

# Safe Start Up Culture

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# Safe Start Up Culture

## Disclaimer

The information in this presentation stems from the personal experience and knowledge of Fluor BV. Information has been arrived at following careful consideration but fairness, completeness or accuracy are not guaranteed.

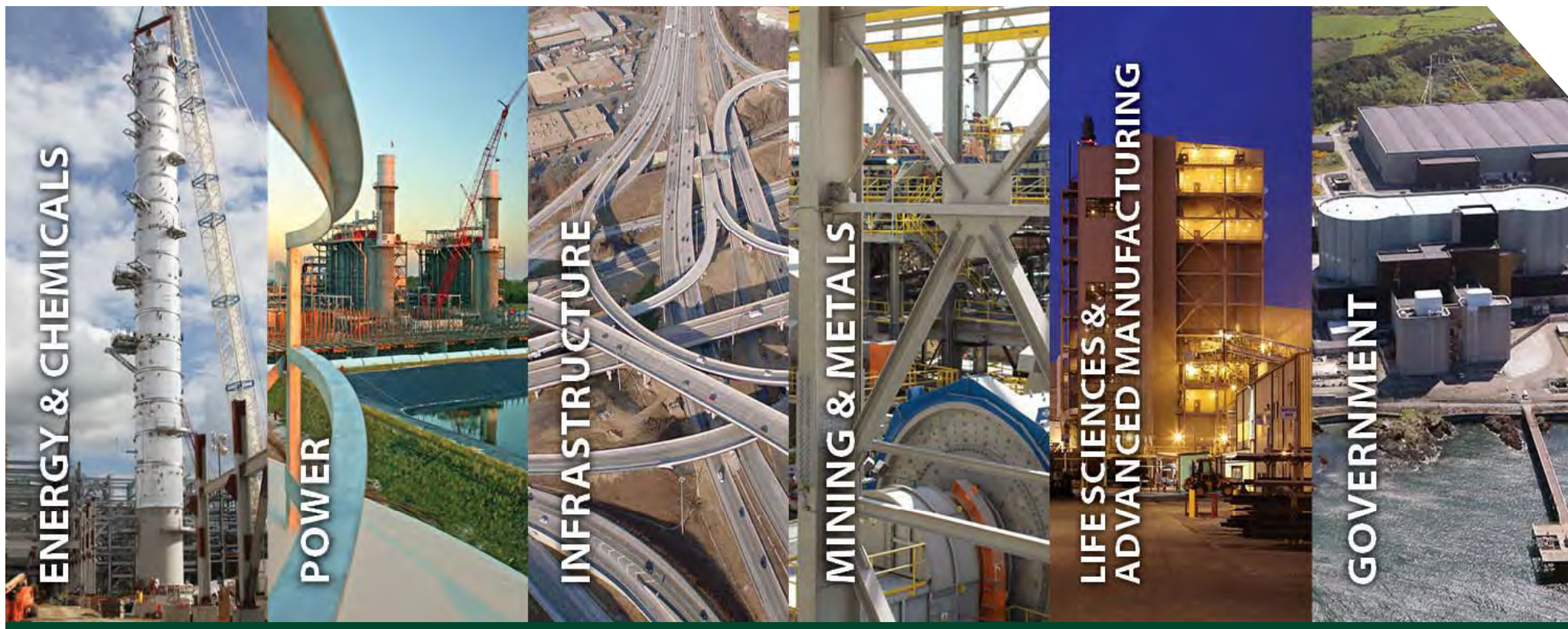
# Contents

## Introduction of Fluor

1. Introduction Safe Startup Culture
2. Safety Topic
3. Cultures of Stakeholders
4. Fluor Culture
5. Safe design and good operability practices
6. Safety in Construction
7. Training and familiarization of Operations
8. Turnover Development and Safe Hand Over
9. Pre-commissioning
10. Pre-Startup Safety Review/Operational Readiness
11. Commissioning and Start-up
12. Summary



# ***INTRODUCTION OF FLUOR***



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# Overview

- ♦ **One of the world's largest** engineering, procurement, fabrication, construction, and maintenance companies
- ♦ **Designs, builds, and maintains** capital-efficient facilities for clients on **six** continents
- ♦ Delivers **integrated solutions** for clients in the energy, chemicals, government, industrial, infrastructure, mining and metals, and power market sectors
- ♦ Serving more than **4,000** clients in over **100** countries
- ♦ **#155** on the 2016 **FORTUNE® 500** list with revenue of **\$18.1** billion in 2015
- ♦ More than **60,000** employees executing projects globally
- ♦ **104**-year **Fluor** legacy

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**Fluor Corporate Headquarters**  
*Dallas, Texas*

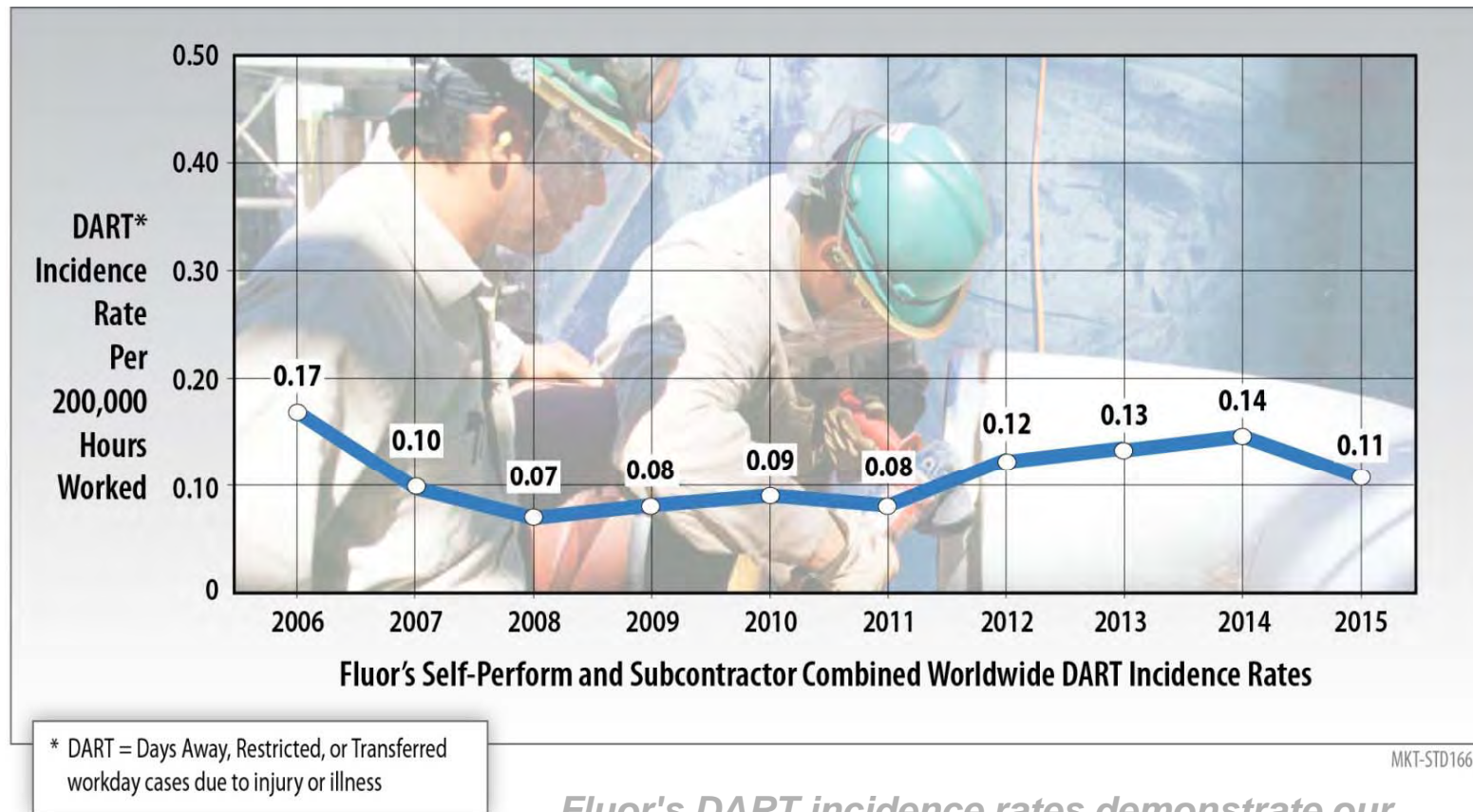


# Differentiators

- ◆ Executing work in challenging locations
- ◆ Mobilizing diverse workforces
- ◆ Linking global engineering resources
- ◆ Developing innovative and cost-effective project financing
- ◆ Sourcing material globally
- ◆ Meeting compressed schedules
- ◆ Managing joint ventures and alliances worldwide
- ◆ Utilizing modular construction techniques



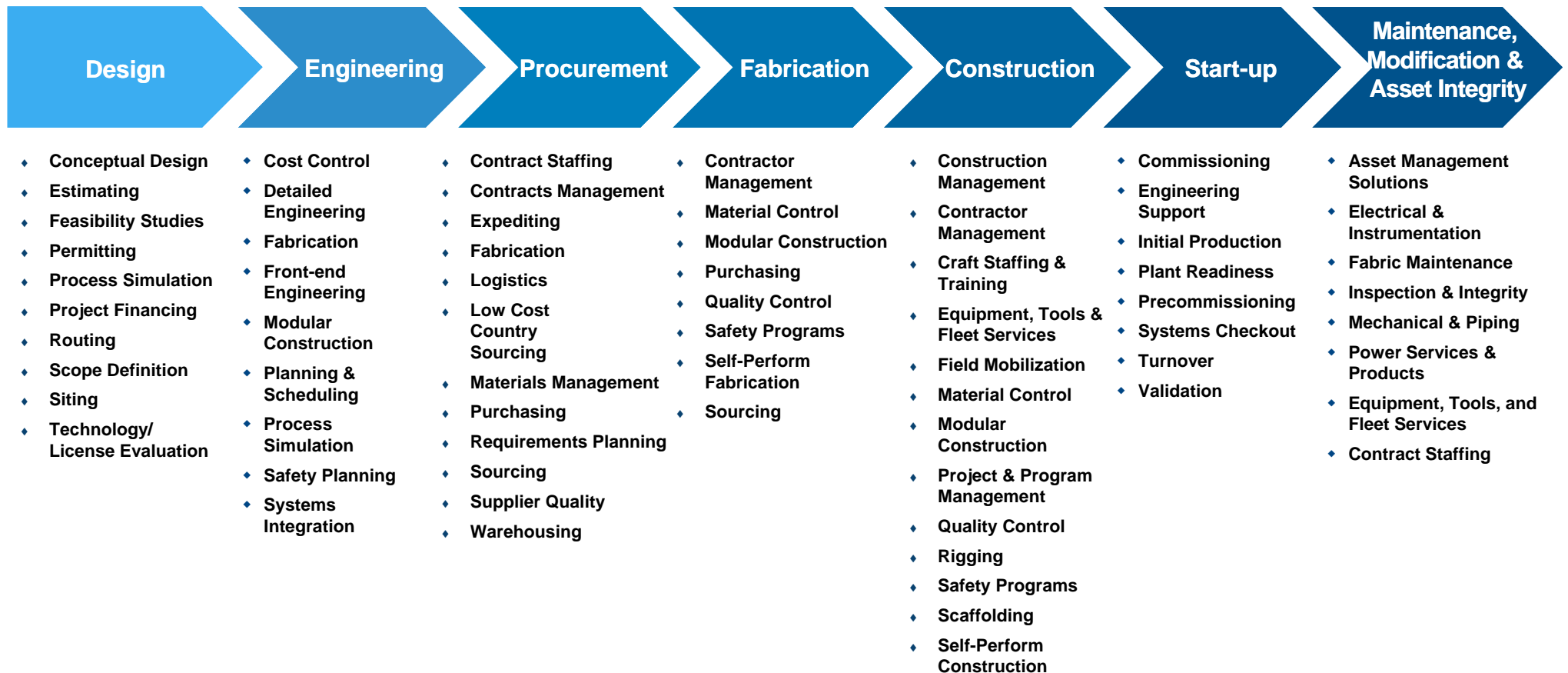
# Outstanding Safety Performance



*Fluor's DART incidence rates demonstrate our company's outstanding safety record.*

# Integrated Solutions

## *Comprehensive Life-Cycle Services for Client Capital Assets*





# Fluor + Stork



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# 1) Introduction Safe Startup Culture

Leading approach to a Safe and Satisfying Start-Up:

- ◆ Development has to be done early on in design phase.
- ◆ Installation
- ◆ Commissioning and Operating Procedures
- ◆ Build a Safe Culture
  - Project = Team/People work
  - Common Values
  - Involvement
  - Management Style
  - Learning Organization
  - Building trust



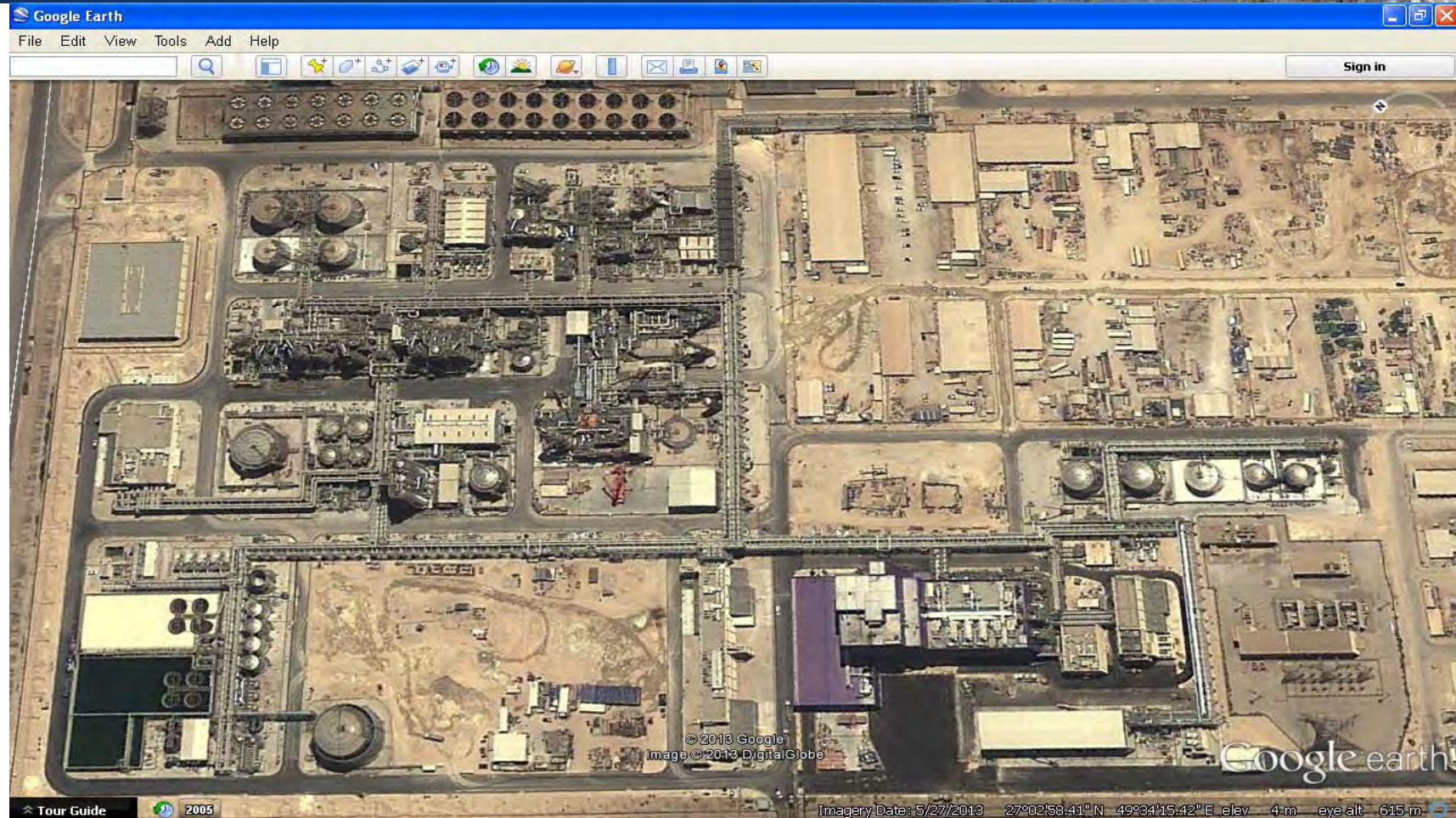
## 2) Safety Topic, Client Site Al Jubail



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## 2) Safety Topic, Client Site Al Jubail



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## 2) Safety Topic, Client Plant



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## 2) Safety Topic, Subcontractors



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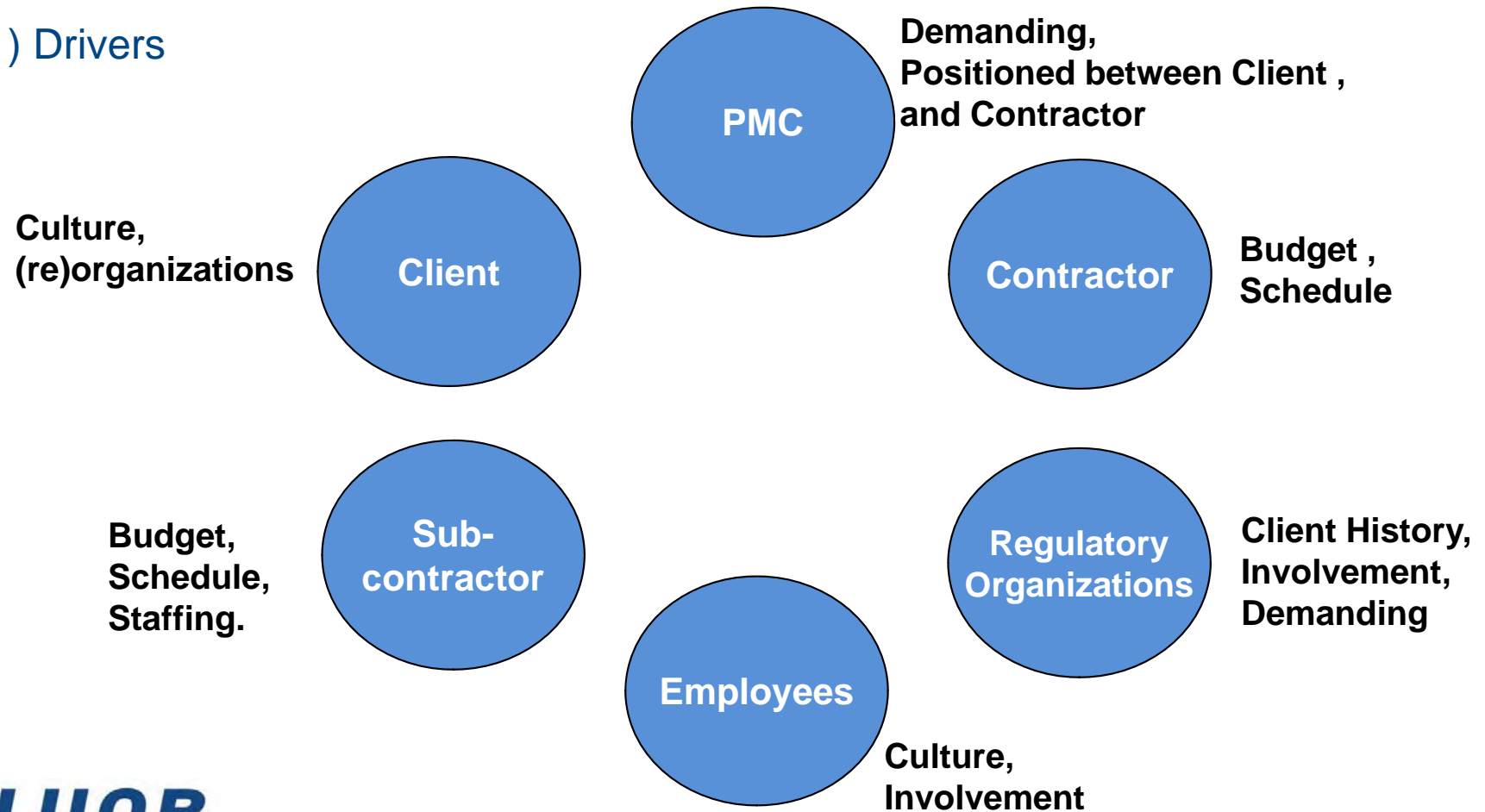
## 2) Safety Topic, Culture Differences



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### 3) Cultures of Stakeholders

#### 3.1) Drivers



### 3) Cultures of Stakeholders

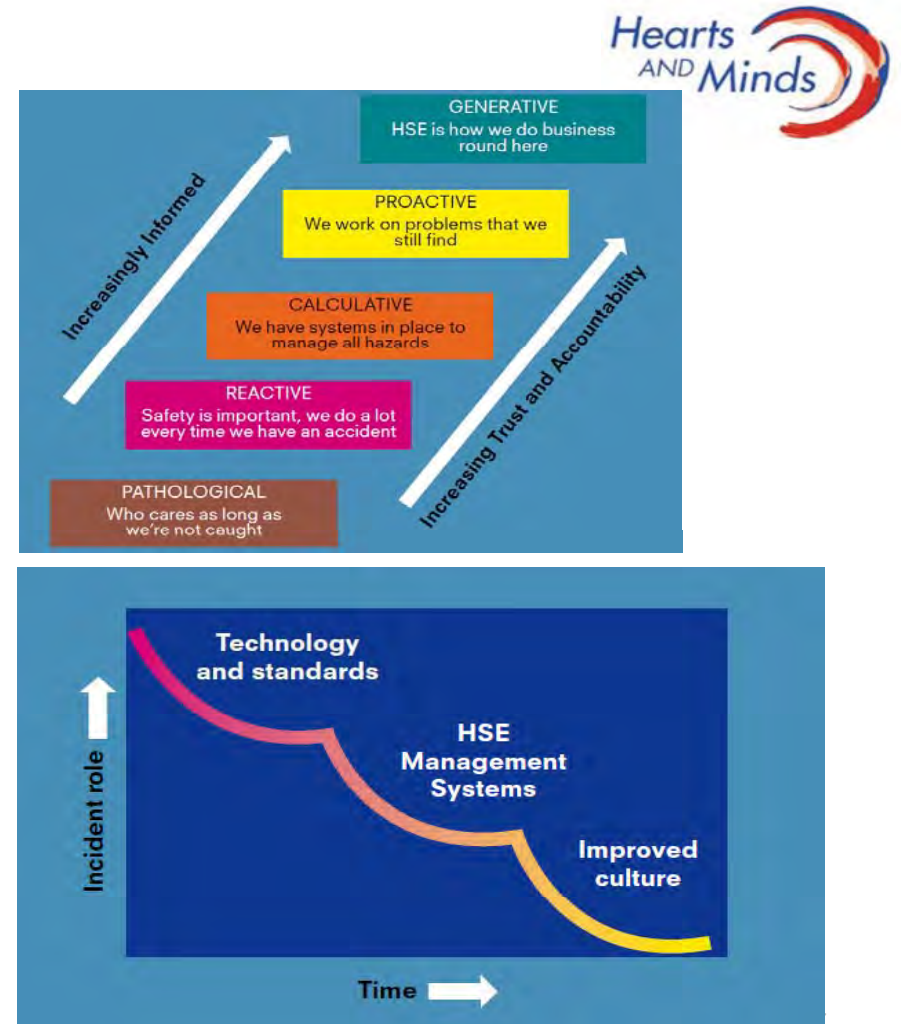
#### 3.2) Culture is the basis of Safe Behavior

- Learning Organization
- Open, honest
- Continuous Improvement
- Benchmark and compare to peers
- Makes difference for e.g. 30 years instead of 4 years LTI free

#### 3.3) Pitfalls for Safe Behavior

- No trust
- Improvisation
- Lack of priorities, wrong focus
- Punishing and hiding

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## 4) Fluor Culture

- ◆ Multi cultural (in Hoofddorp 34 Nationalities)
- ◆ Foster ethics and diversity
- ◆ Satisfy Client request
- ◆ Enthusiastic mix of young and experienced employees
- ◆ Experienced teamwork
- ◆ Flexible organization with Decentral Engineering Centers
- ◆ Execute within Schedule and Budget
- ◆ Follow contract as much as possible and do not change

## 5) Safe design and good operability practices

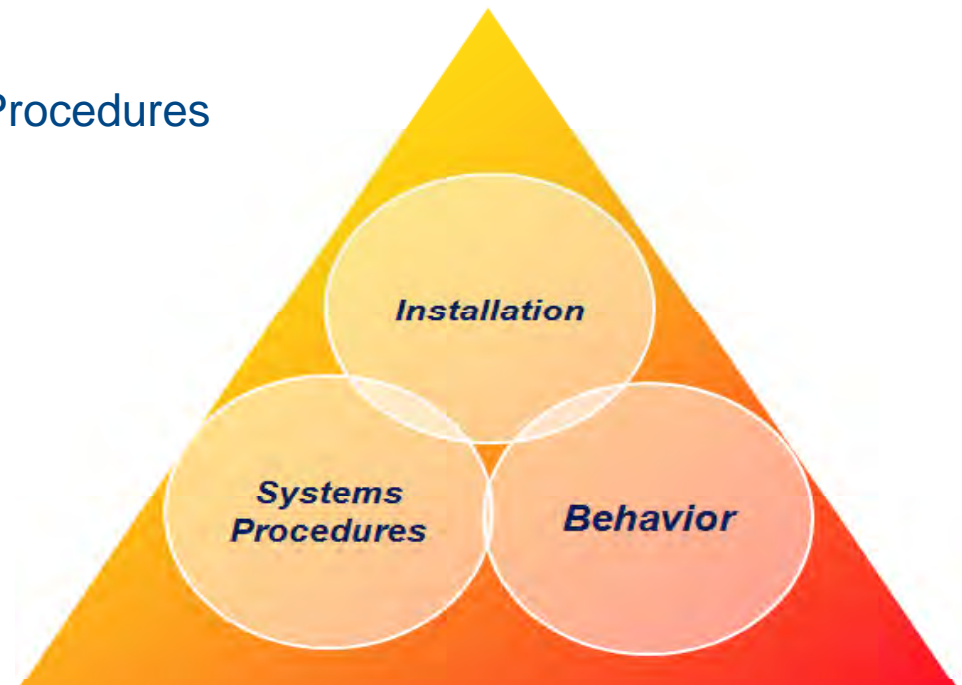
### 5.1) Installation

#### ◆ Design:

- Latest codes and standards
- Client and Licensor Specifications
- Client operational and maintenance Procedures
- Intrinsic Safe Design

#### ◆ Safety Analysis

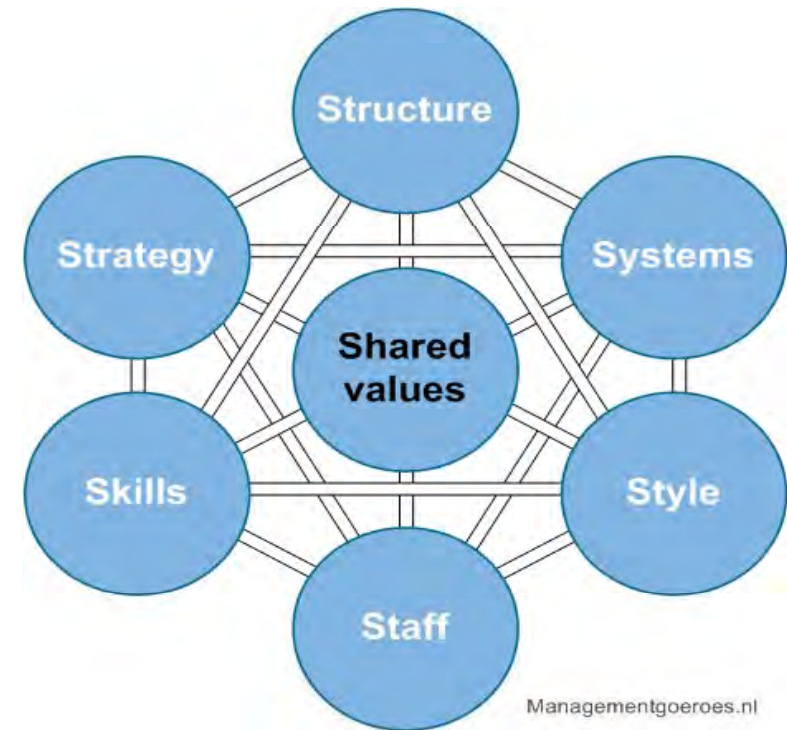
- HAZOP
  - ▲ By multi disciplinary teams
  - ▲ Operational input
  - ▲ Knowledge based/ Guide words
- Relief case and valve size analysis
- SIL
- Quantitative Risk Analysis



## 5) Safe design and good operability practices

### 5.2) Procedures

- ◆ Client Operation:
  - Mature procedures
  - Proven safety track-record
  - Optimized
- ◆ Contractor:
  - Short term teams
  - Less familiar procedures
  - No team track-record
  - Generic projects track record
  - Construction, Commissioning and Startup Procedures
- ◆ Project approach:
  - Implement/train procedures and check frequently





## 5) Safe design and good operability practices

### 5.3) Behavior

- ◆ Client Culture:
  - Experienced teams
  - Financial situation
  - Reorganizations
  - Coherent ion
- ◆ Contractor:
  - Short term teams
  - No team track-record
  - Generic projects track record
- ◆ Project approach:
  - Implement/train procedures and check frequently
  - Involvement ,Proactive behavior



Figure 1: ConocoPhillips Marine Safety Pyramid, 2003

## 6) Safety in Construction

- ◆ Client HSE standards adapted during detail design
- ◆ Contractor HSE standards
- ◆ Dedicated HSE staff
- ◆ HSE Aspects:
  - Safety Officers
  - Attendance registration
  - Fire watch
  - Safety Inductions
  - Safety training
  - Training Register
  - Job Safety Analysis JSA/TRA
  - Working permits
  - Good housekeeping
  - Periodically Safety Inspections
  - Pre-Startup Safety Review
  - Near Miss registration
  - Incident registration and Analysis
  - Toolbox meetings
  - PPE's, Harnesses, Ex/O<sub>2</sub> measurements

## 7) Training and familiarization of Operations

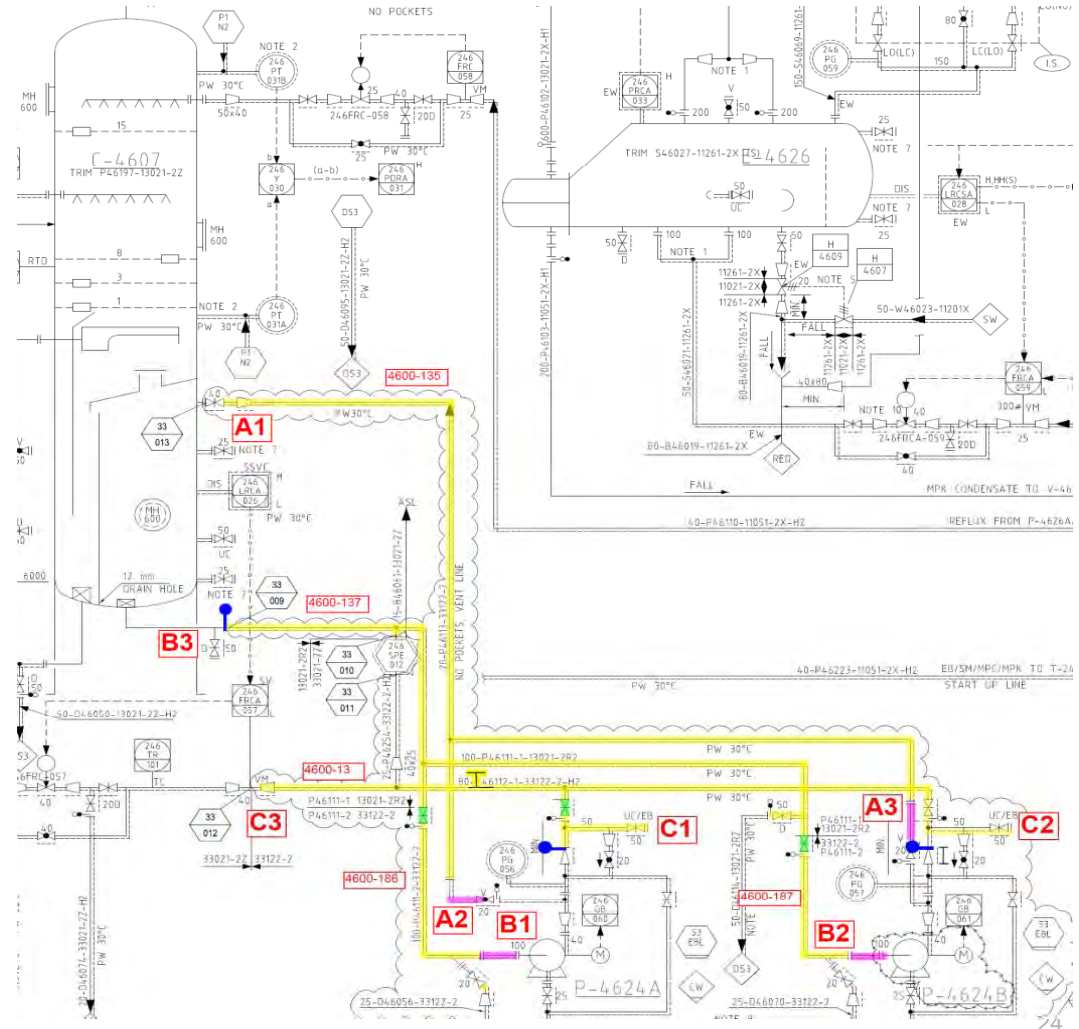
- ◆ Process Descriptions
- ◆ Operating and Maintenance Manuals
- ◆ Operations and Maintenance Training
- ◆ Training of Generic Client Operation Procedures
- ◆ DCS Training
- ◆ Field Training
- ◆ Organizing all Operating documentation
- ◆ Exams and testing post instruction
- ◆ Commissioning assistance



## 8) Turn Over Development and Safe Hand Over

- ◆ Define Turnover Systems
  - Pipelines
  - Equipment
  - Instrumentation
- ◆ Inspection Test Packs
- ◆ Cleaning & Flushing
- ◆ System Punching
- ◆ Mechanical Complete
- ◆ Pre Startup Safety Review
- ◆ Handover
- ◆ Commissioning
- ◆ Startup

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## 9) Pre-commissioning



| REN Pre-Commissioning Label |  |
|-----------------------------|--|
| Operationeel Systeem        |  |
| Omschrijving                |  |
| Identificatie nr.           |  |
| Datum                       |  |
| Paraaf                      |  |
| Tel.                        |  |

IDS Fluor\_640-LBL-01

**WARNING**  
  
**DO NOT TOUCH**

System and Valve only allowed to touch by Pre-Commissioning team

☐ Cleaning/Drying Going on  
☐ Cleaned  
☐ Dried  
☐ Reinstated

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**STORK**

**COFELY**

IDS Fluor\_640-LBL-02

# Pipeline in Operation

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## 10) Pre-Startup Safety Review/Operational Readiness

- ◆ Audit Operational Organization:
  - HAZOP actions implemented
  - Controlled master document list
  - Training plan
  - Training registration
  - Operational procedures
  - Organization scheme
  - Emergency organization
  - Emergency procedures clear, instructed and rehearsed
  - Simultaneous Construction and Operation (SimOps) review
- ◆ Installation:
  - Barricades applied
  - A and B punches cleared
  - Unit accepted by the Client



## 11) Commissioning and Start-up

- ◆ Startup Procedures and Plan developed
- ◆ Client can Safely start the Units:
  - Utilities
  - Steam
  - Chemicals into installation
  - Start Process
  - Performance Tests
- ◆ More often assistance requested from Contractor
- ◆ Sometimes assist and temporarily manage the Start of a facility with Client.

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## 12) Summary

It is our experience, the safety culture makes the difference.

Foster cooperative environment and trust:

- Build Teams (Client, PMC, HSE, Contractor, Sub-contractor)
- Common Values
- Pro-activeness
- Involvement
- Work a plan
- Management Style
- Learning Organization

Safe design, Procedures and rules provide the essential net to reach a goal like 4 years no LTI's.

BUT it is every individual's mindset, operator and construction worker up to management which really makes the difference.

Which leads to a Safe and Satisfying Start-Up and 30 years no LTI's

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# Questions



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