



Asset Management for oil and gas producers
Norwegian example.

Barriere management and Life time Extensions

Stig Aune – Asset Development Manager

OKEA ASA - www.okea.no



Northern North Sea sector


Norwegian Sea

Barents Sea

Central North Sea sector

Southern North Sea sector

Our area of responsibility

-  **60** rigs/units with AOC
-  **300** subsea installations
-  **8** land-based plants
-  **25 000** people
-  **15 400** km subsea pipelines
-  **83** fields in production at 1 Jan 2019

Petroleum Safety Authority Norway - Ptil

Supervision includes:

- Audits and verifications on facilities, at land-based plants and at construction sites
- Dialogue and meetings with the industry
- Data acquisition concerning risk, accidents and incidents
- Investigation of accidents
- Consideration of consent applications
- Assessment of development plans
- Applications of consent (AoCs) for mobile facilities
- Player assessments and licence awards
- Use of enforcement powers

Search



> The framework regulations

The management regulations

The facilities regulations

The activities regulations

Technical and operational regulations

The Working Environment Regulations

Other acts

About the regulations

Show

Chapter I - Introductory provisions (§§ 1 - 8)

Show

Chapter II - Basic requirements for health, safety and the environment (§§ 9 - 16)

Show

Chapter III - Management of the petroleum activities (§§ 17 - 19)

Show

Chapter IV - Emergency preparedness (§§ 20 - 22)

Show

Chapter V - Material and information (§§ 23 - 32)

Show

Chapter VI - Special offshore provisions pursuant to the working environment act (§§ 33 - 44)

Show

Chapter VII - Design and outfitting of facilities and conducting activities in the offshore petroleum activities (§§ 45 - 50)

Show

Chapter VIII - Offshore safety zones (§§ 51 - 61)

Show

Chapter IX - Closing provisions (§§ 62 - 73)

Show

Technical subjects

Explore technical subjects

We have assembled technical and supervisory news items, project reports and studies, and articles on various technical subjects and topics under this heading – along with all our videos.

> Explore technical subjects

Trends in risk level (RNNP) >

Terms and expressions >

Main theme 2019 >



Fill out the questionnaire and say



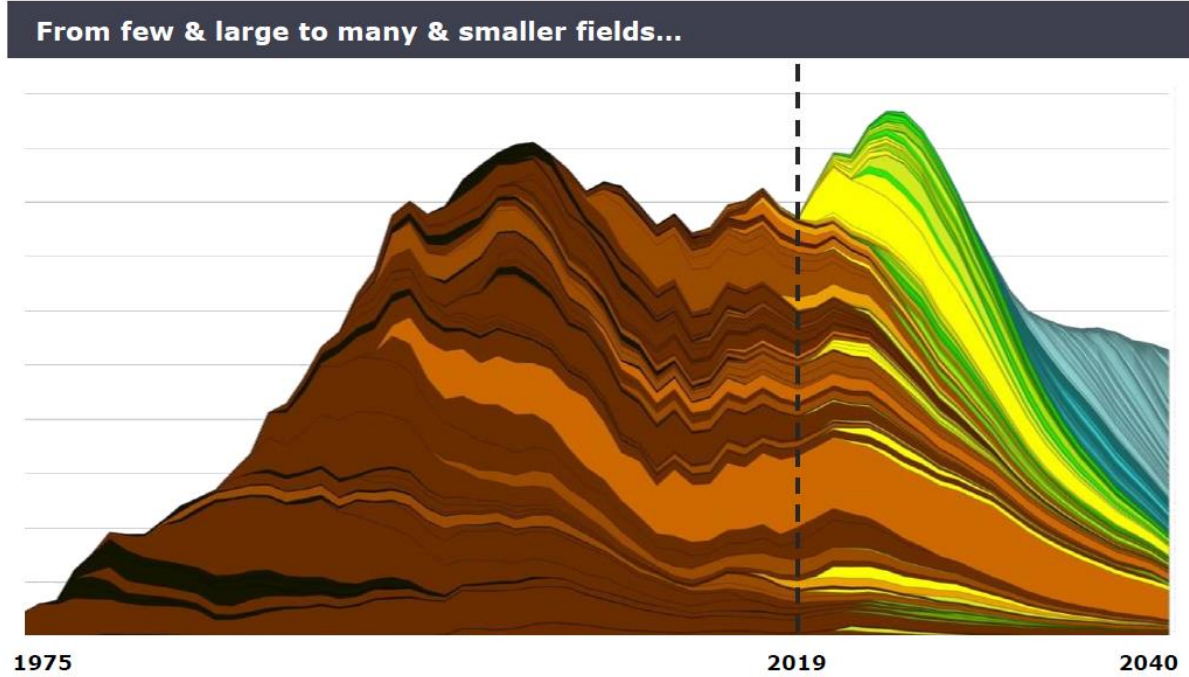
Field projects off Norway studied



Investigating the effect of the PSA's supervision

New Area – Majors on their way out – Minors entering the stage

And setting the scene.



- Production on the NCS before 2000 dominated by a handful of relatively large fields
- Significant share of future production expected from a large number of smaller fields, creating an attractive playing field for smaller Independents over Majors

...with OKEA in pole position to capture growth

Have exited or in the process of exiting	
Currently present, but with no clear growth ambitions	
Actively seeking NCS growth	
Tier 1 operator organisation with focus on small and medium sized developments	

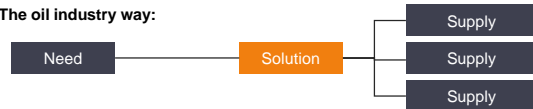
- OKEA is one of the new breed of agile NCS independents actively seeking growth in a maturing basin
- OKEA uniquely positioned to play the leading role in the sub 100 mmboe segment leveraging a highly capable operator organisation

The OKEA “straight-line” philosophy...

Working closely with key-partners from day one



The oil industry way:

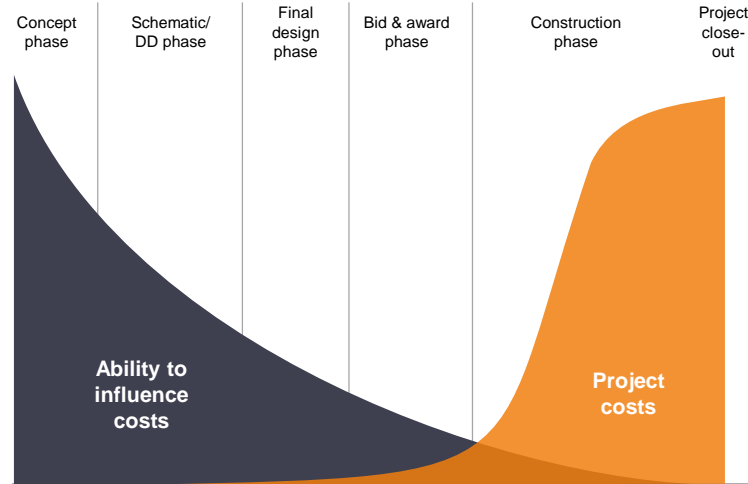


The general industry way:



- Working with competent, well-recognized partners
- They understand OKEA and what we are trying to achieve
- We know what they can deliver

Demand solutions, not decision support



- Involve suppliers early in evaluation at a time when influence on costs is highest
- Demand solutions not decision support
- Most competent staff gets to use their experience to develop the best solutions
- No OKEA specific requirements

Relentless focus on cost-efficiency



- Focus on off-the-shelf concepts and standardisation
- Taking project towards FID at minimum costs
- Use of existing infrastructure and focus on core areas

Rapidly identify best development solution to shorten time to market

Draugen

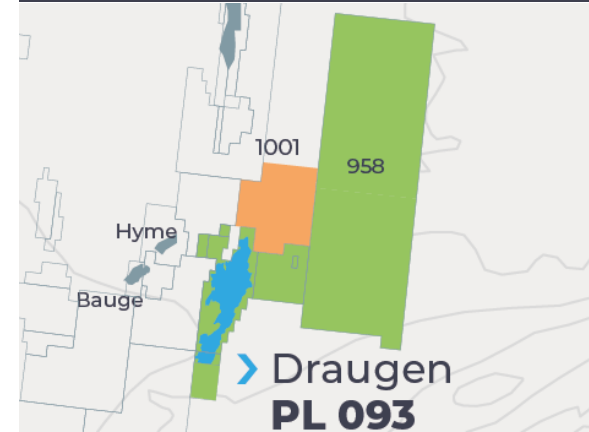


Draugen – Material and long life oil producer

Asset overview

- Giant oil field with well defined and truly world-class reservoir, in production since 1993
- Concrete mono-tower platform with five subsea satellites
 - 16 production wells and 4 water injection wells
- Revitalisation and strategic changes agreed in license following OKEA taking over operatorship
 - Formal license decision to extend field life from 2027 to 2035...
 - ... with aim to prolong life further into the 2040s
 - Shift from “harvest mode” to “development mode”
 - Chase near field opportunities and seek collaboration with nearby licenses
 - Entered into a two-well sublet contract for the Deepsea Nordakapp rig – drilling expected Q4’19/Q1’20
 - 190 m of processing plant pipes replaced in only 5 days, with a total shutdown of 14 days
- More than 90 mmboe remaining reserves and resources (gross)^{1,2}
- Experienced, Tier 1 operating team – used as benchmark globally in Shell
 - Decades of operational experience and consistent high production performance
- Shell ultimately covers 100% of the estimated decommissioning costs on OKEA’s 44.56% WI for wells and installations present per 30 November 2018⁴

Field facts



- **Partners:** OKEA (44.56%, Op.), Petoro / Norway State DFI (47.88%), Neptune (7.56%)
- **Discovered:** 1984
- **Production start:** 1993
- **Reserves and resources¹:** 67 mmboe 2P and 24 mmboe 2C (till 2035)
- **2018 production:** 20,982 boepd
- **Rem. LoF opex³:** USD 27/bbl



1) CPR. Reserves and resources are gross per 1.1.2019

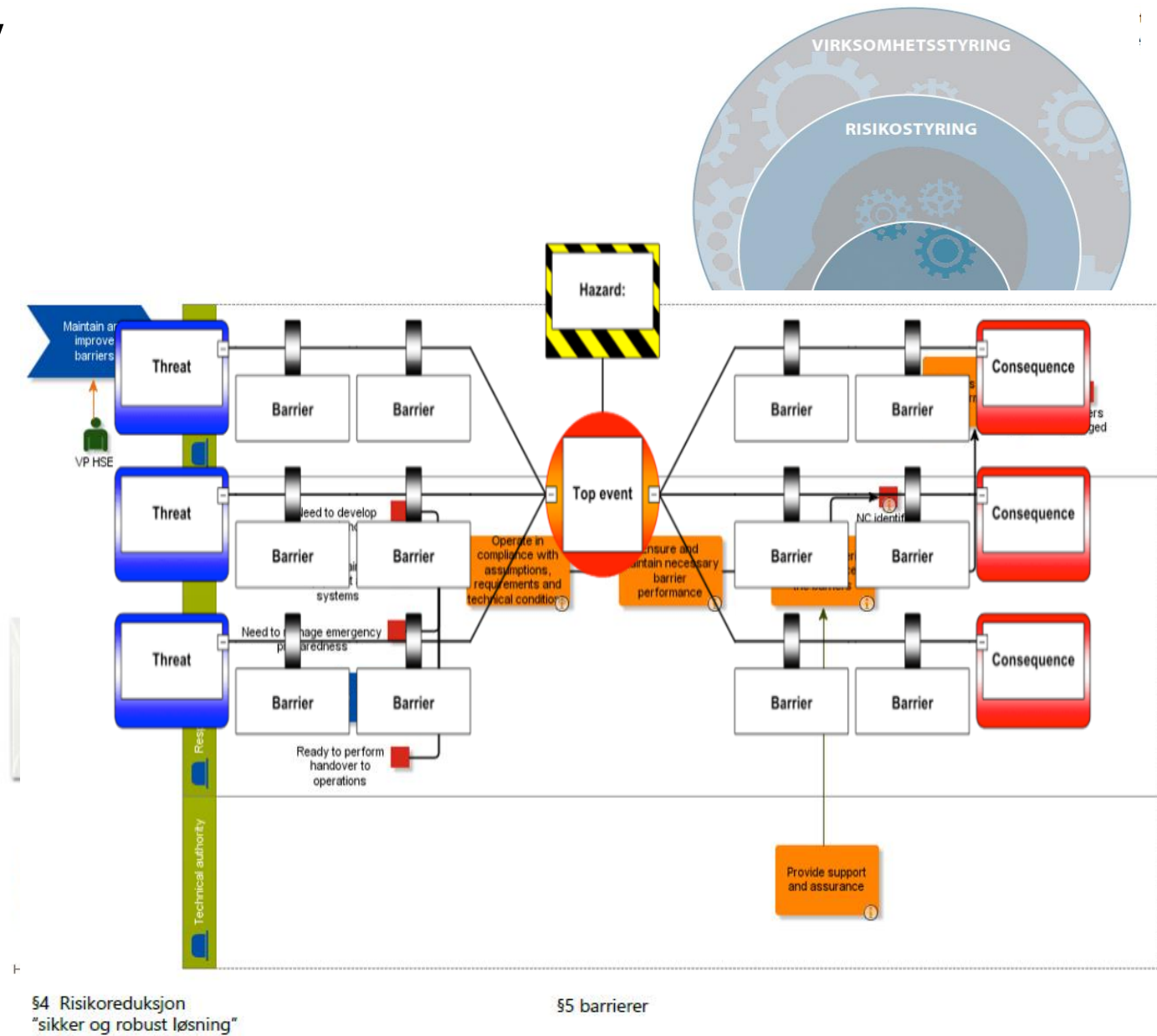
2) Company estimates

3) CPR. Real terms based on USD/NOK of 8.5

4) For both Draugen and Gjøa: Shell retains 80% of decommissioning liability up to a post-tax cap of NOK 638m (combined for Draugen and Gjøa), subject to CPI indexation, and further pays OKEA NOK 375m, subject to CPI indexation, upon OKEA completing the decommissioning of the assets. The NOK 375m more than covers OKEA’s post-tax exposure on the 20% portion not directly covered by Shell (subject to the cap)

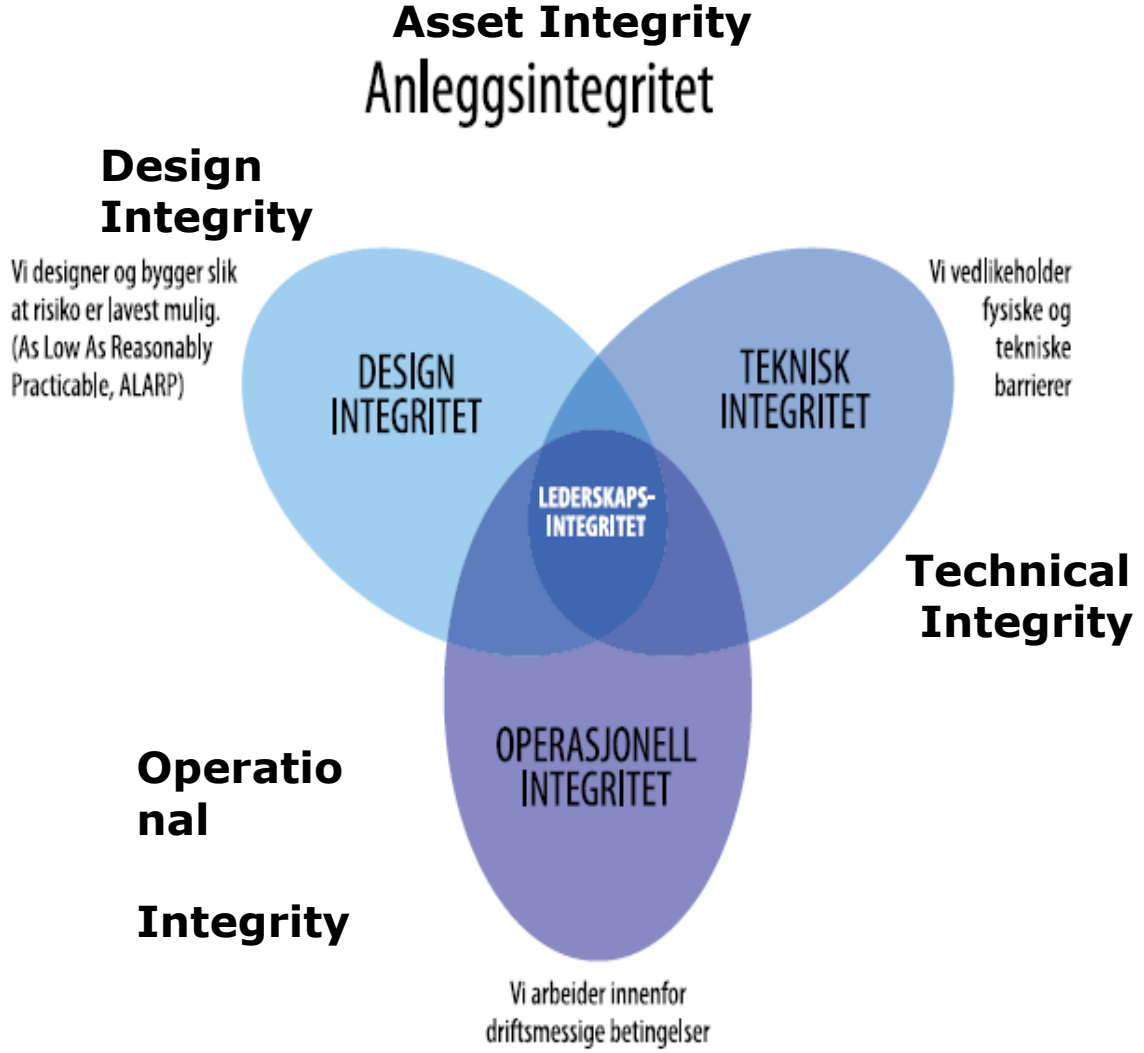
OKEAs Barrier Management Strategy

- Definitions from Ptils (PSA) barrier memo
- «Management of Major Accident Risk» is governing.
- Barriere management Integrated in OKEAs Management System.
- 9 Top Events analysed in BowTies



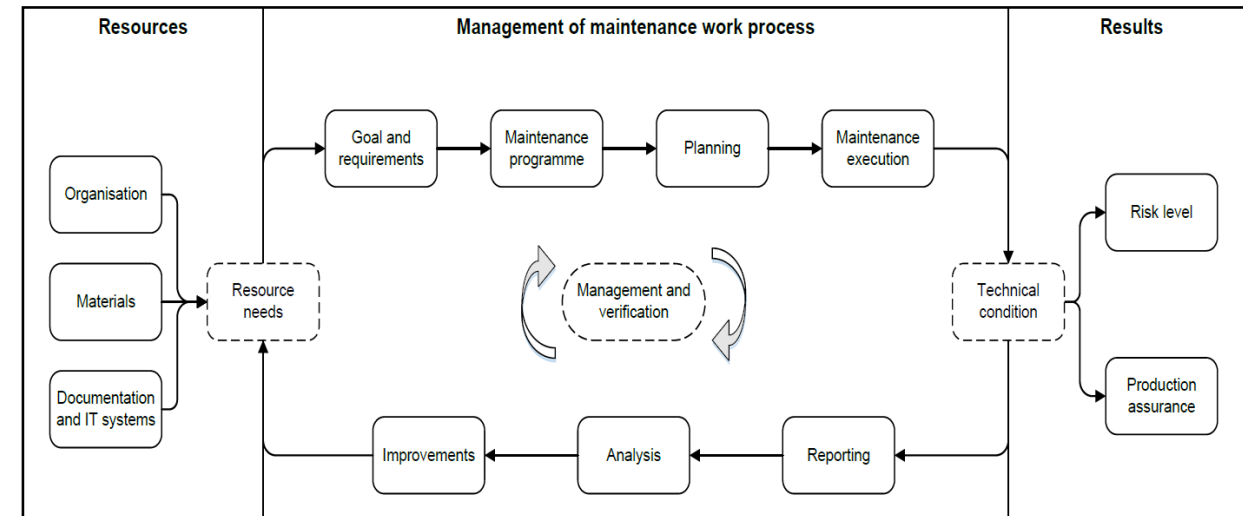
Figur 4: Modell for å illustrere forholdet mellom sikker og robust løsning, og barrierers plass i risikostyring (basert på Ersdal 2014)

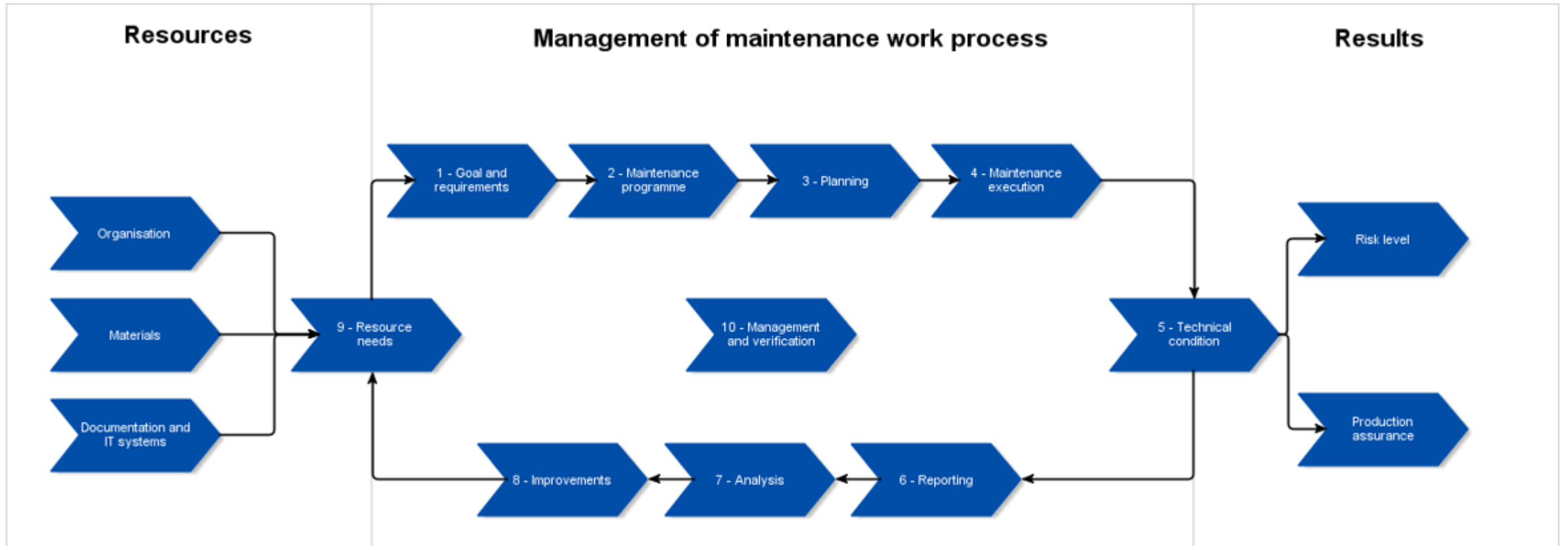
Asset Integrity - Model in NOROG used for Process Safety.



Management of Maintenance Work Process

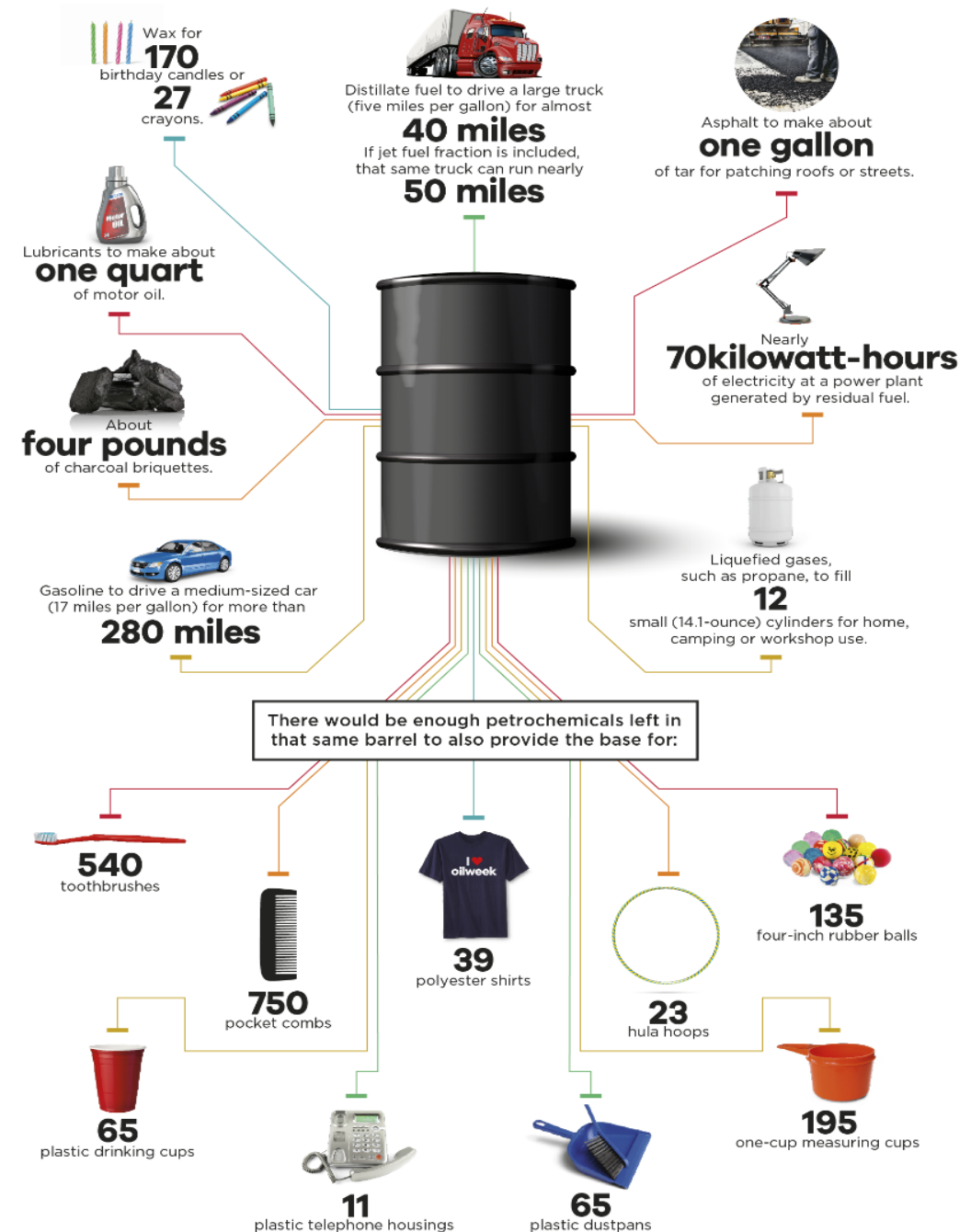
- Based on NORSOK Z-008
- From porcedures to processes
- Involvement of work force and safety delegates part of the Norwegian Legislation.





Why Oil and Gas?

10 litres of oil = 1 man year of hard physical labour





Thank You!
