
approval for manufacture of
marine and offshore castings



Health & Safety Structure 2002



Health & Safety Structure 2013



Medical Centre

- 3 x Qualified Occupational Health Nurses, 1 x Doctor and 1 x Physiotherapist
- Pre-employment screening to set a bench mark and facilitate the management of individuals health
- Commitment to maintain the health and well-being of all employees
- Legal compliance, duty of care
- KPI's to monitor and target areas of concern



Safety Culture

“The product of individual and group values, attitudes, perceptions, competencies and patterns of behaviour that can determine the commitment to, and the style and proficiency of an organisation’s health and safety management system”

Psychological Aspects

“How people feel”

Can be described as the “Safety Climate” of the organisation, which is concerned with individual and group values attitudes and perceptions

Behavioural Aspects

“What people do”

Safety related action and behaviours

Situational Aspects

“What the organisation has”

Policies, procedures, regulations, organisational structures and the management systems



Psychological Aspects

“How people feel”

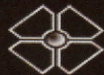
- Safety Culture Intervention, HSE 2008
- Health and Safety Climate Survey 2011
 - 5 areas of improvement identified
 - Health & Safety Procedures
 - Accident and Near Miss Reporting/Investigation
 - Team Leaders/ Shift Managers. Accident investigation and feedback
 - Behavioural Safety Programme
 - Safety over Production



Behavioural Aspects

“What people do”

- Introduction of AREA Health Safety and Environment Managers
- Appointment of a Health and Safety Director
- IOSH training for all employees at all levels 2009
- Introduction of Behavioural Safety programme 2011
- Introduction of mini risk assessment 2011



Situational Aspects

“What the organisation has”

- Implementation of a Management System in line with OHSAS 18001
- Intranet for Health and Safety Management System
- Implementation of Contractor and Supplier audit System
- Tap Root
- Occupational Health

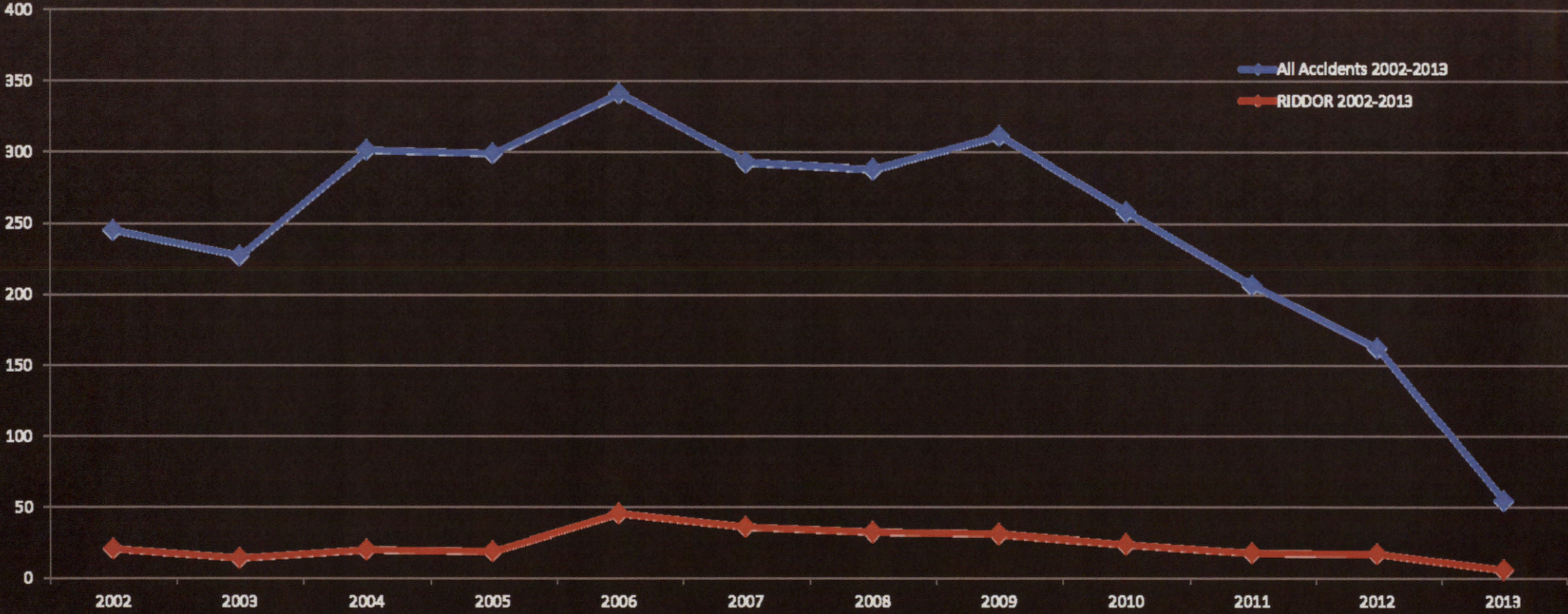


Systems alone will NOT drive safety improvements.

The Company needs to develop beliefs and values and instill these in the culture of OUR organisation through leadership and employee participation.



Accident Statistics



Future

Objectives and Targets

- Zero tolerance of accidents
- Be a STAR. Stop, Think, Ask, Resolve!
- Continual improvement/ 1 Best Way
- KPI's
- Implementation of a Business Continuity Plan

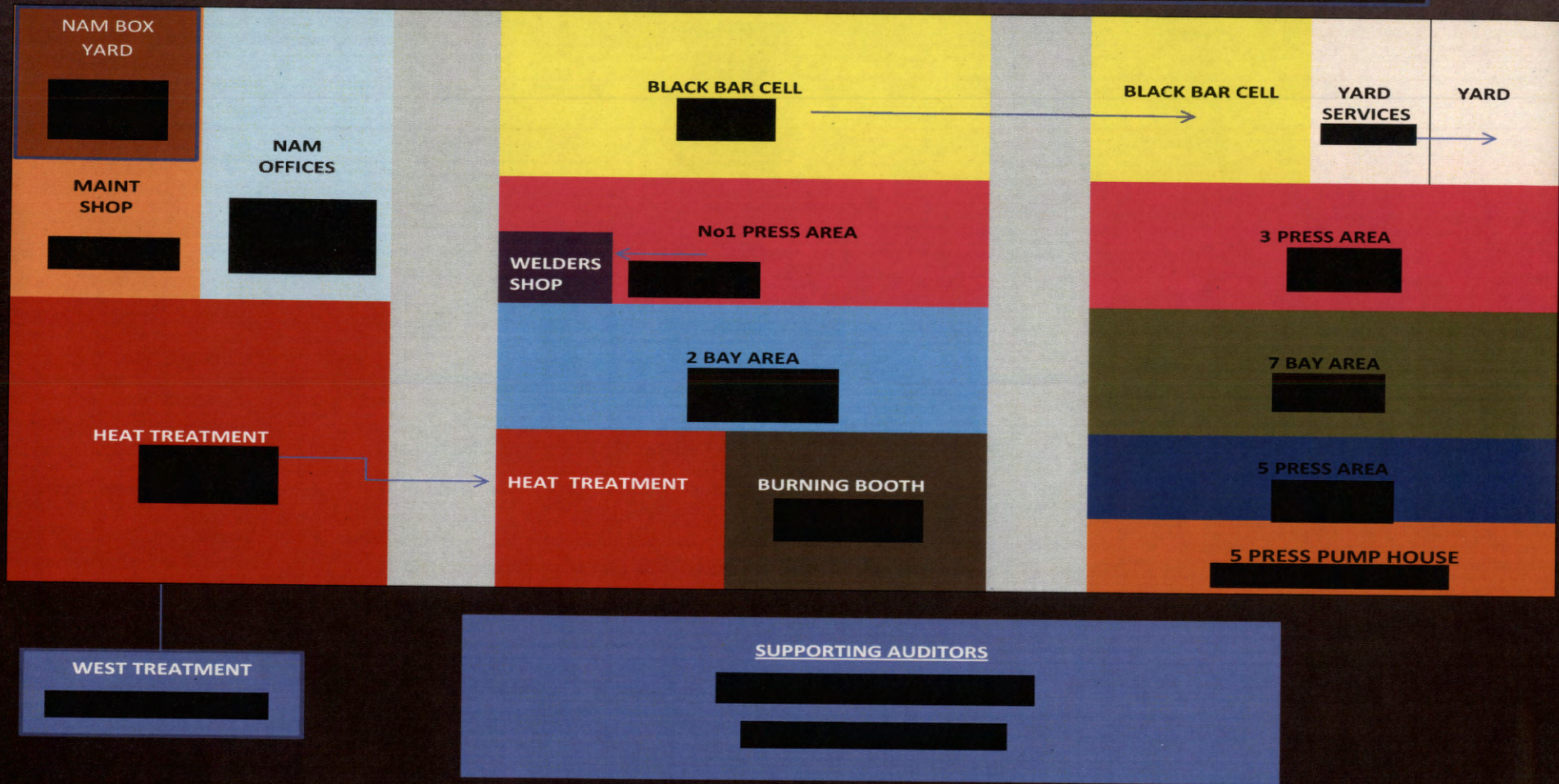


Forge Pilot Scheme

Past	Present	Future
Top Tier Audits	Team Audits	Audit Other Areas
Closed Agenda H&S Meeting (AOB)	Ownership of H&S Agenda	Project Teams
H&S Culture Change Stepped Change	Involvement Consultation	Pre-job Coaching Pre-job Briefing



FORGE AUDIT PLAN – AREAS OF RESPONSIBILITY AND DUTY HOLDERS



Benefits

- Hazards identified and closed out.
- Ownership of H&S.
- Initiatives supported from the very top.
- Performance is measurable.
- Not just 'another audit'.
- Reduce Hazards = Reduce Accidents



Product Safety

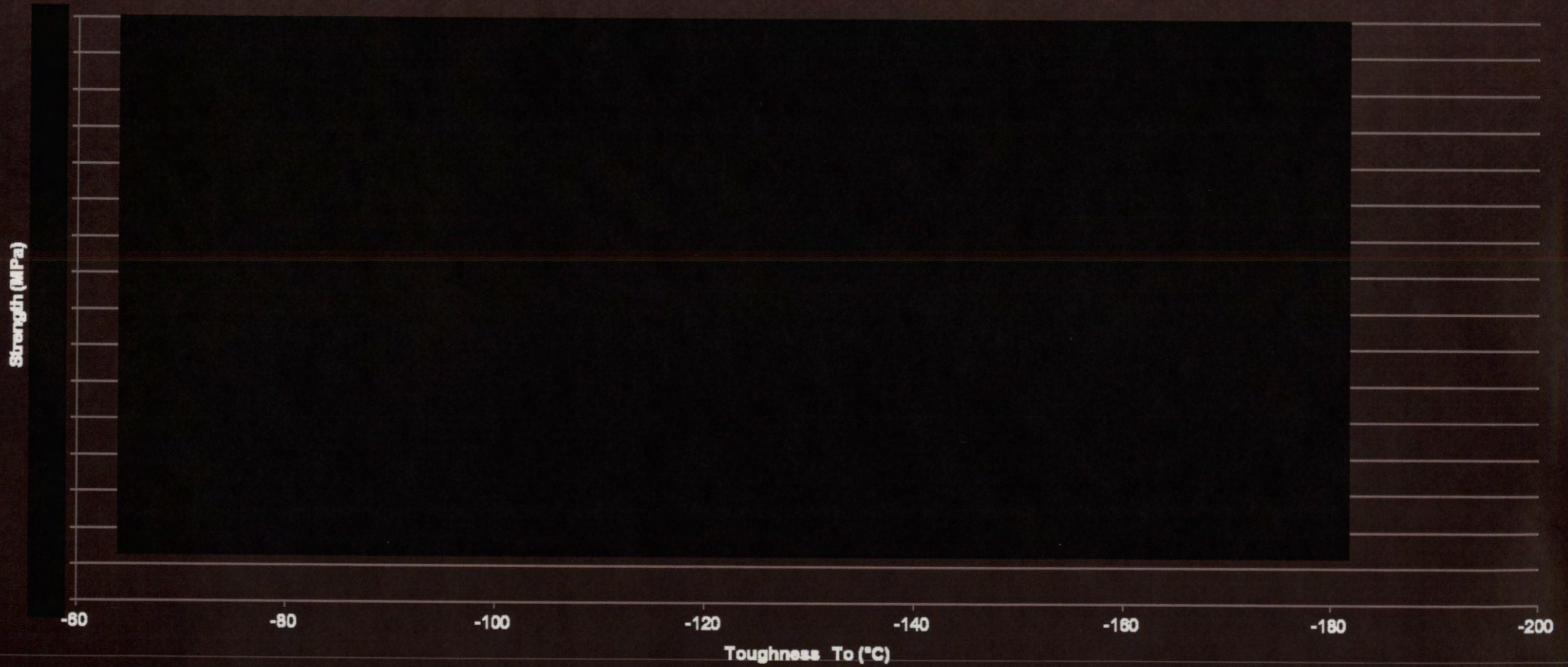


Composition

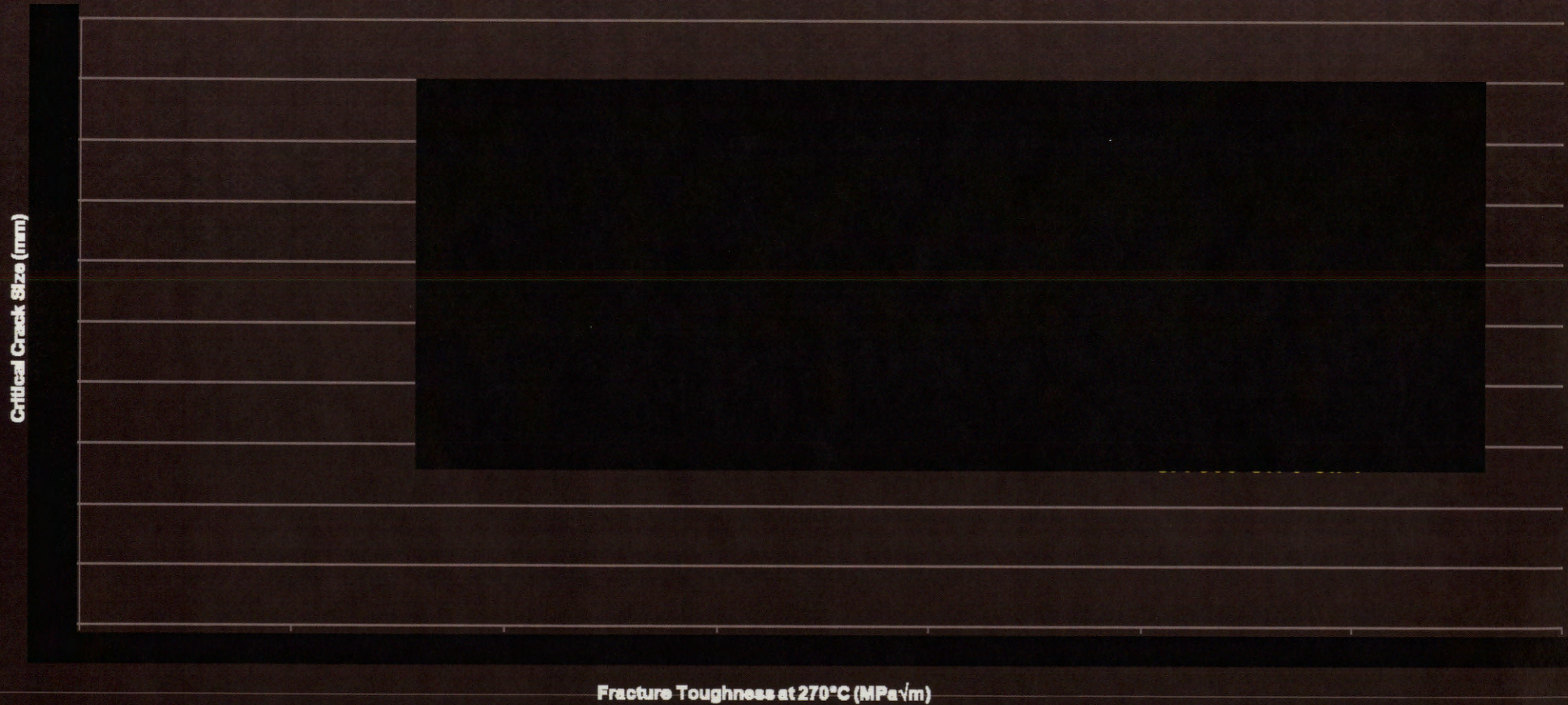
Positive Elements	Negative Elements



Mechanical Properties of Nuclear Grades



Mechanical Properties of Nuclear Grades

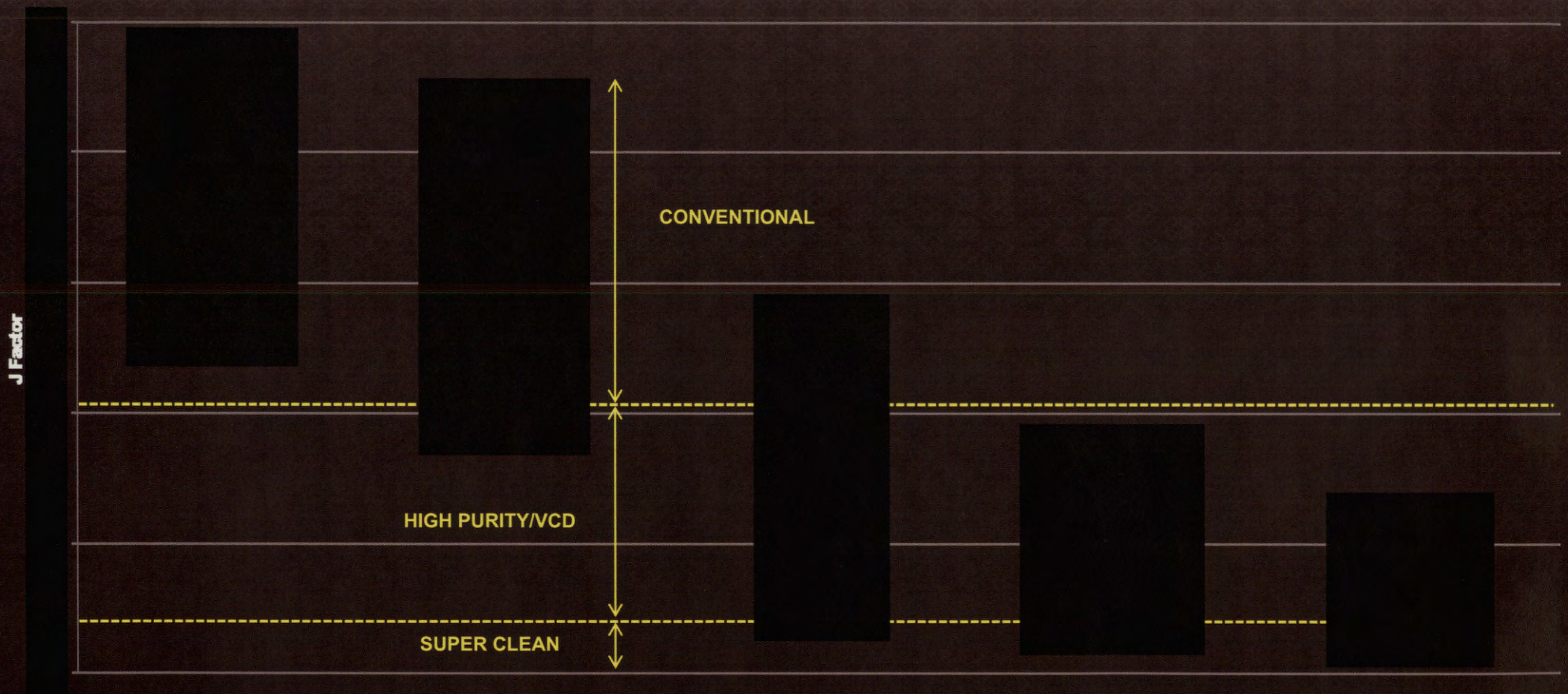


J Factor

$$\text{J Factor} = (\text{Si} + \text{Mn}) \times (\text{P} + \text{Sn}) \times 1000$$



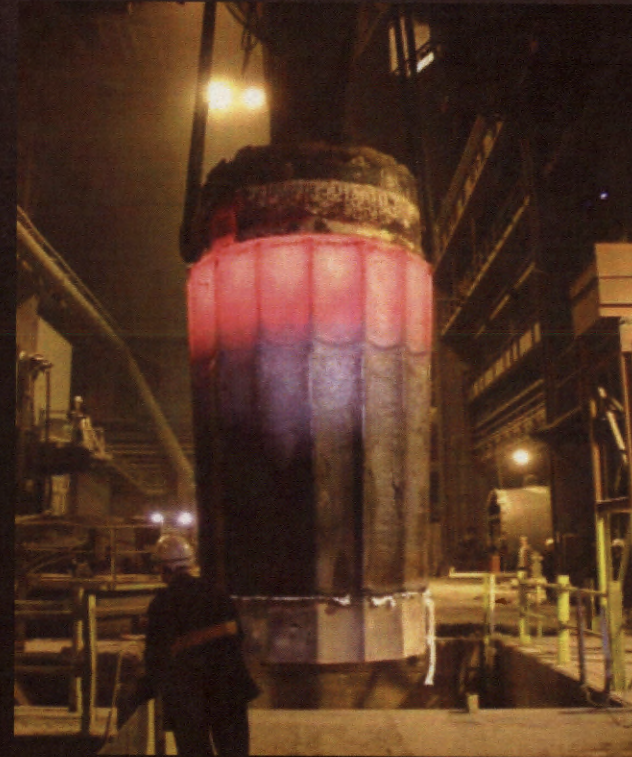
Steelmaking Practice for High Integrity Components



Research & Development



Ingot Development



Nuclear Head forging



Shape Forging of Heads



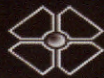
Specific Forging Tools



Forming & Extrusion on an Elliptical Head



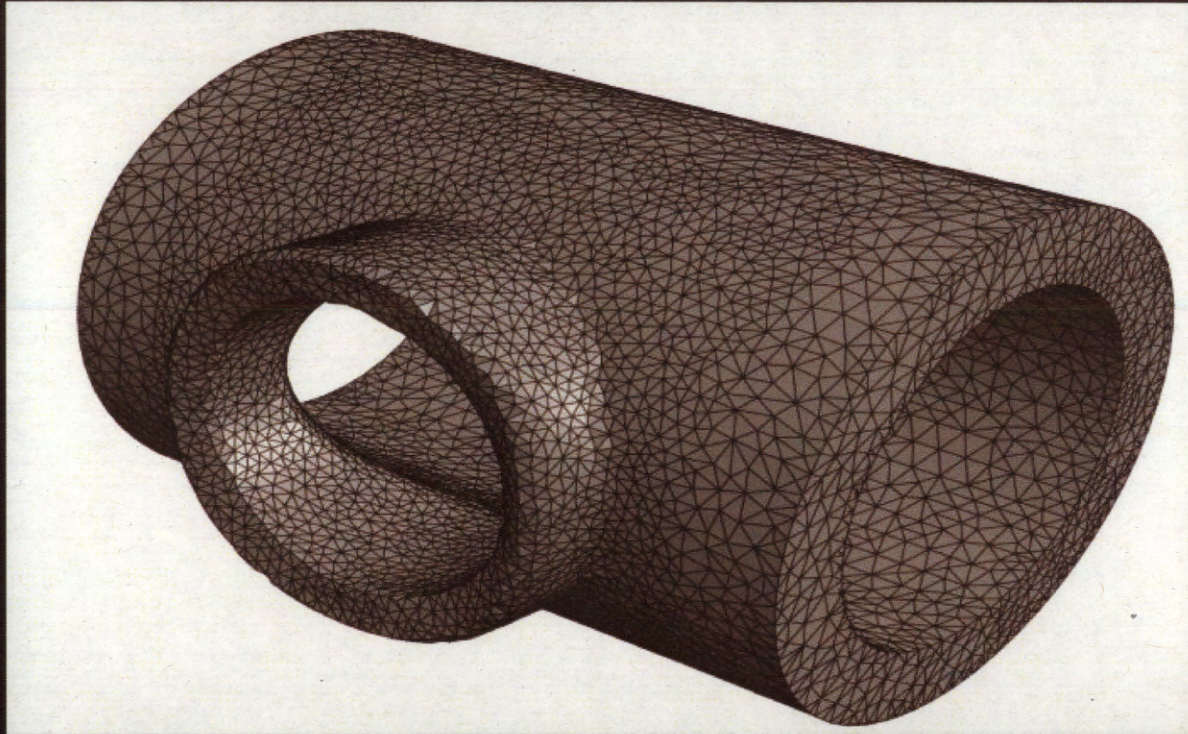
Forming a Spherical dome



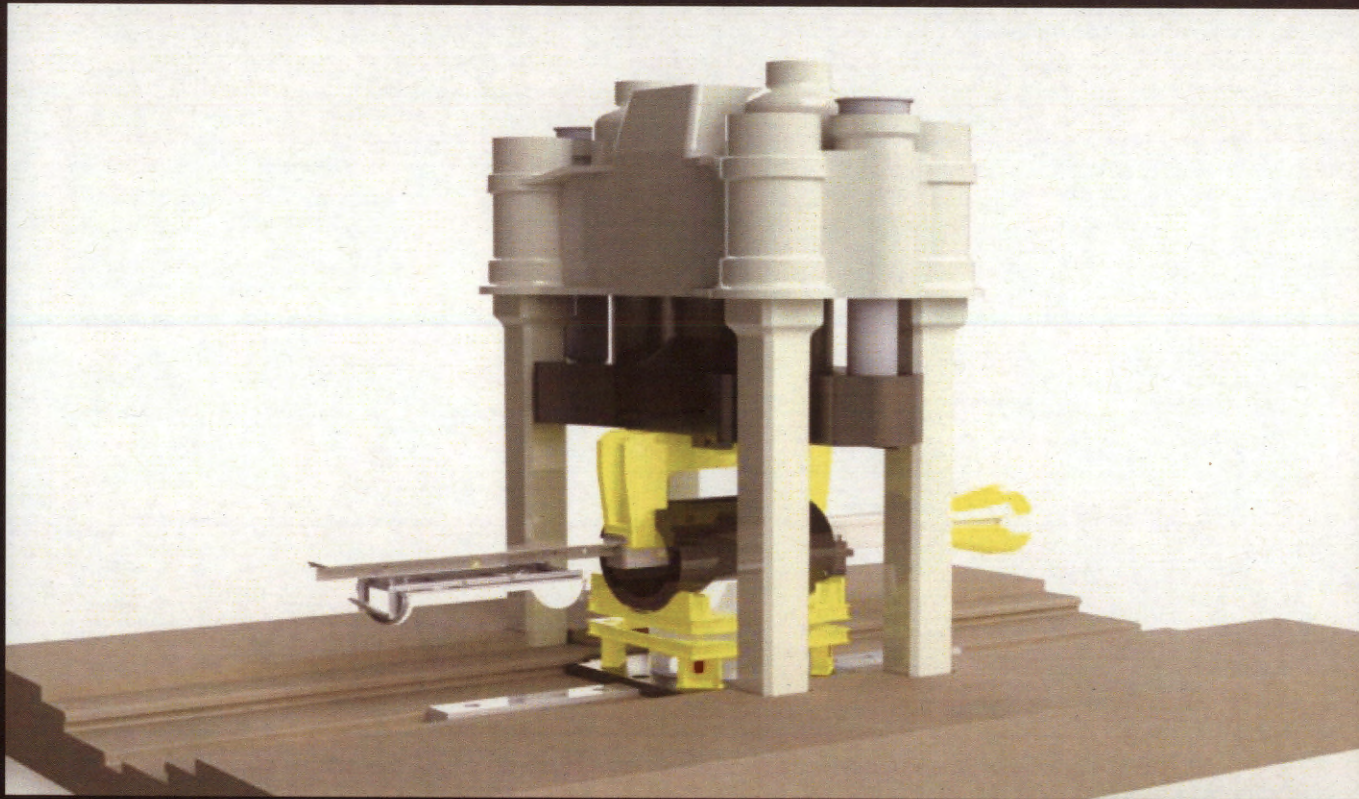
Extruded Nozzles



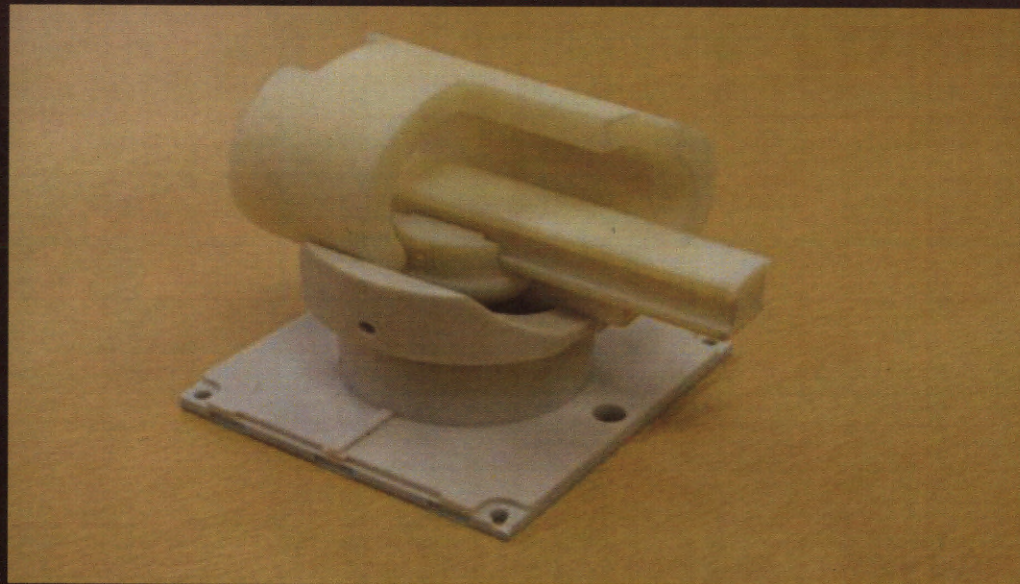
Novel Manufacturing routes



Novel Manufacturing routes



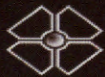
Novel Manufacturing routes



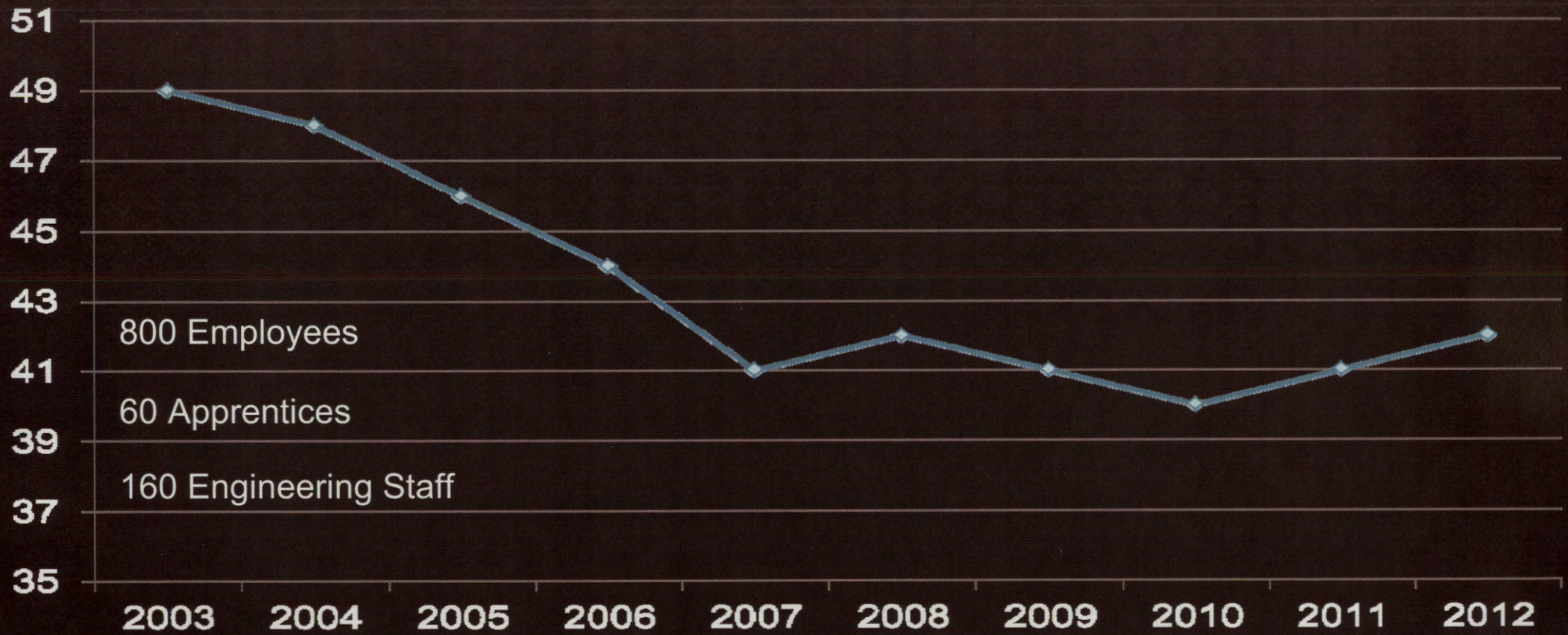
Novel Manufacturing routes



People



Employee Average Age



800 Employees

60 Apprentices

160 Engineering Staff



LONG SERVICE

Length of service	Number of staff
25-40 years	95
40+ years	40



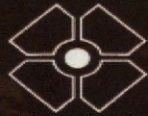
Conclusions

- Safety of our Employees is our **Number One** priority.
- Product quality is essential in securing the safety of our components in service.
- Continuous improvement in all aspects of our business underpins our future direction.
- Company policy dictates that defence sits above all other manufacturing activities.





**SHEFFIELD FORGEMASTERS
INTERNATIONAL**



Experienced | Global | Innovative

