Nguyen Thua Duong

5rd EMship cycle: October 2014 – February 2016

Master Thesis

Assessment of the Conditions of Medium-size Shipbuilding Company to Build Offshore Structures

Supervisor: Professor Tadeusz Graczyk, West Pomeranian University of Technology, Szczecin
Internship tutor: Mr. Michał Gołębiowski, Finomar Spółka z o.o., Szczecin, Poland
Reviewer: Professor R. BRONSART, University of Rostock, Rostock, Germany

Szczecin, January 2016

Aim of this thesis

1. What is the full potential of medium-sized shipbuilding company?

2. What is the recommendation to improve the competitiveness of this company?

Method

Qualitative method was used:

Only approved literature from leading experts

Practical work documents in real construction period (production drawings and pictures)

Academic books, previous research reports, articles

Prezi

Presentation plan

Constraints = Business challenges + Technical challenges

Affected factors


Location


Collaboration


Labour


Building Process

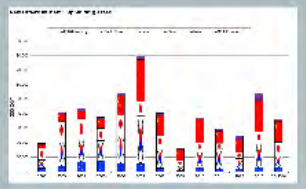

Products

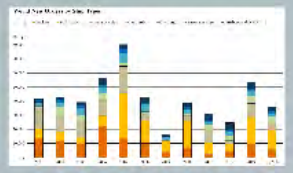
Prezi

Business challenges

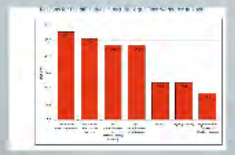
Economic crisis

Competitors





Labor difficulty



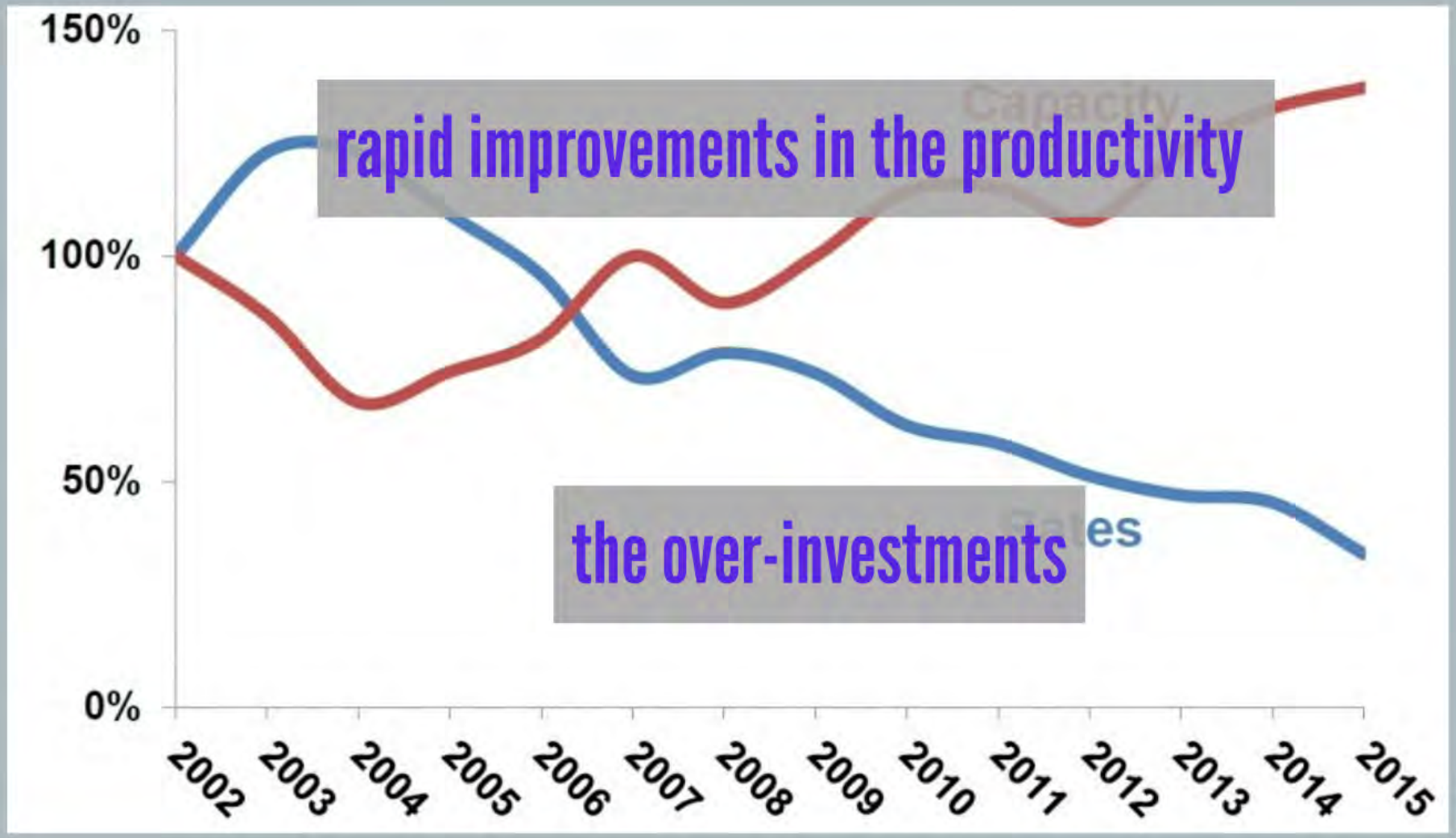
3-D stands for :

Dirty
Difficult
Dangerous

Prezi


Brent crude oil price, 1988-2015
$ per barrel
150
120
90
60
30
0
07/1988
'90
1995
2000
2005
2010
2015
Source: Bloomberg

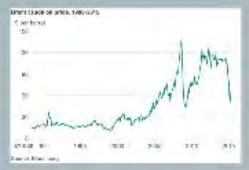
Prezi


150%
100%
50%
0%
rapid improvements in the productivity
the over-investments
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

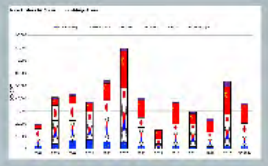
Prezi

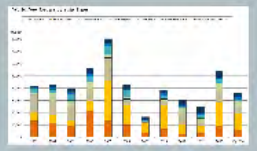
Business challenges

Economic crisis



Competitors





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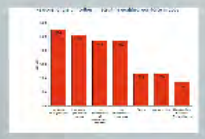

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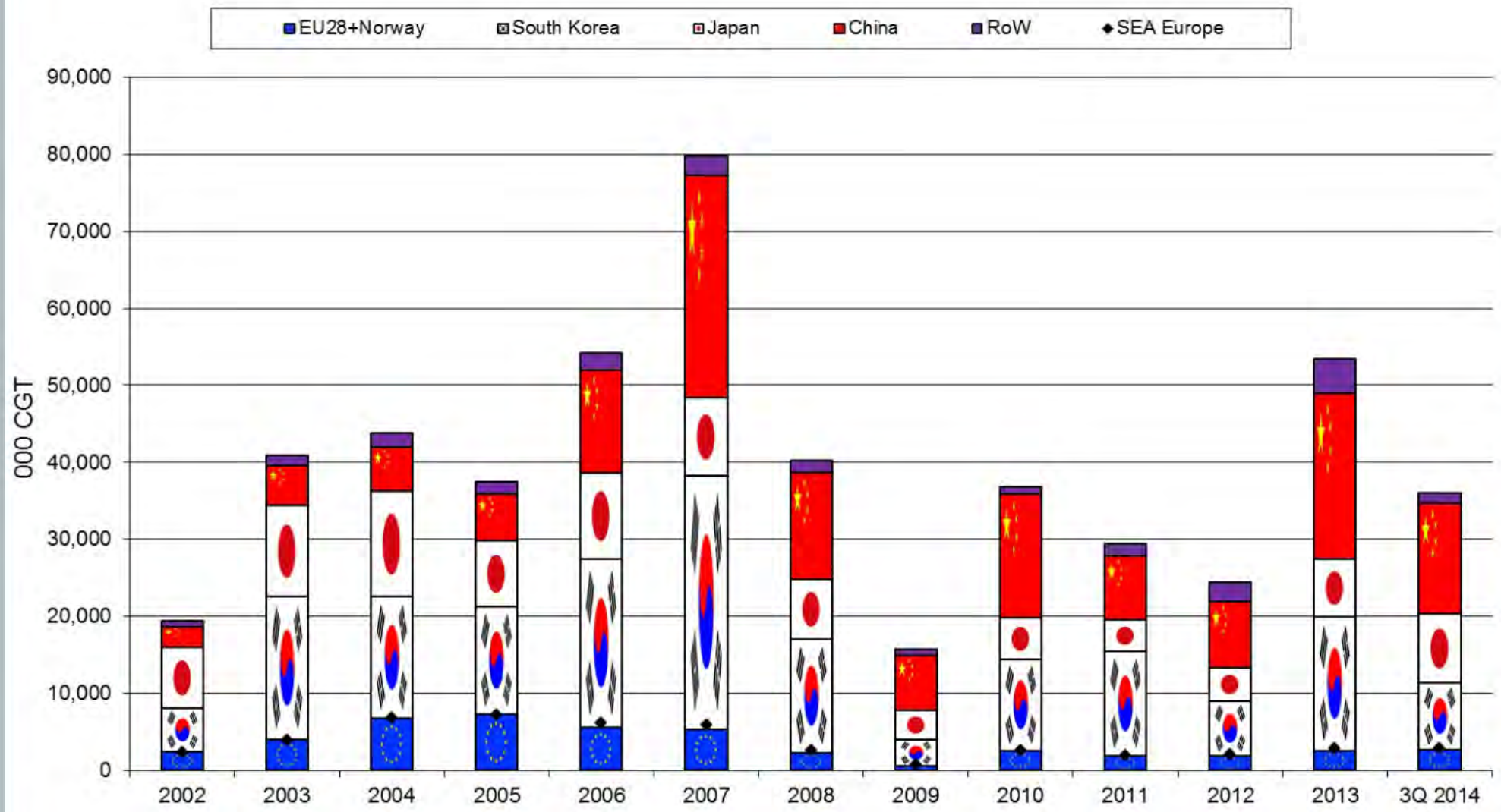
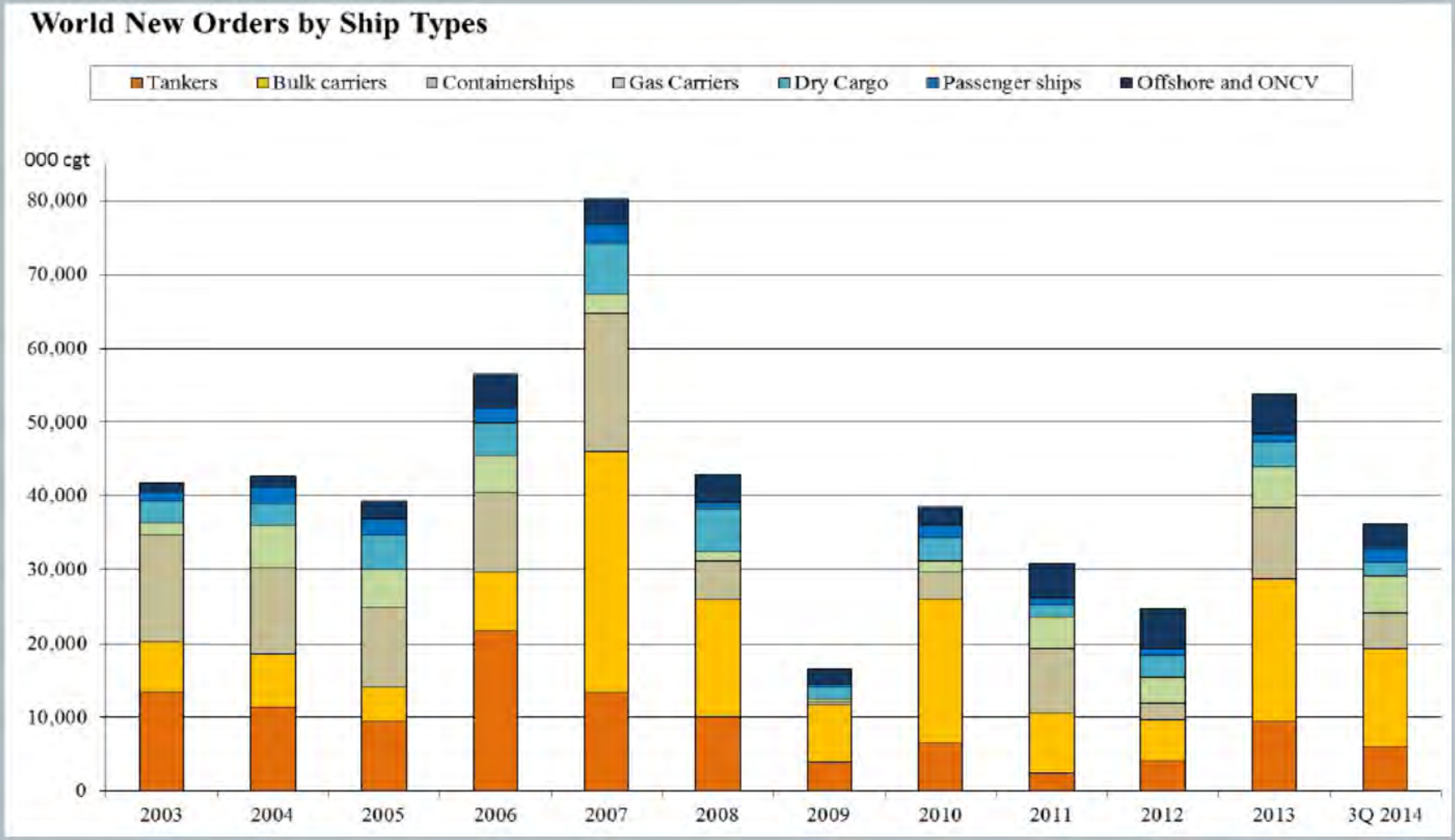
New Orders by Main Shipbuilding Areas



Prezi

World New Orders by Ship Types



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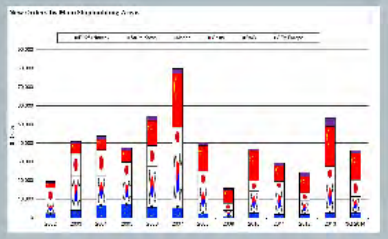
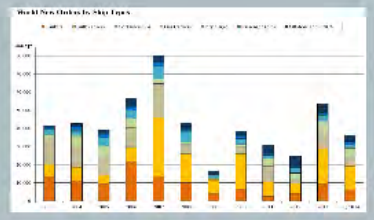
Competitors





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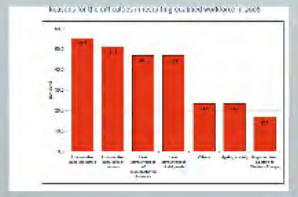

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Difficult
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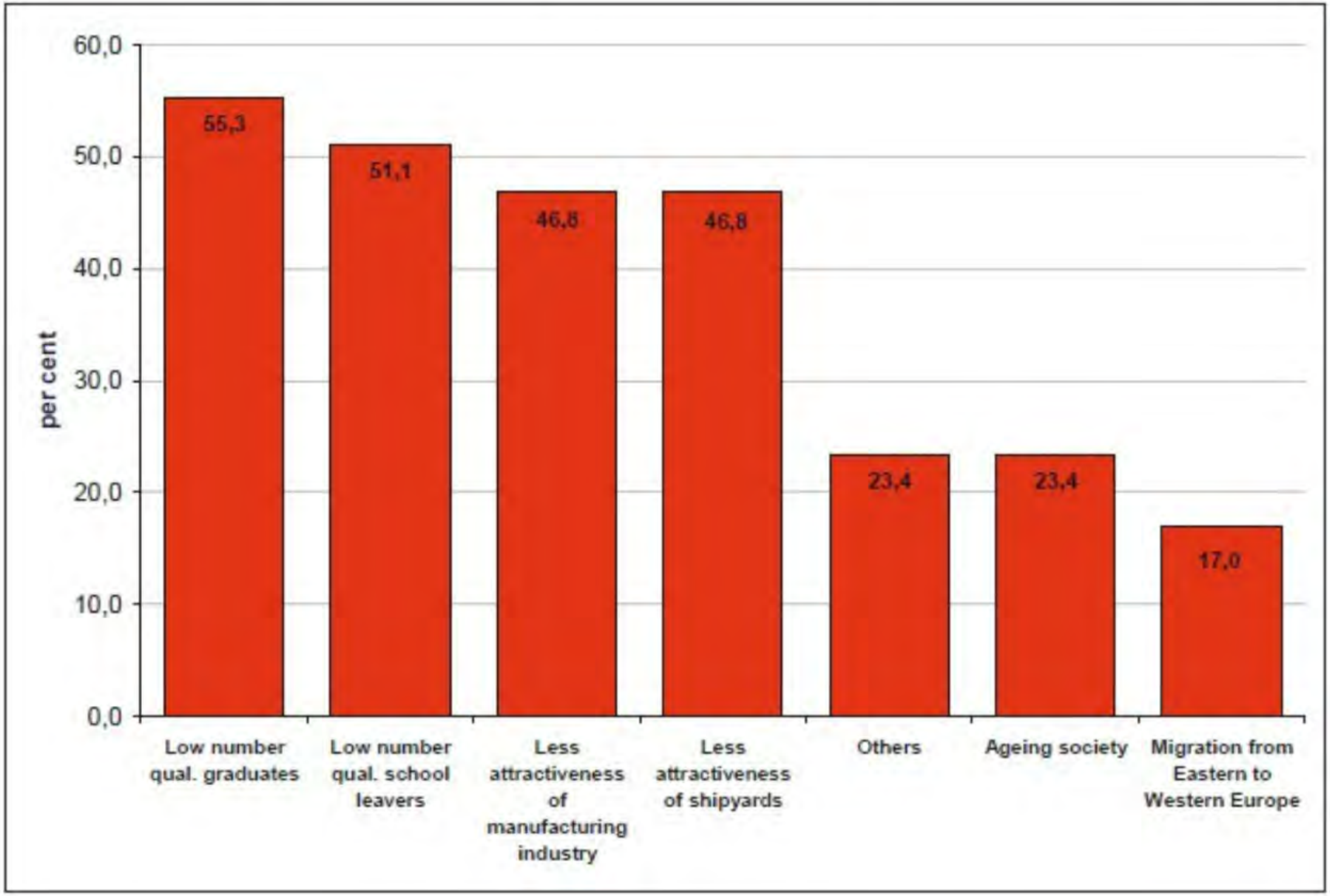
Prezi

Reasons for the difficulties in recruiting qualified workforce in 2008



Prezi

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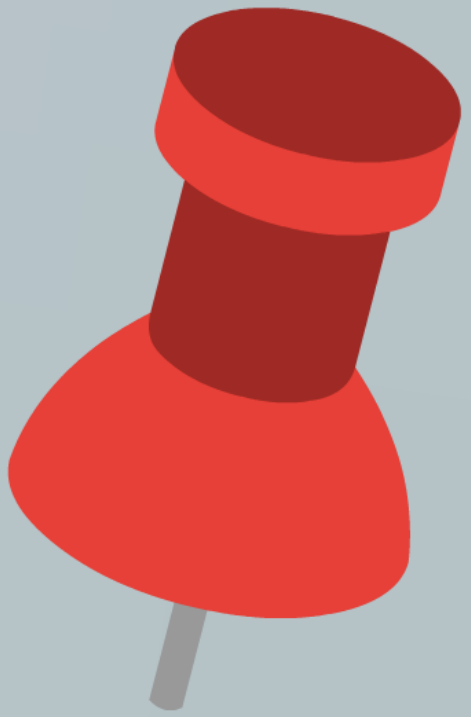


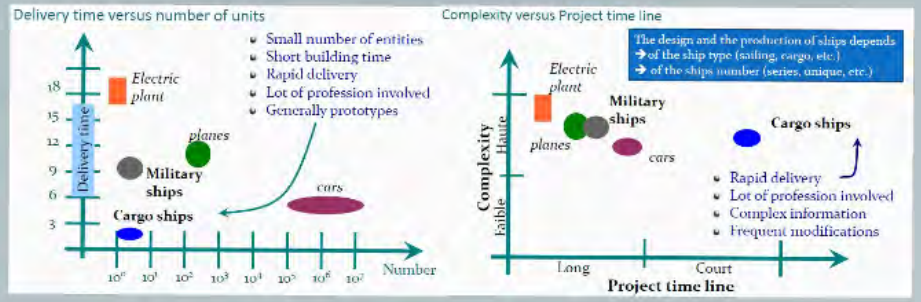
Dirty

Difficult

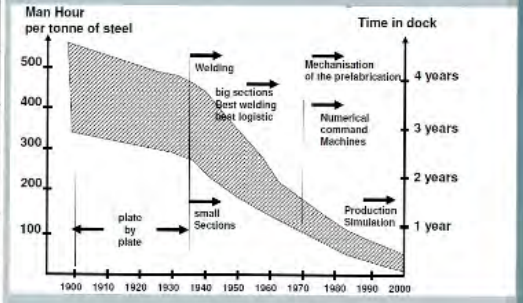
Dangerous

Prezi

Technical challenges



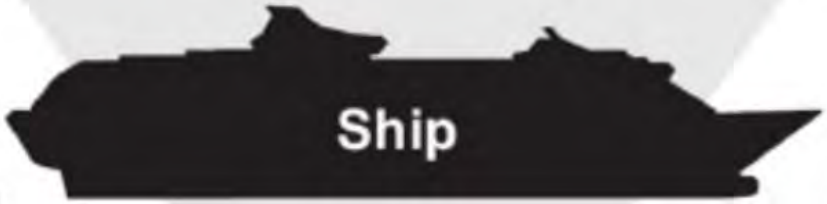
Level	Description
1	Early 1960s – welded hulls, small cranes (<50 t), multiple open berths, Manual operating systems.
2	Late 1960s/ early 1970s, larger cranes (<250 t), some mechanization and pre-outfitting, numerical controlled metal cutting machines. Some computerized systems.
3	Late 1970s, large capacity cranes (>350 t). High degree of mechanization and use of computers. Block manufacturing shops.
4	Technology advances of the middle 1980s. Generally large docks, protected microclimate zones, High lifting capacity of Goliath cranes (>800 t)
5	1990s, with automation, integration of operating systems, use of CAD, CAM, CAPP., Increased automation and robotics in welding, pipe shops.
6	2000 to present: large, renovated and some completely covered shipyards, large grand and ultra blocks to 3000 t, mainly robotics for welding and part assembly.



Prezi

3 stakeholders

Ship Owner
Hotel
Factory
Catering
Floating vessel
Navigation & Shipping
Entertainment & Leisure

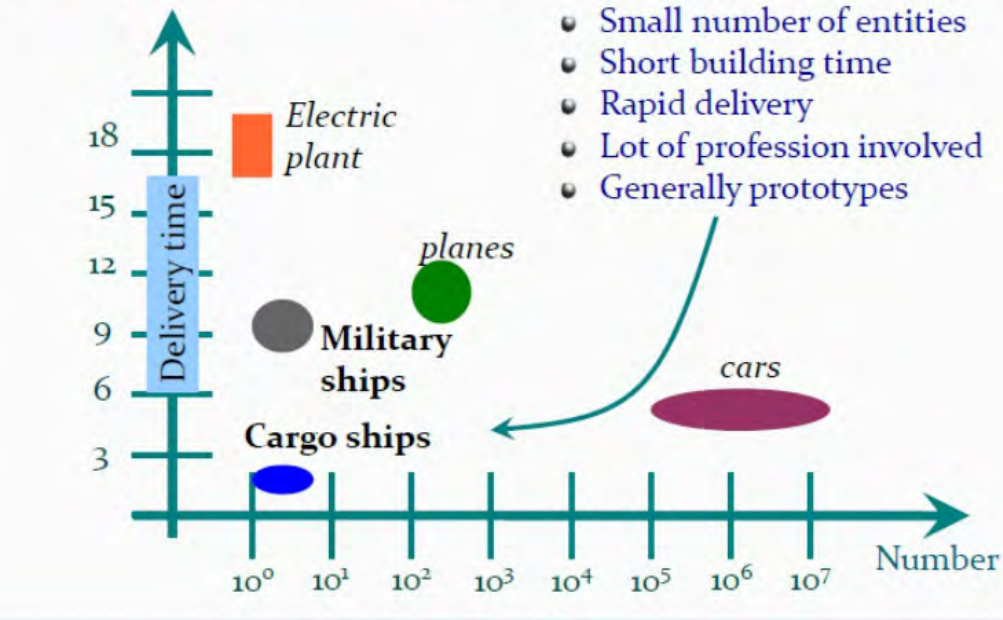


Shipyard
Stability
Propulsion
Manoeuvrability
Structural integrity
Energy production
Production scheduling
Components integration

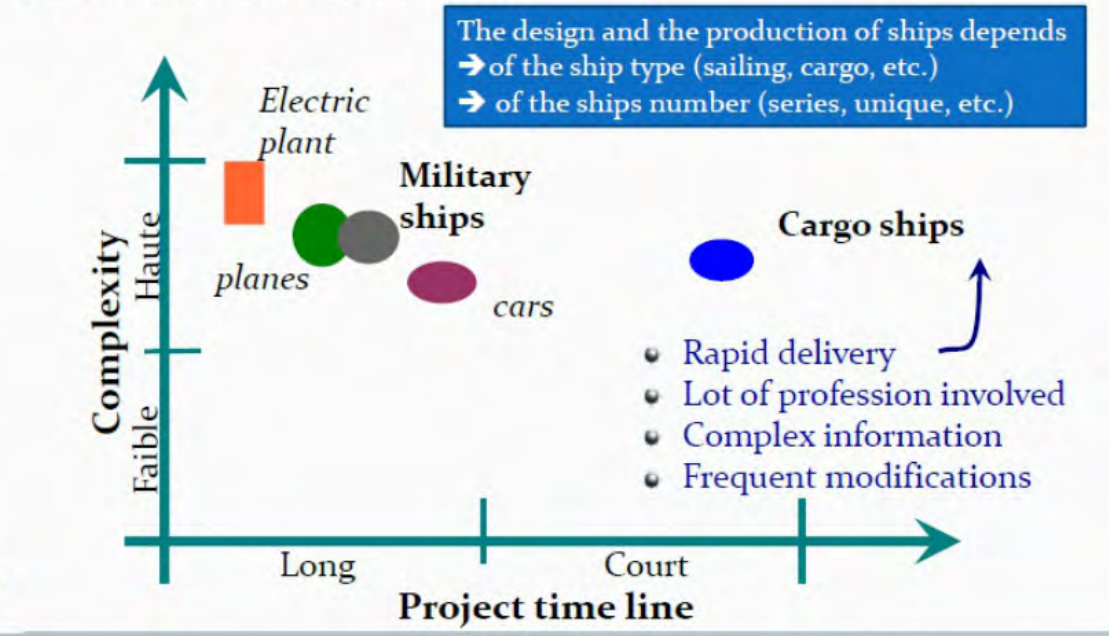
Class and Flag Society
Quality
Environment
Health & Safety
Social Responsability

Prezi

Delivery time versus number of units



Complexity versus Project time line



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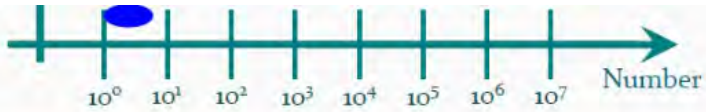

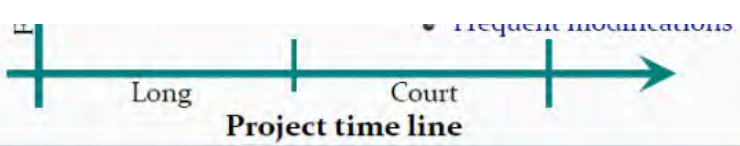

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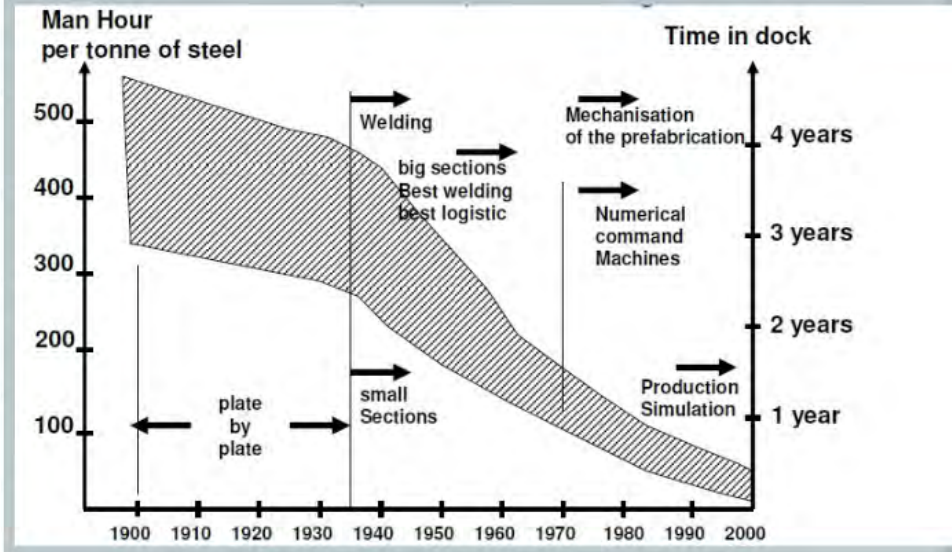


Prezi

Summary

Strengths of EU shipyards

- Level of innovation
- Innovative SMEs (Small and medium-sized enterprises) and strong position of marine equipment industry
- Strong connections between shipyards and marine equipment suppliers
- Efficiency
- Specialization in niche markets

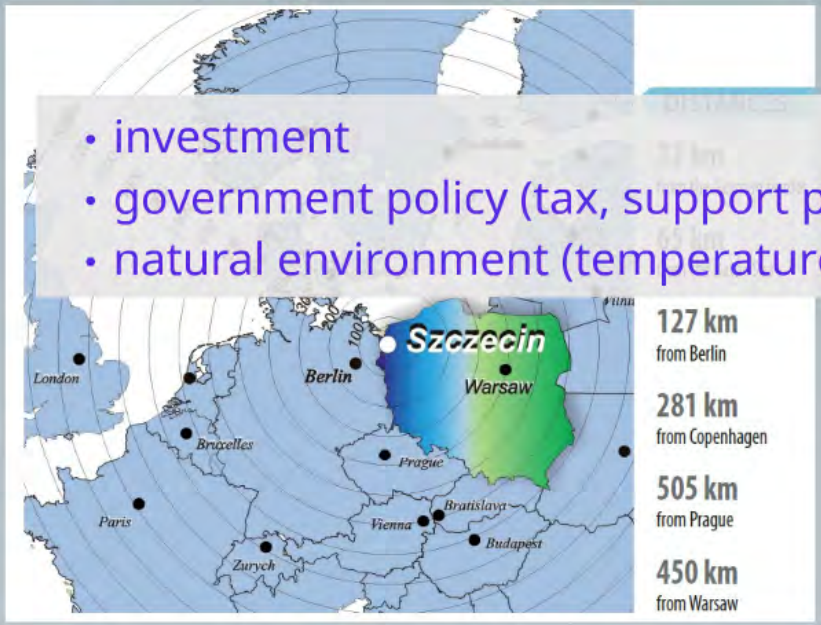
Weaknesses

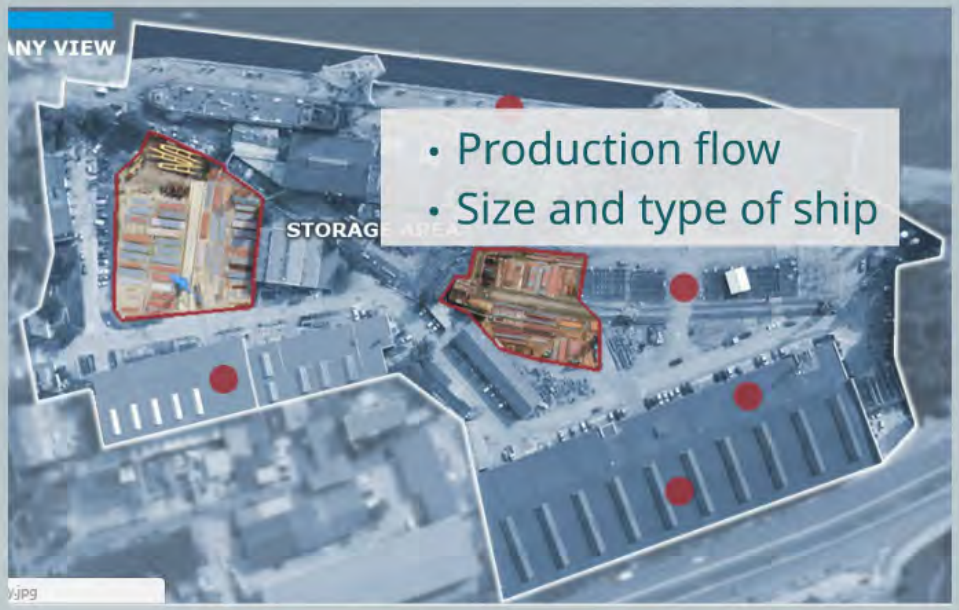
- Cost levels (wage levels and steel prices)
- Access to skilled labour
- Access to finance
- Potential difficulties in knowledge protection
- Fragmented government responses

Prezi

Location of shipyard

- investment
- government policy (tax, support program)
- natural environment (temperature, sunlight hour)





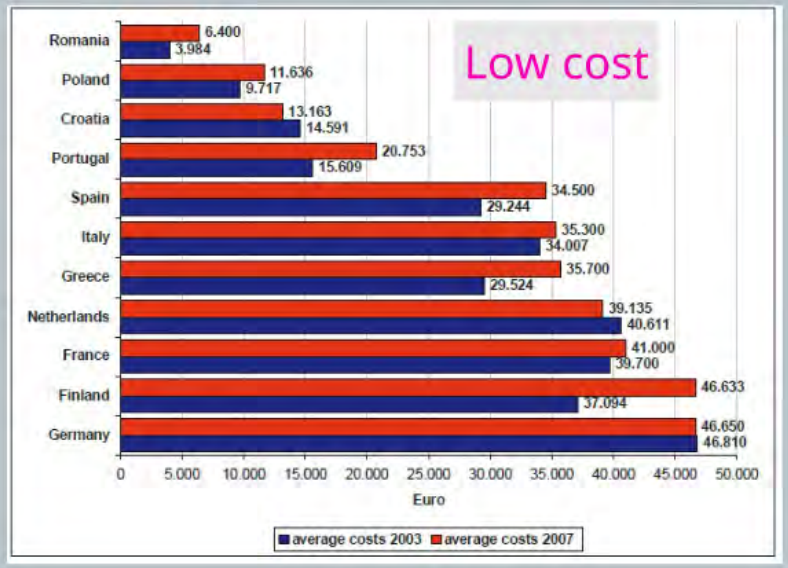
Prezi

CLUSTER

- attracting foreign investors
- sharing experience related to business and administration among companies

Prezi

Labour resource



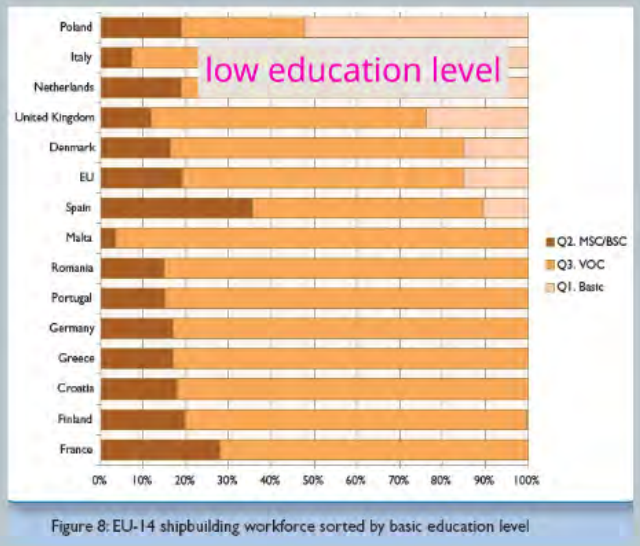
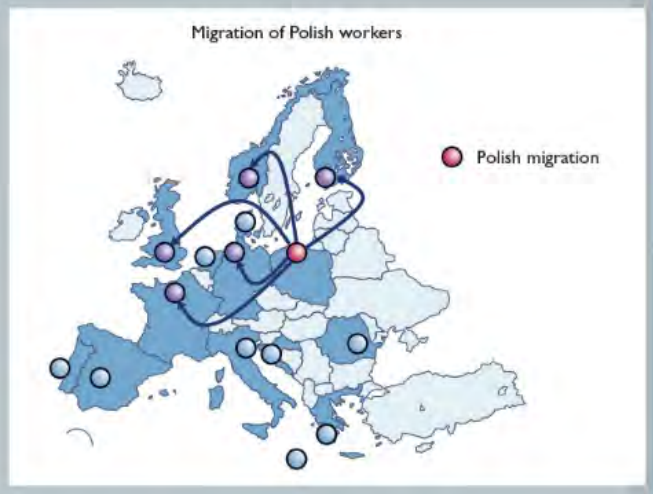


Figure 8: EU-14 shipbuilding workforce sorted by basic education level



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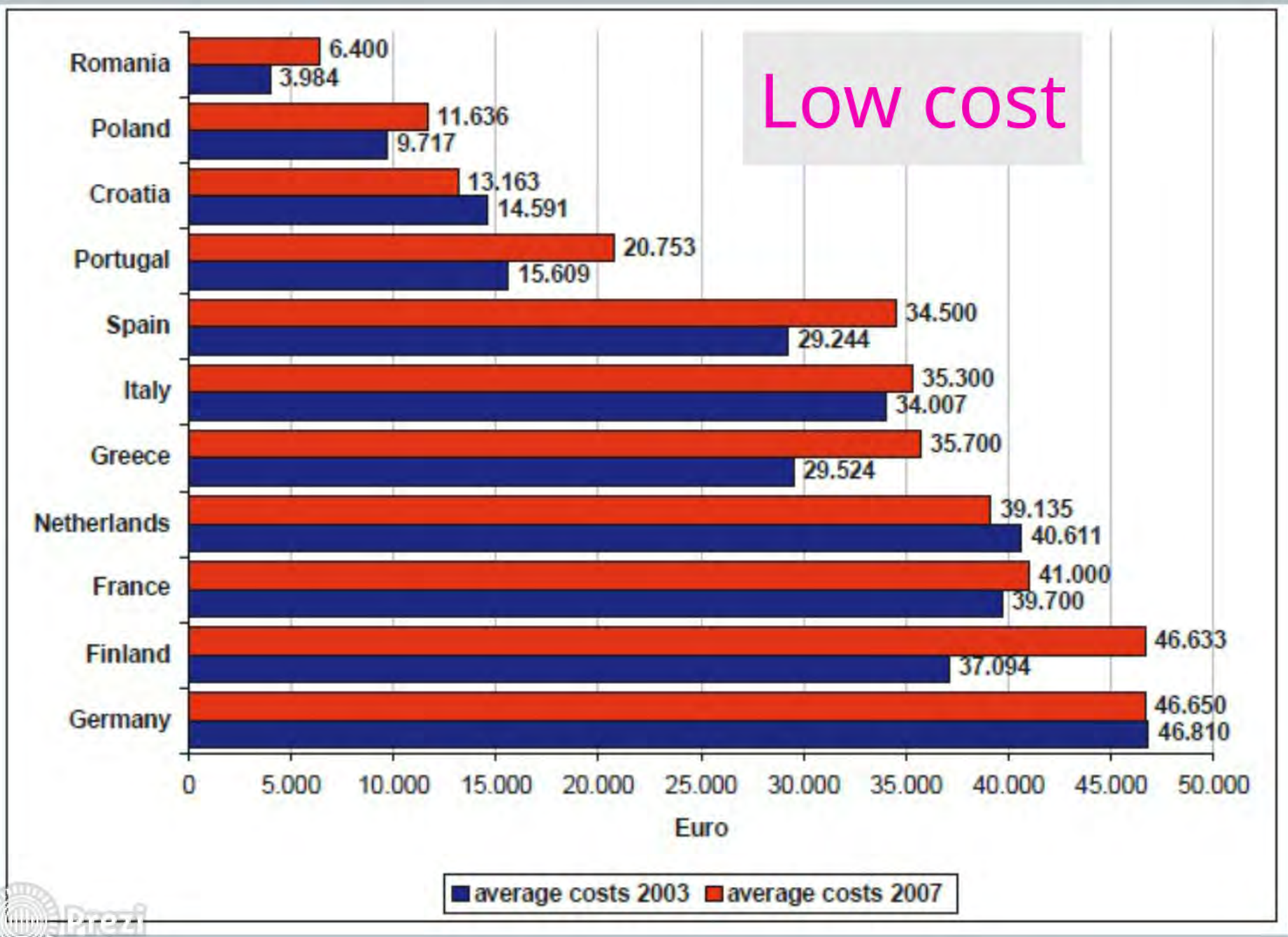

Low cost
Romania
6.400
3.984
Poland
11.636
9.717
Croatia
13.163
14.591
Portugal
20.753
15.609
Spain
34.500
29.244
Italy
35.300
34.007
Greece
35.700
29.524
Netherlands
39.135
40.611
France
41.000
39.700
Finland
46.633
37.094
Germany
46.650
46.810
0
5.000
10.000
15.000
20.000
25.000
30.000
35.000
40.000
45.000
50.000
Euro
average costs 2003
average costs 2007

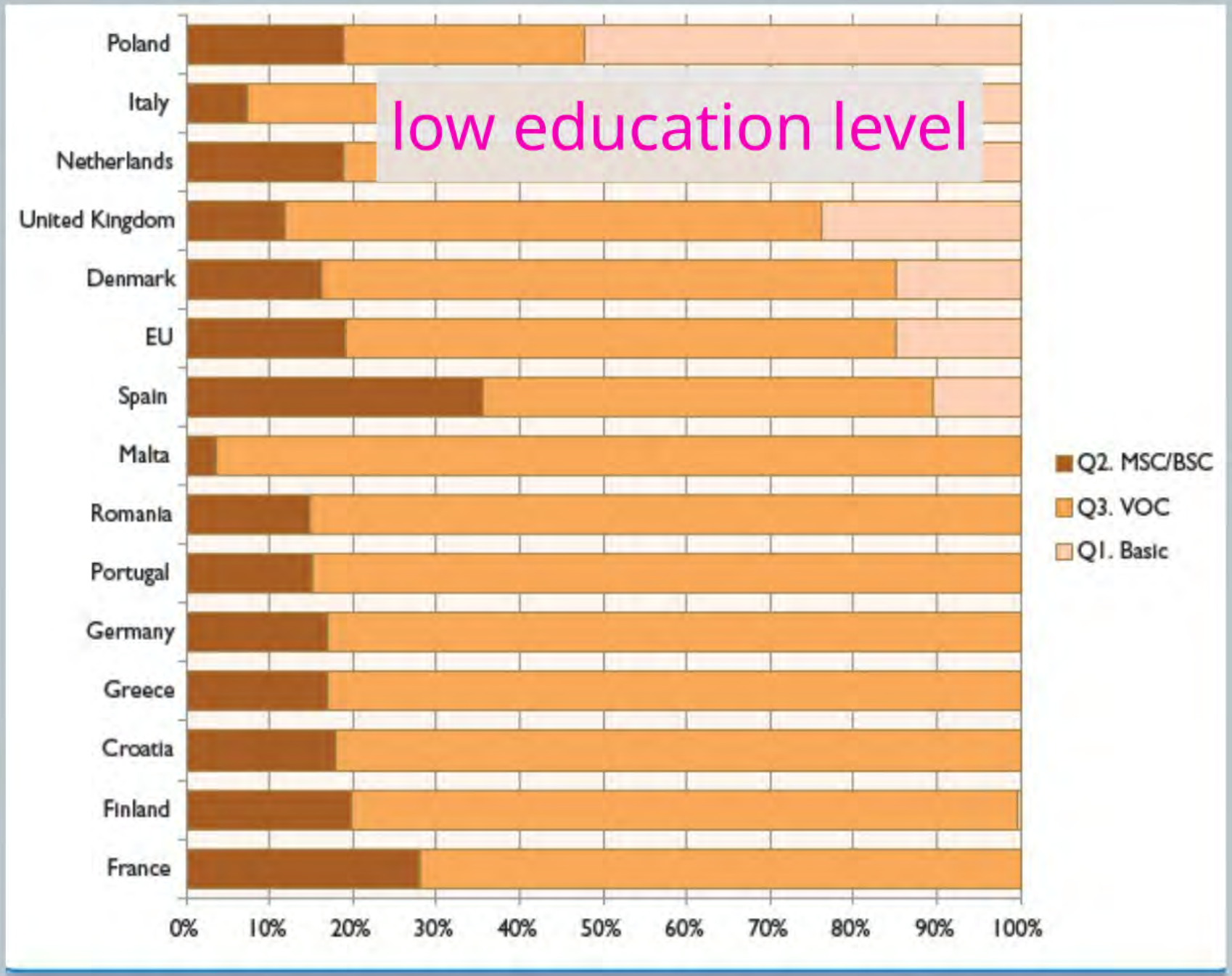


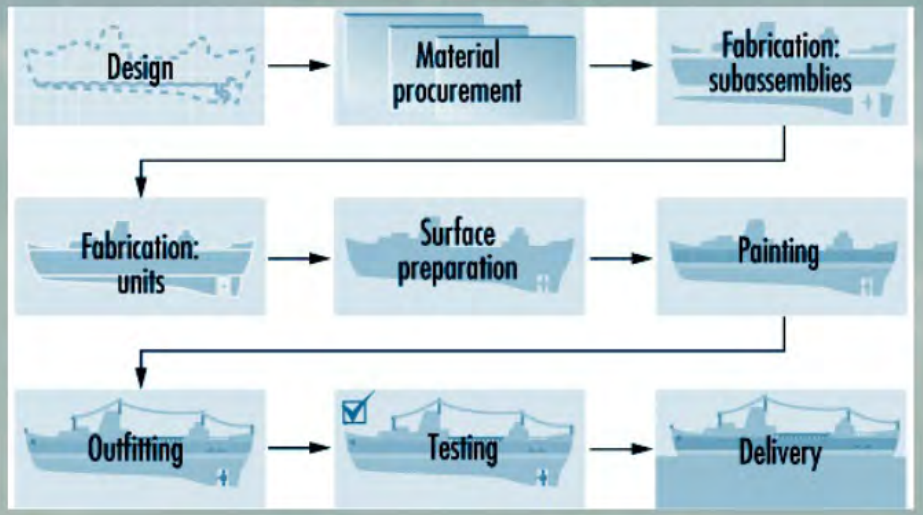
Figure 8: EU-14 shipbuilding workforce sorted by basic education level

Prezi

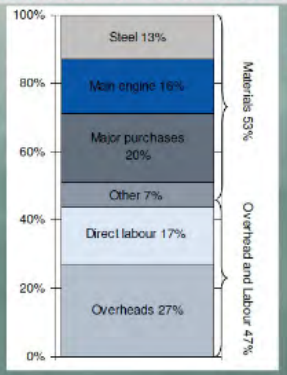
Migration of Polish workers

Prezi

Ship Construction Process



The cost breakdown for new construction of ship



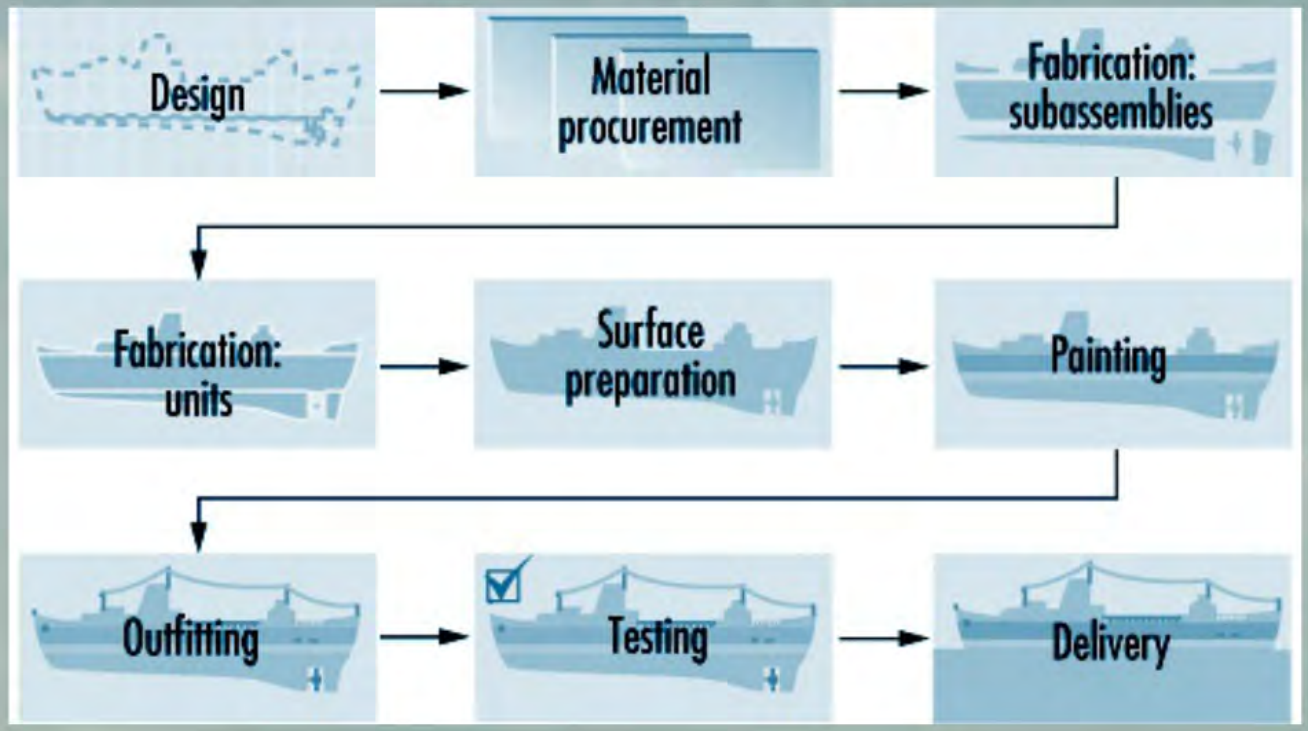
Mainly for steel fabication

- Cutting
- Bending
- Welding
- Painting

Products

Prezi

Ship Construction Process



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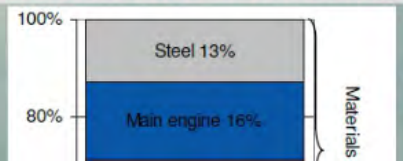

Mainly for steel fabication

- Cutting

Prezi

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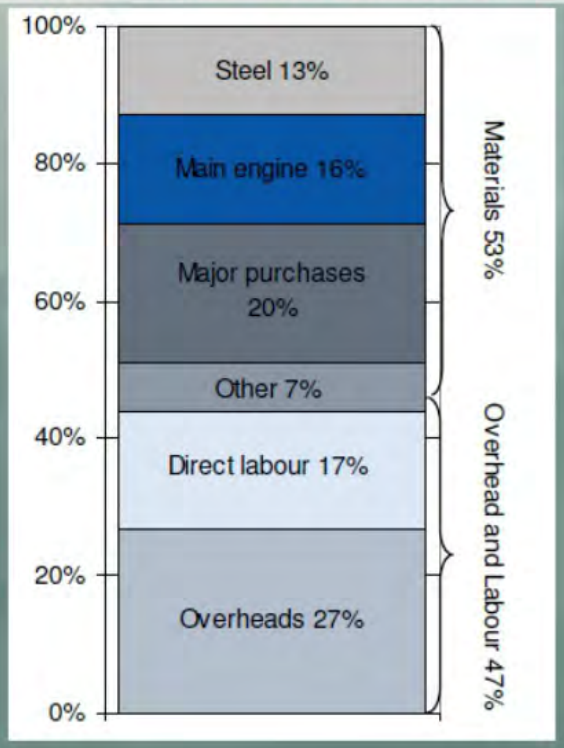


Mainly for steel fabication

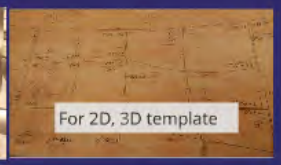
- Cutting
- Bending
- Welding
- Painting

Prezi

Cutting

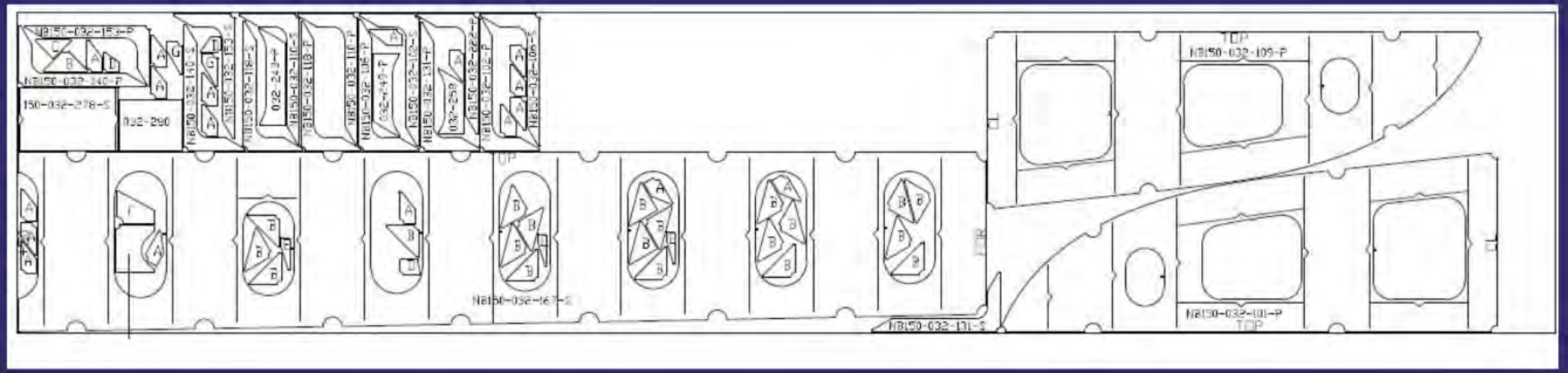
Plate

- Wide range of thickness
- Excellent quality of cutting edges
- Very narrow cutting jet
- High speed of cutting



Prezi

- High speed of cutting



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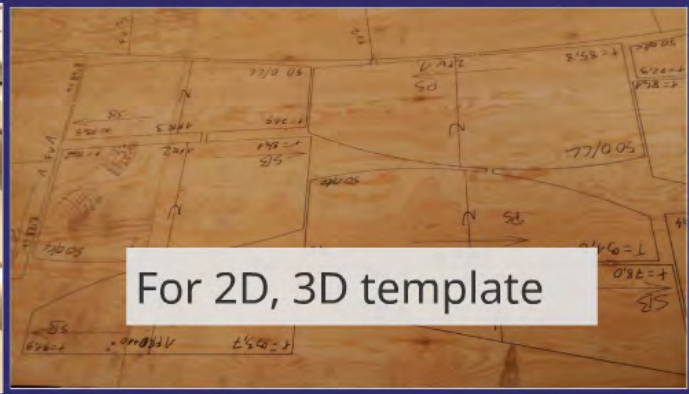


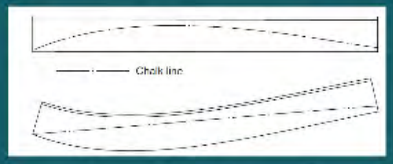
Prezi

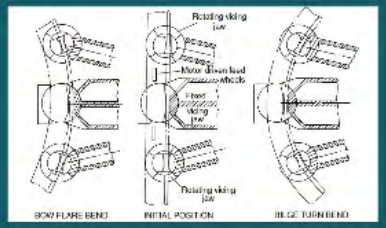
Bending

Plate rolls

Heat line bending

Cold frame bending





Prezi

nding

Plate rolls

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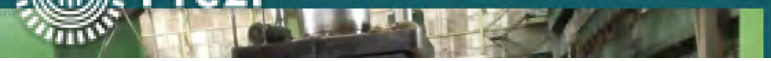
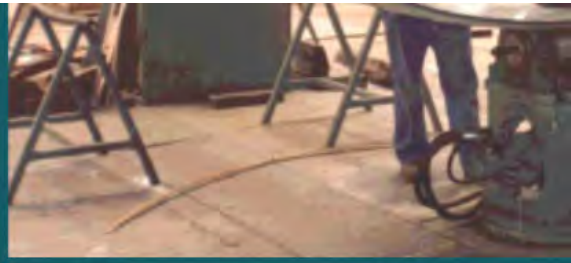
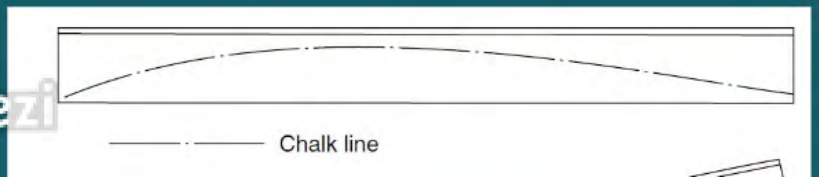




Heat line bending

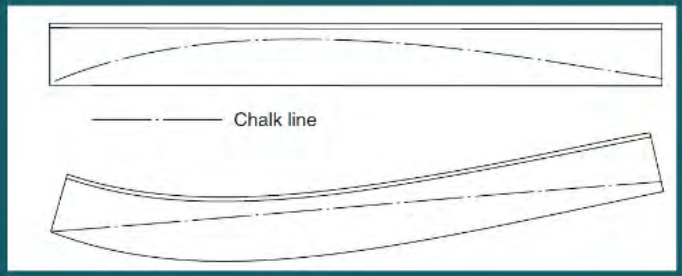
Cold frame bending

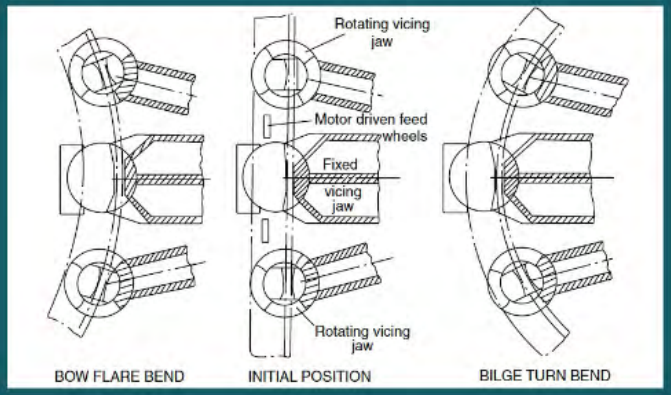


heat into bending

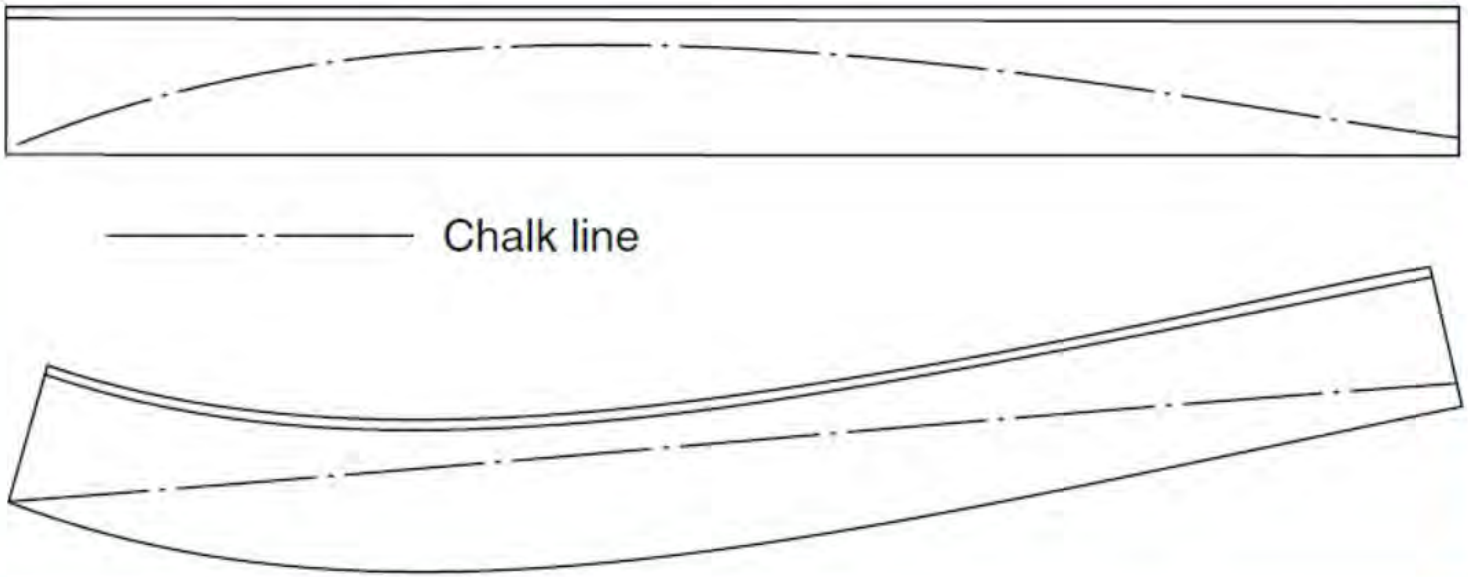
Prezi

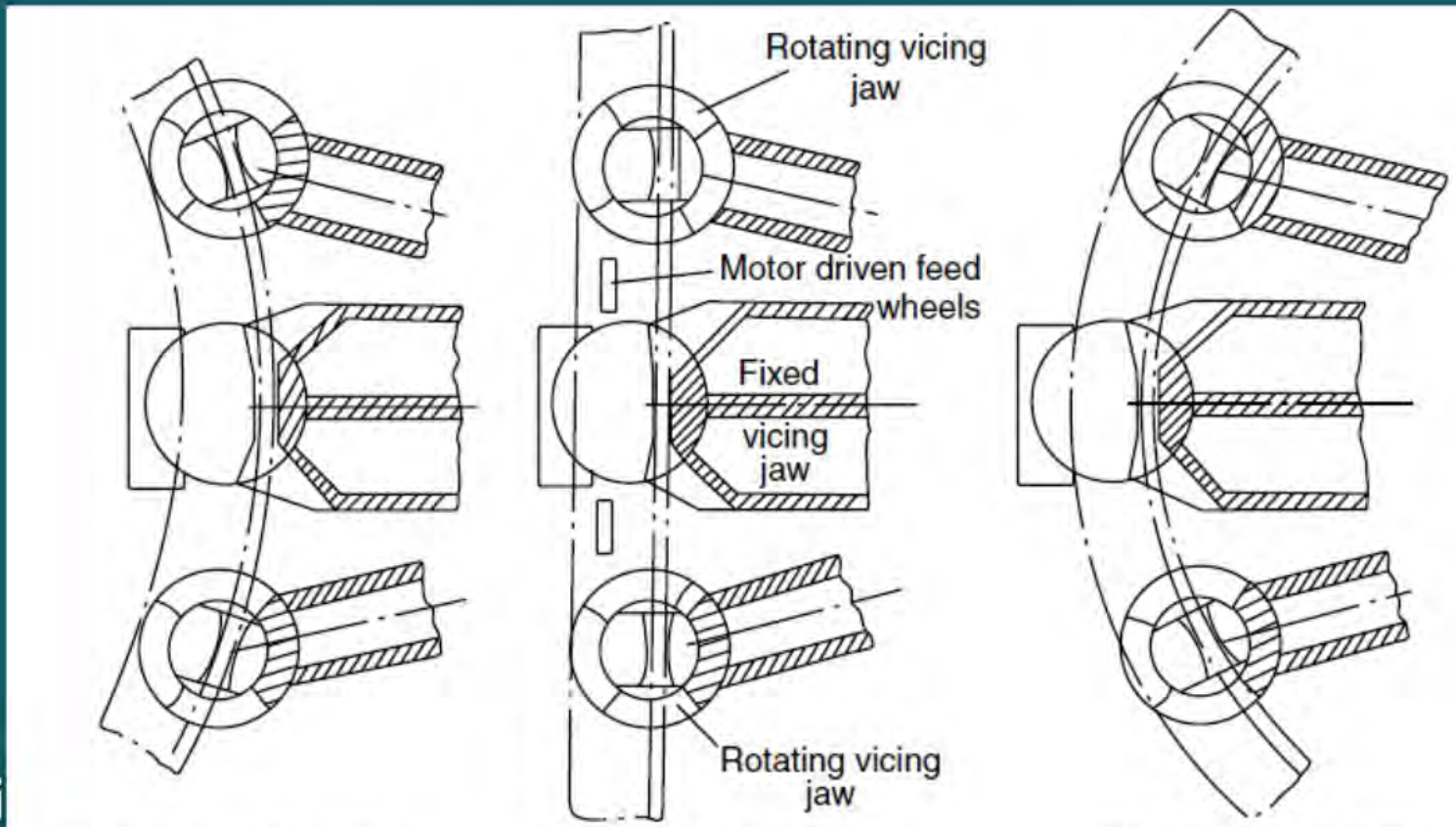
Cold frame bending





Prezi


Chalk line


Rotating vicing jaw
Motor driven feed wheels
Fixed vicing jaw
Rotating vicing jaw
BOW FLARE BEND
INITIAL POSITION
BILGE TURN BEND

Prezi

Welding

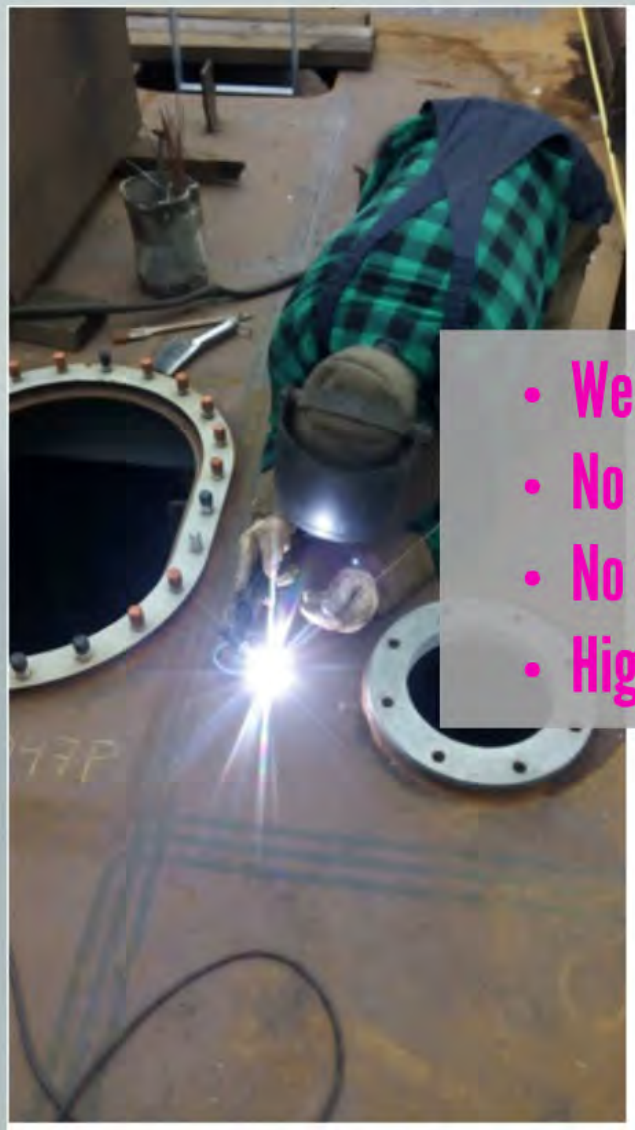
Prezi

Submerged arc welding (SAW)

- High deposition rates
- Deep weld penetration
- High speed welding
- High mechanization

Prezi

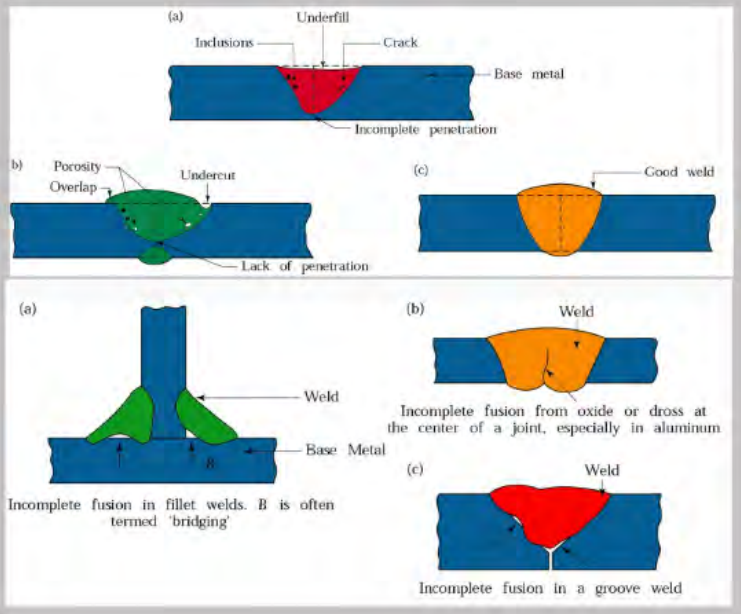
Gas tungsten arc welding (GTAW)

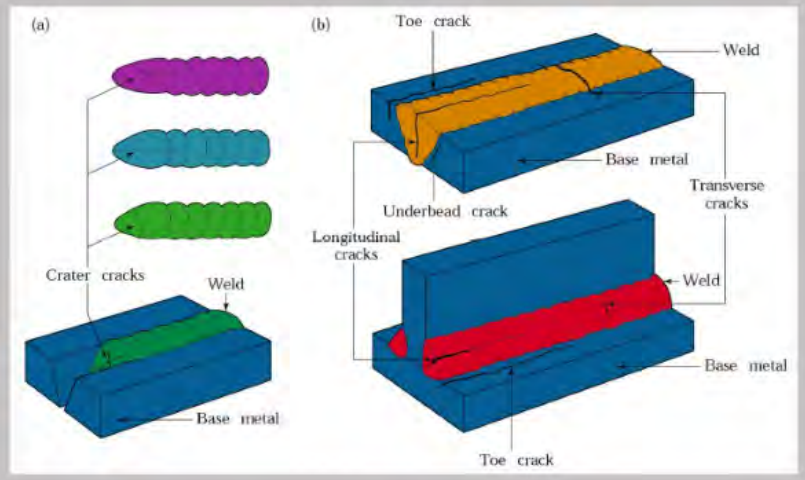


- Welds more metals and metal alloys
- No spark or spatter
- No flux or slag
- High quality and precision

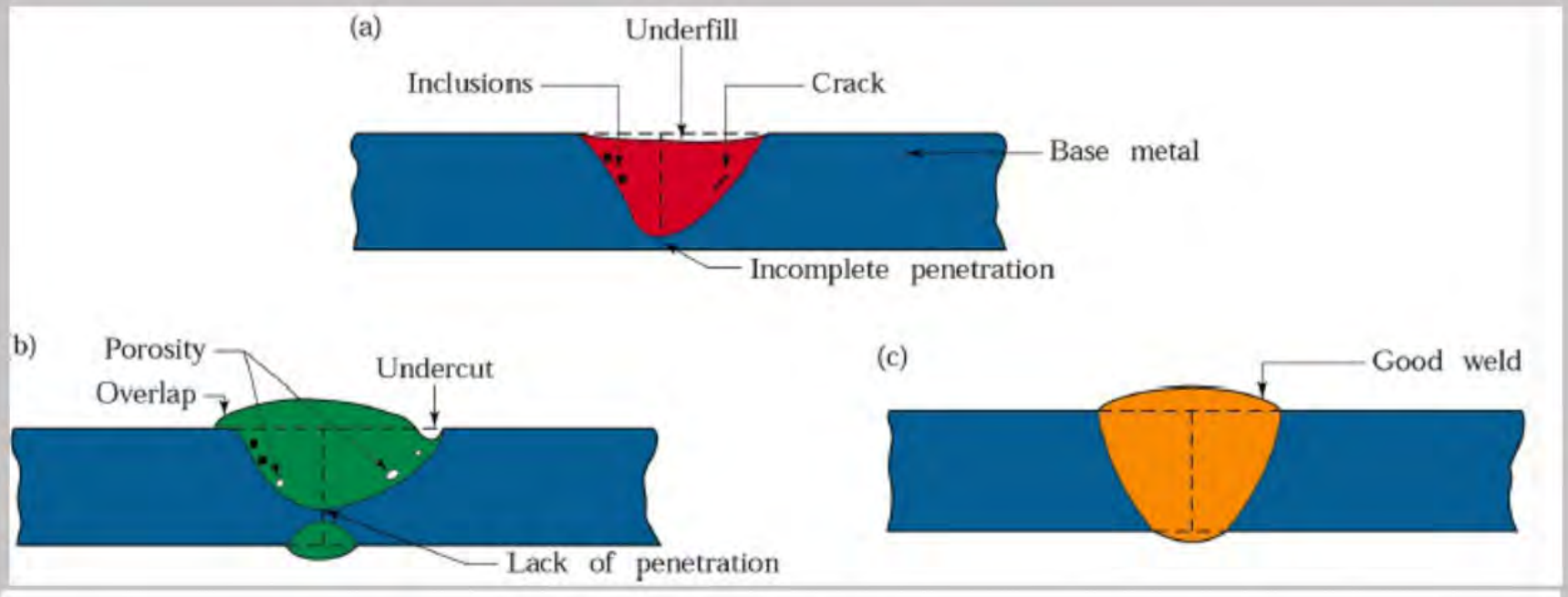
Prezi

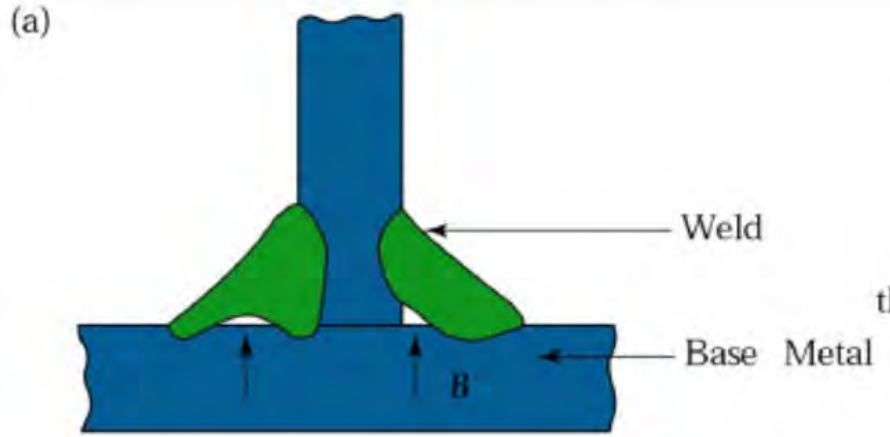
Weld faults



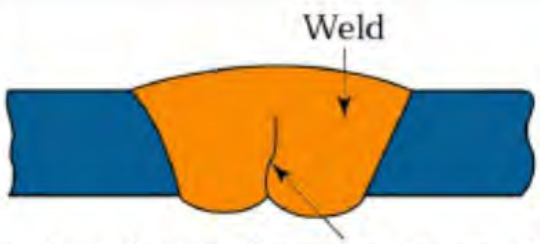


Prezi

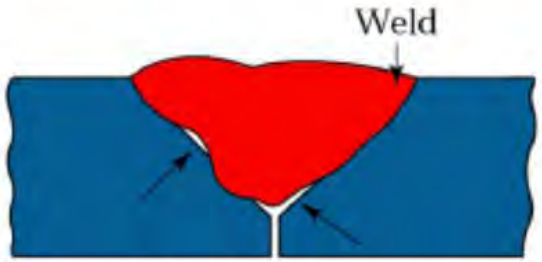




Incomplete fusion in fillet welds. *B* is often termed 'bridging'

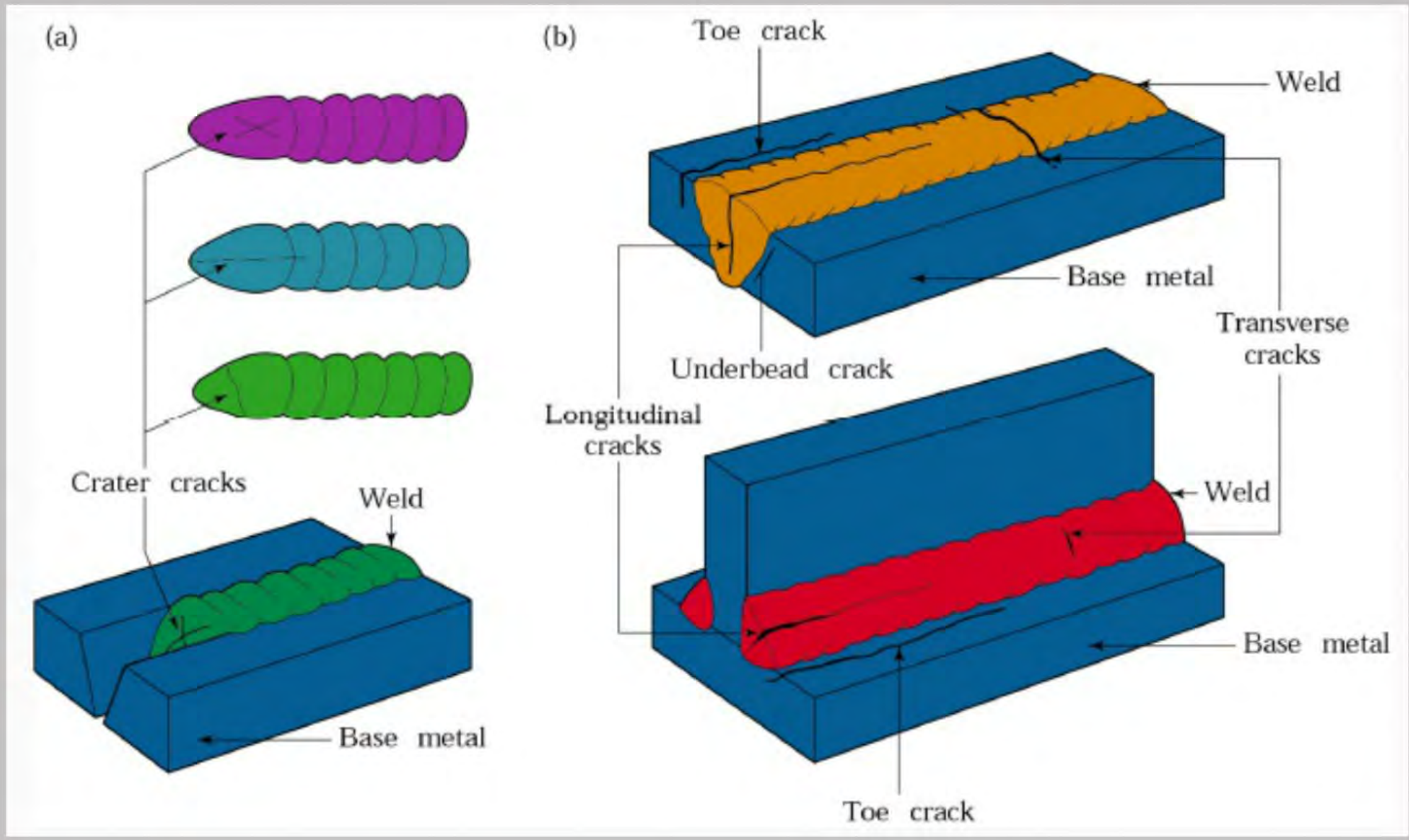


Incomplete fusion from oxide or dross at the center of a joint, especially in aluminum



Incomplete fusion in a groove weld

Prezi

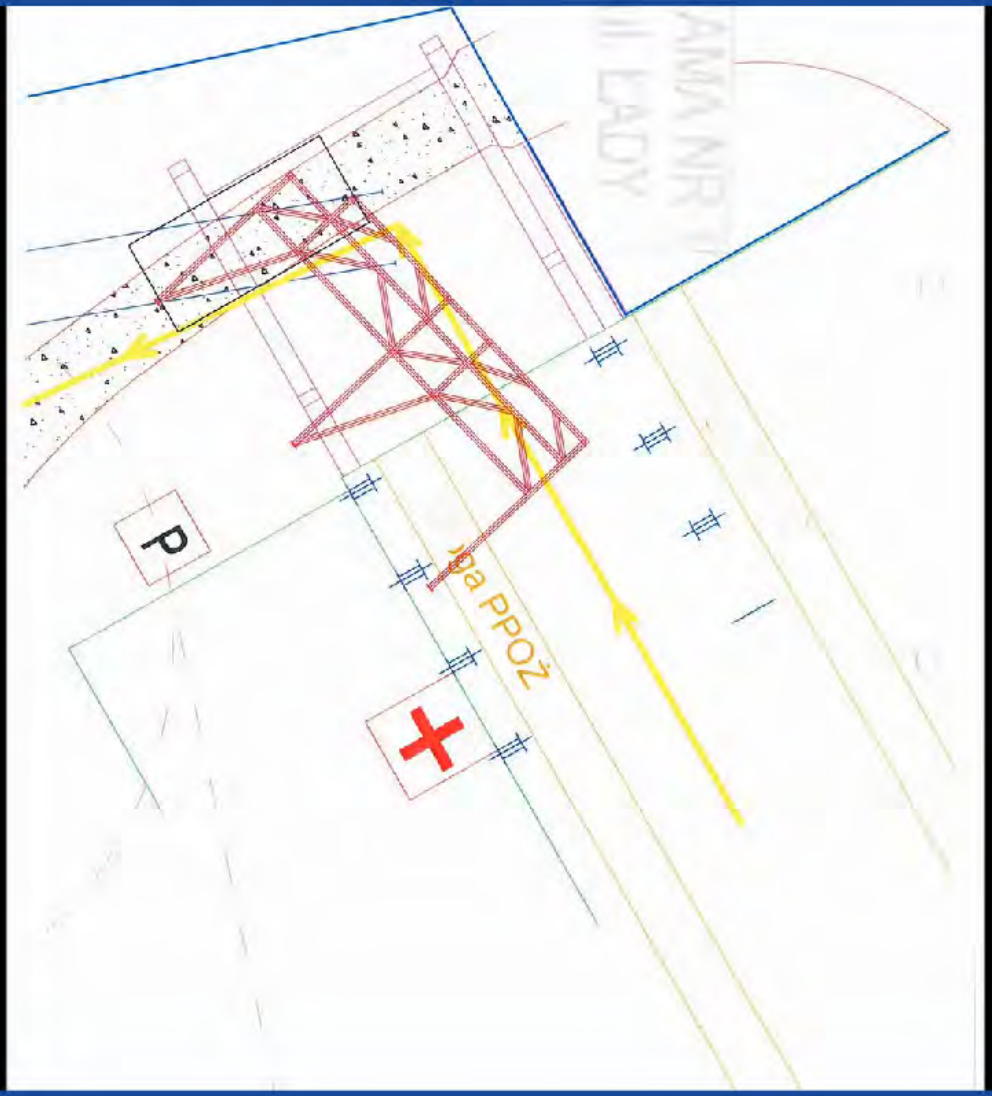

(a)
Crater cracks
Weld
Base metal
(b)
Toe crack
Weld
Base metal
Transverse cracks
Underbead crack
Longitudinal cracks
Weld
Base metal
Toe crack

Erection

Limitation:

Workshop area
Crane capacity

Prezi



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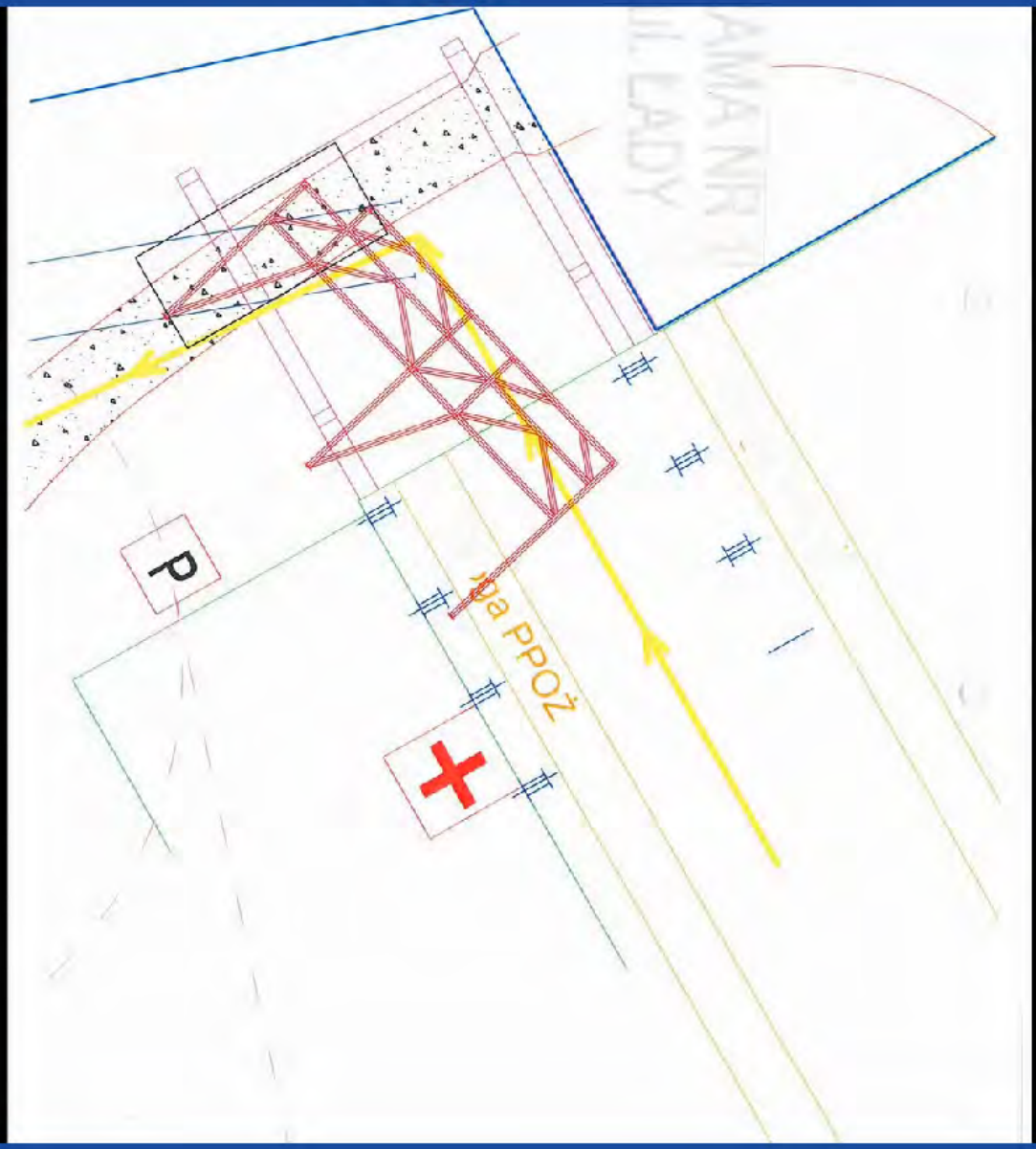


Prezi

Painting

Surface preparation

Blast cleaning

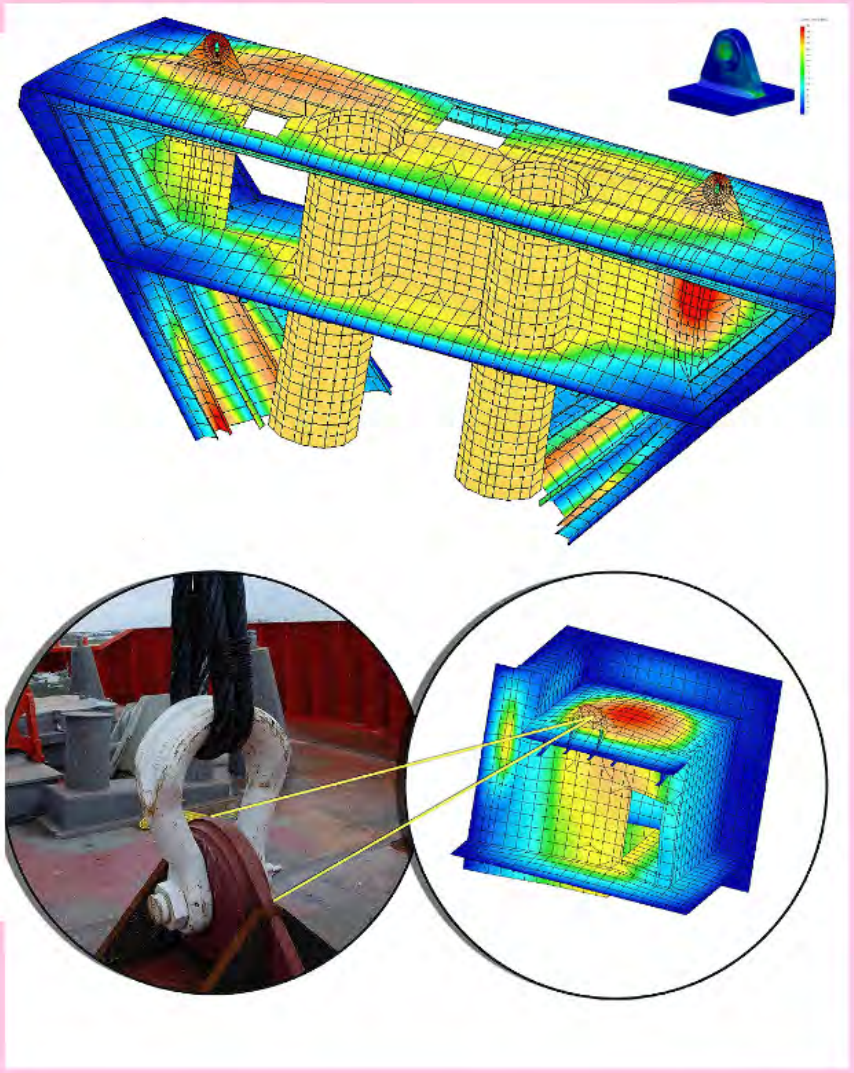
Prezi

Painting

Equipment

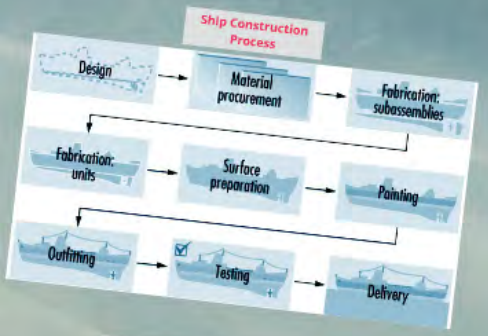
Prezi

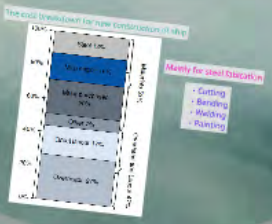
Launching

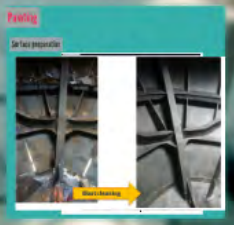


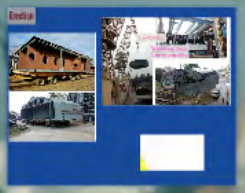
Prezi

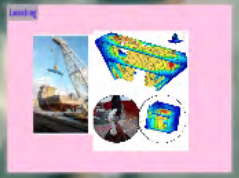
Master Thesis











Prezi

Products

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Assessment of the Conditions of Medium-size Shipbuilding Company to Build Offshore Structures
EMShip Master Thesis

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