

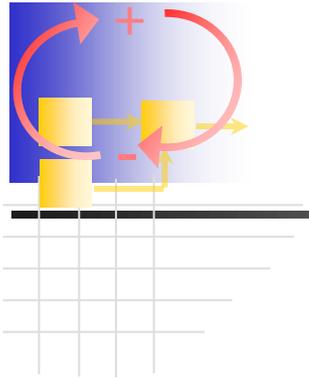
ESD.36 System Project Management

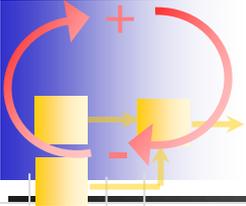
Lecture 18

Multi-Project Program Management

Instructor(s)

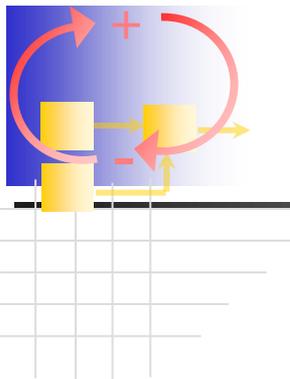
Prof. Olivier de Weck





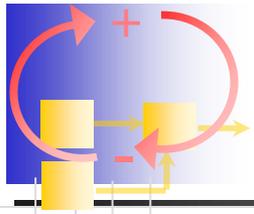
Outline

- Program Management
 - Definition, Distinction from Project Management
 - Example Program (BP Azerbaijan)
- Project Portfolio Management
 - Project Selection Process
 - Example Portfolio (PreQuip)



Concept Question 1

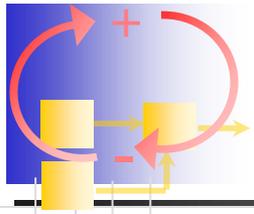
- What is the *largest* number projects you have worked on or managed at the same time (in parallel)?
 - 1
 - 2
 - 3
 - 4
 - more than 4



Programs – PMBOK Definition

- **Program. A program is a group of projects managed in a coordinated way to obtain benefits not available from managing them individually.**
- Many programs also include elements of ongoing operations. For example:
 - The “**XYZ airplane program**” includes both the project or projects to design and develop the aircraft as well as the ongoing manufacturing and support of that craft in the field.
 - Many electronics firms have “program managers” who are responsible for both individual product releases (projects) and the coordination of multiple releases over time (an ongoing operation).
- Programs may also involve a series of repetitive or cyclical undertakings, for example:
 - Utilities often speak of an annual “construction program,” a regular, ongoing operation which involves many projects.
 - Many non-profit organizations have a “fundraising program,” an ongoing effort to obtain financial support that often involves a series of discrete projects such as a membership drive or an auction.

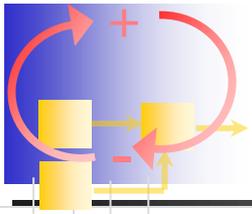
Scale-based Product Families



- Develop a product platform that can be “scaled” or “stretched” in one or more dimensions to satisfy a variety of market niches
- Boeing 737 is divided into 3 platforms:
 - Initial-model (100 and 200)
 - Classic (300, 400, and 500)
 - Next generation (600, 700, 800, and 900 models)
- The Boeing 777 has also been designed knowing that it will be “stretched”

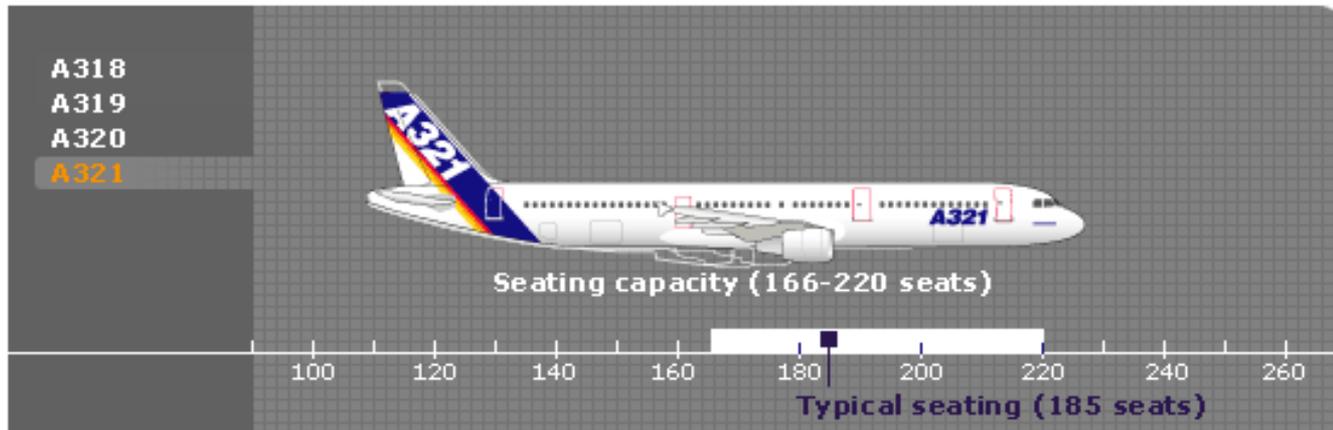


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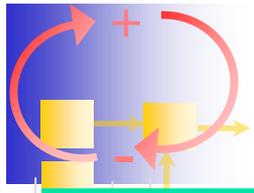


Airbus Aircraft Program

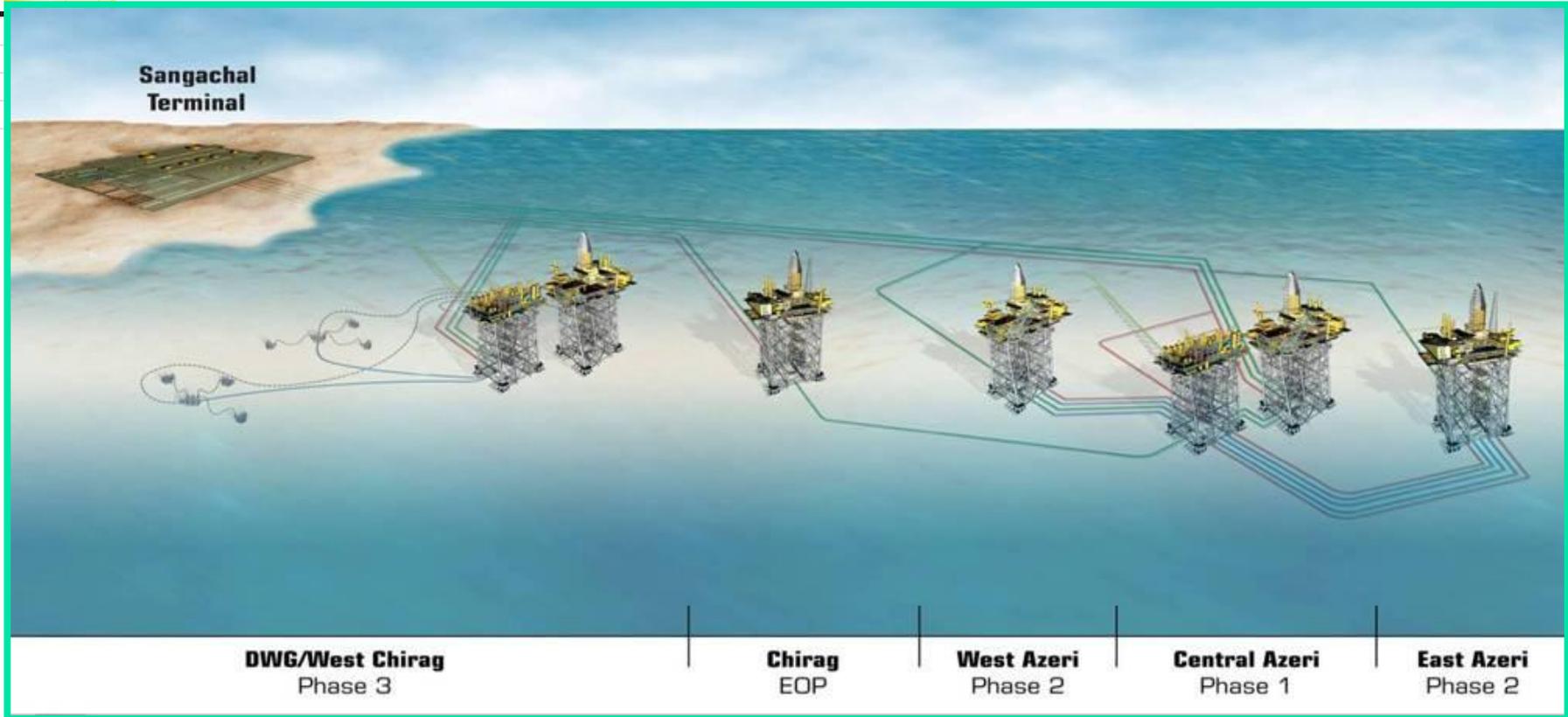
- Airbus A3XX Family: common height, width, cockpit



- The A330 cockpit is common to all other Airbus types while Boeing's 767-400 cockpit is common only with the 757. This enabled the A330-200, a less efficient “shrink” of a larger aircraft, to outsell Boeing's 767-400ER, a more efficient “stretch” design of a smaller aircraft.



Sample Program: BP ACG (Azerbaijan)



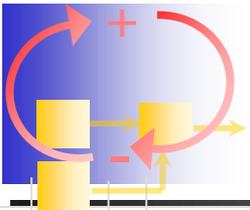
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Capex: \$9bn total / \$6m / day
90,000 te topsides
90,000 te jackets
1000 km offshore pipelines

One of world's largest terminals
7 years of execute
74 million man-hours total so far
Over 3 million man-hours/month

80% of man-hours in Azerbaijan
20% across another 10 countries
New Workforce - 9000 Azeris

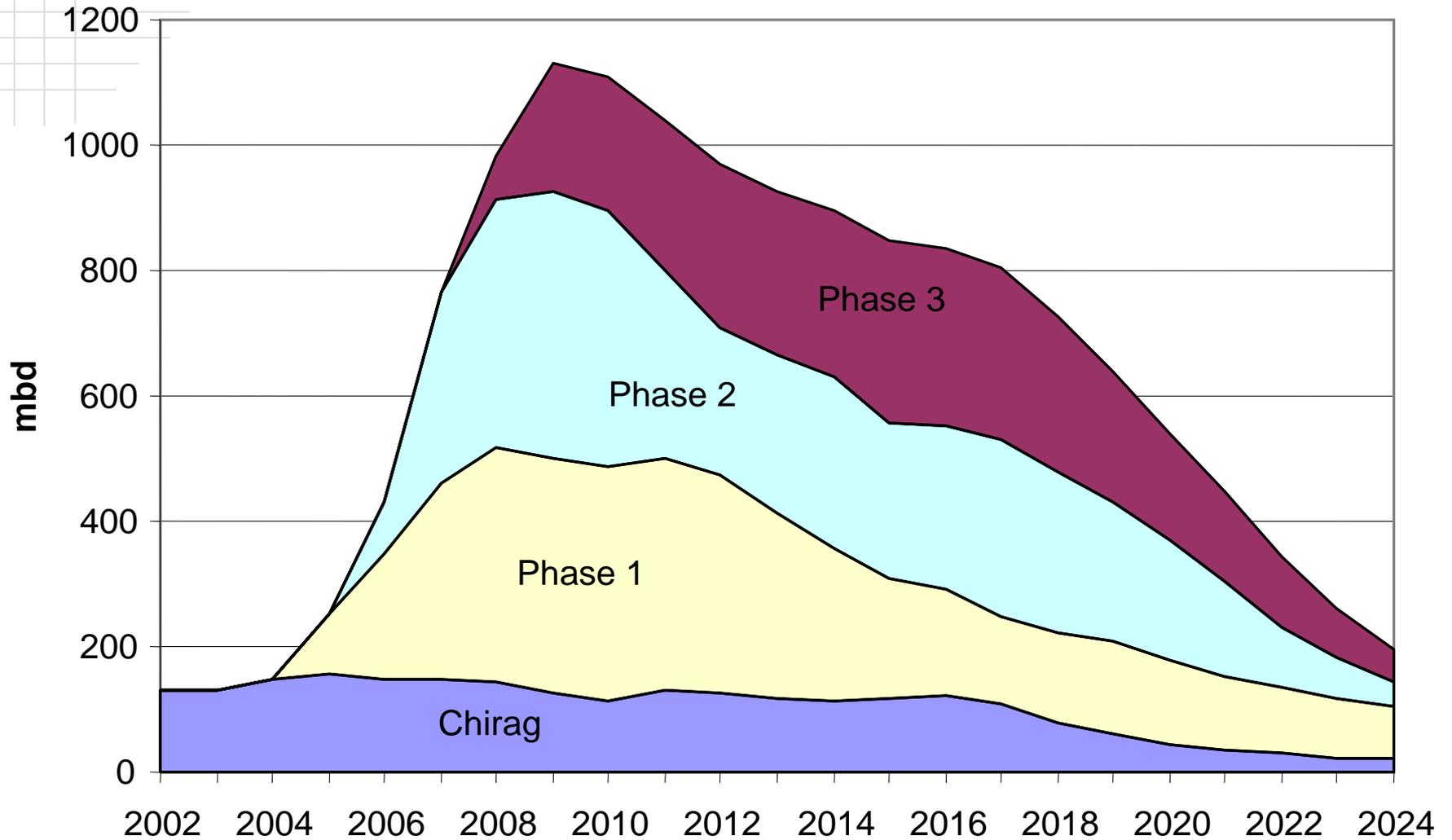
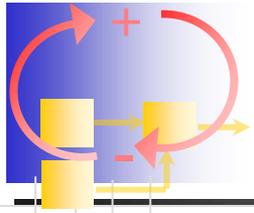
Source: Adrian Luckins, BP



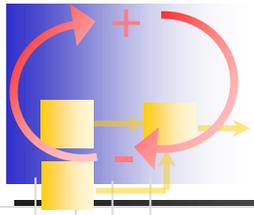
ACG Reservoir Size



ACG Full Field Development - Production



Geographical Challenges



Drilling Equipment,
Norway

Living Quarters
Fabrication, Sweden

Engineering &
Procurement, UK

Drilling
Construction (WA/
EA), Holland

Drilling
Construction (CA),
France

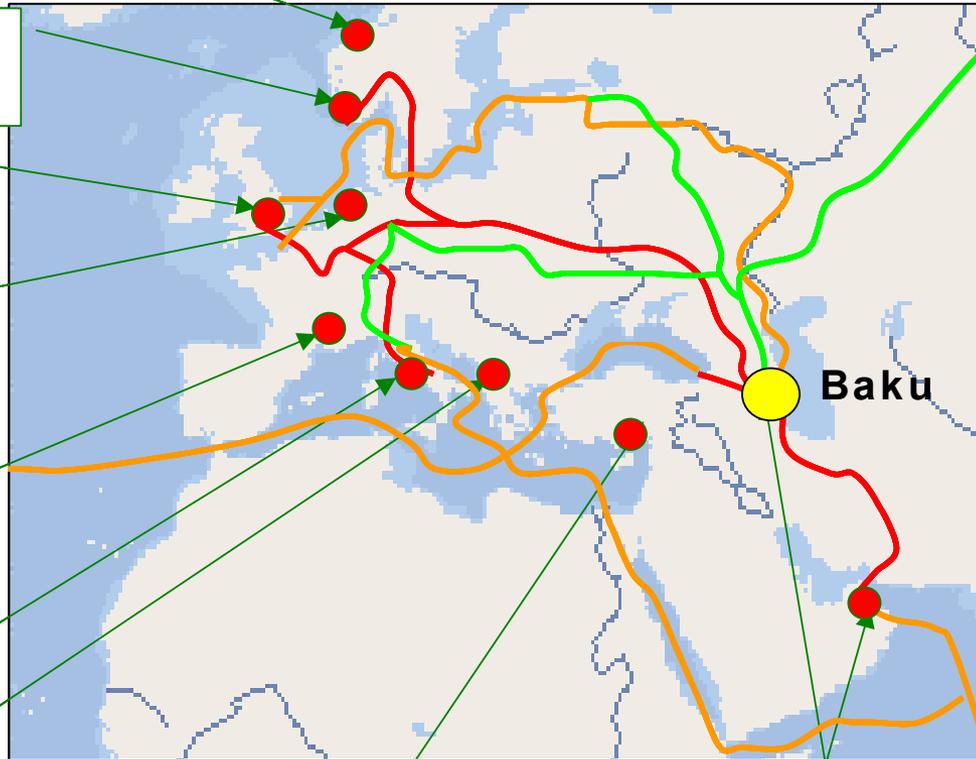
Jacket Pre-
Fabrication, Italy

Installation
Design,
Croatia

C&WP/ terminal pre-
fabrication, Turkey

Topsides Pre-
Fabrication, Dubai

Topsides Fabrication, Jacket
Fabrication, Terminal Construction,
Engineering Design, Azerbaijan



Transport routes:

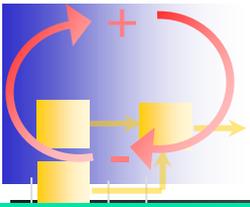
By Trailer

By Rail

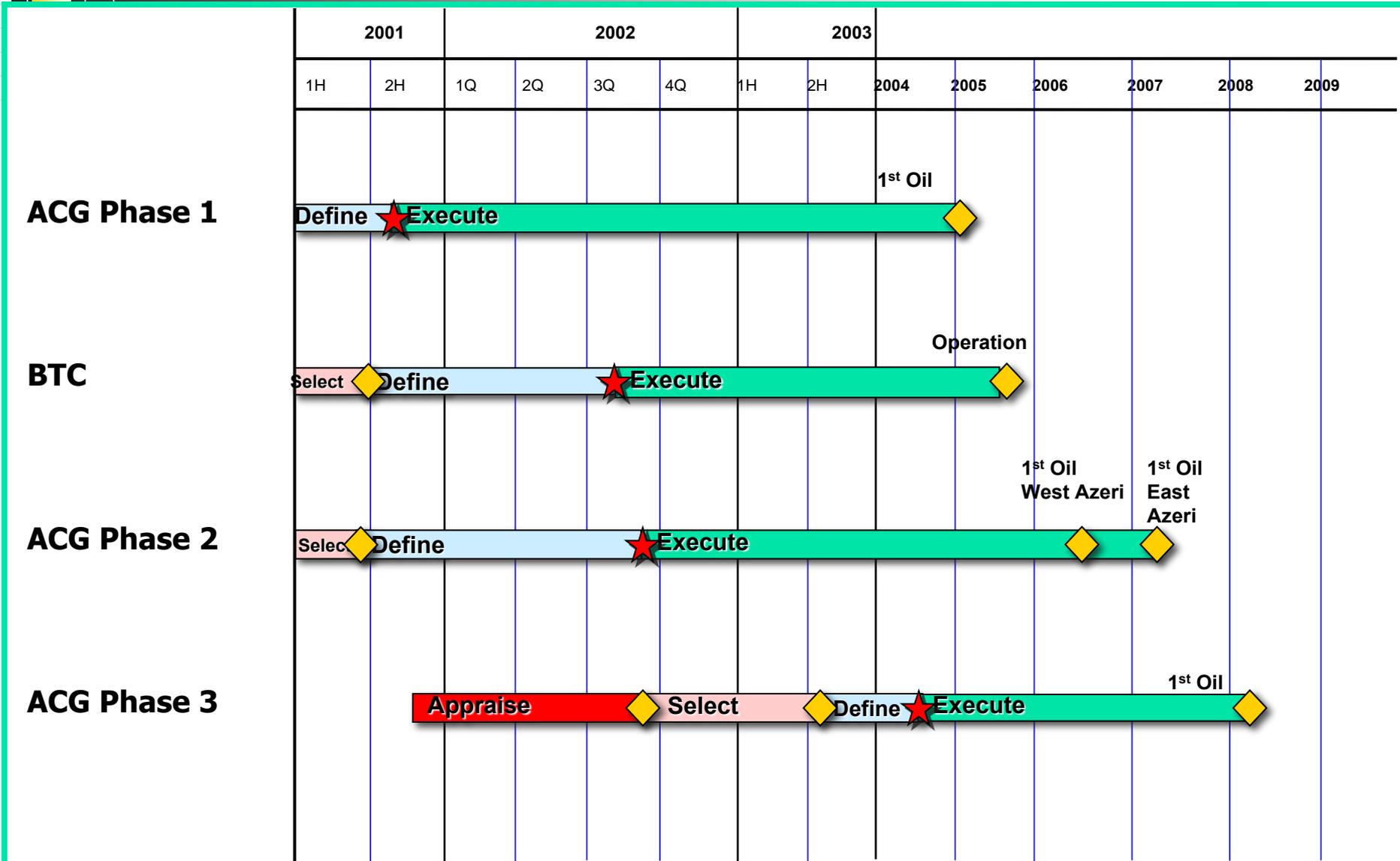
By Sea

Logistics

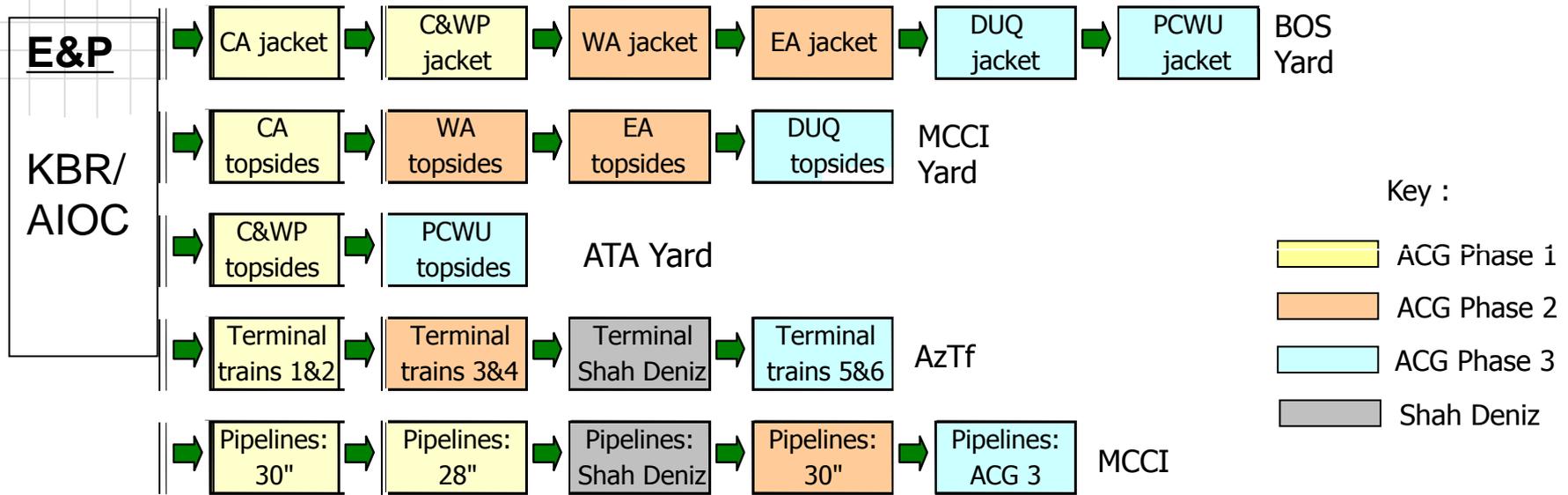
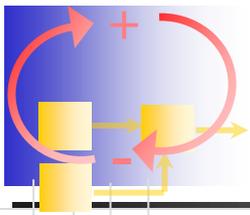
- 5000 Trailer trips
- 6000 rail trips
- 200 river boats



Project Schedules

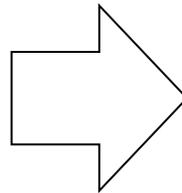


Production Line Strategy Development



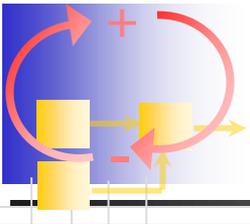
Objectives :

Learning Curve Benefits – Faster,
Cheaper
Elimination of Inefficiency
Continually Reduce Unit Costs



Strategy :

Standardization
Contracting – Natural Choice at Right Price
Organisation – People Continuity
Right Pace for capital efficiency



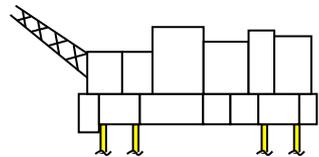
Project Challenges – ACG & Shah Deniz

Phase 1

Phase 2

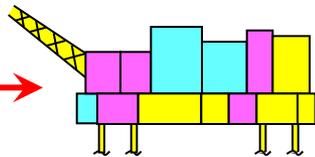
Phase 3

Phase 4



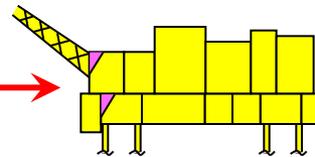
CA-PDQ

**Topsides
Detail Design**
42 Mhrs Per Tonne



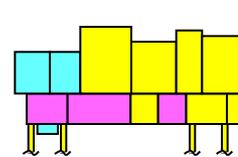
WA-PDQ

50% Copy
31 Mhrs Per Tonne



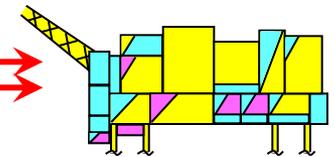
EA-PDQ

95% Copy (WA)
11 Mhrs Per Tonne



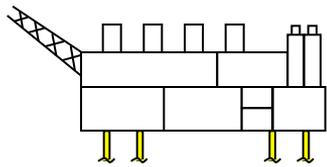
DWG-DUQ

60% Copy (WA/EA)
28 Mhrs Per Tonne



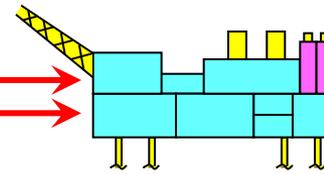
CB-PDQ

30% Copy
30 Mhrs Per Tonne



CA- C&WP

**Topsides
Detail Design**
21 Mhrs Per Tonne



DWG-PCWU

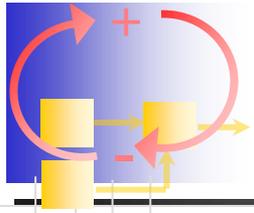
20% Copy (C&WP/WA)
19 Mhrs Per Tonne

 Copied Building Block

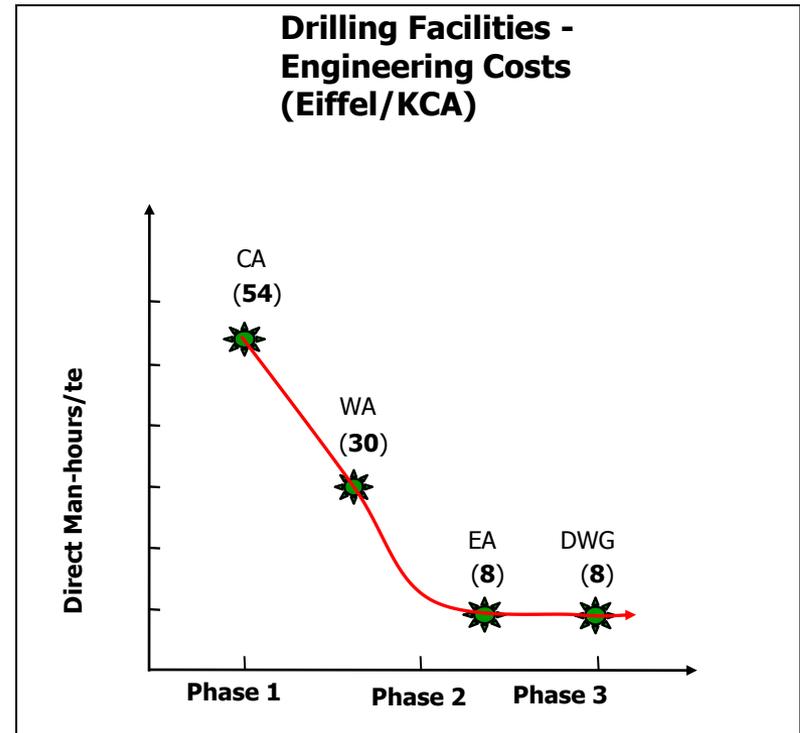
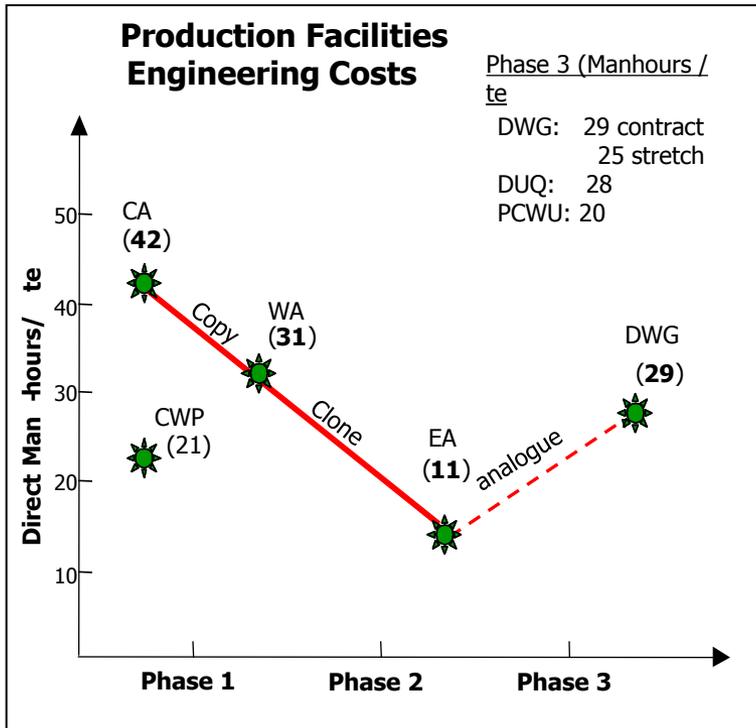
 Seed Building Block To Develop

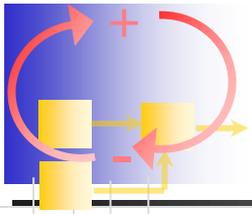
 New Design

Benefits realised through standardisation: Engineering



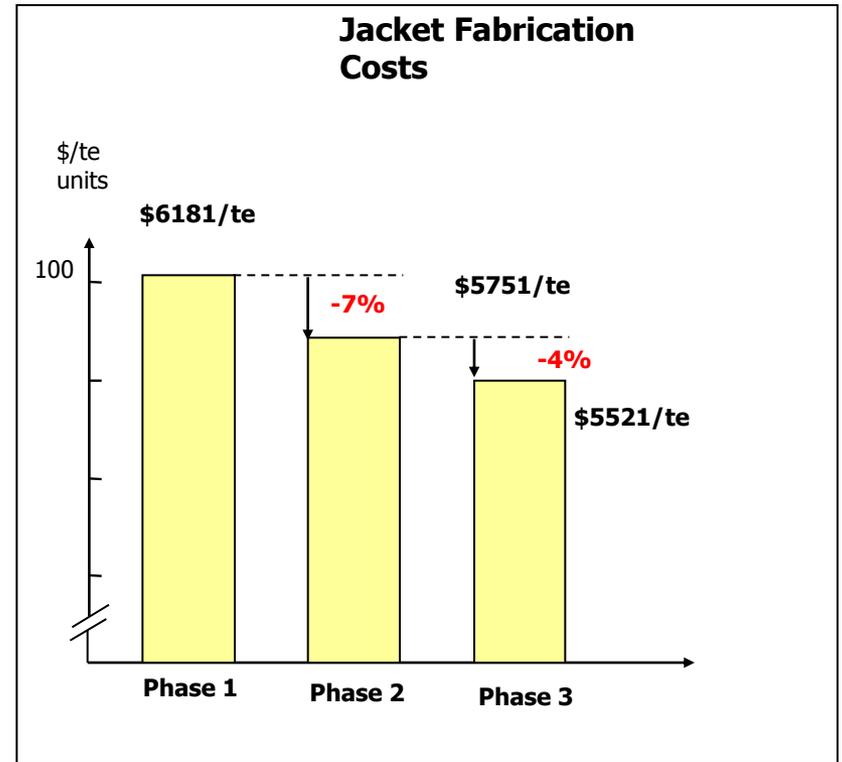
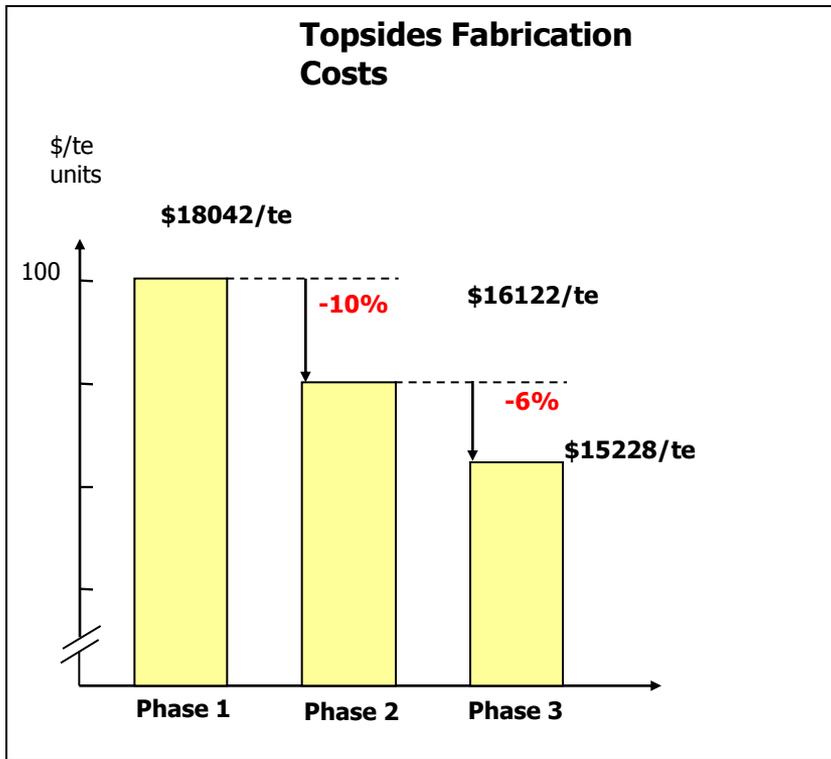
Engineering Benefits

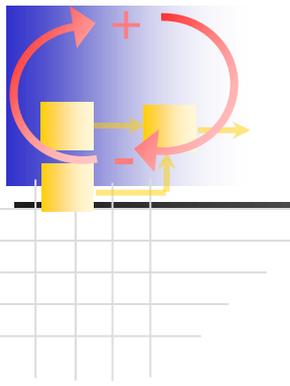




Benefits realised through standardisation: Fabrication

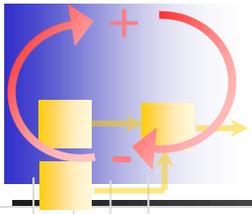
Fabrication Benefits





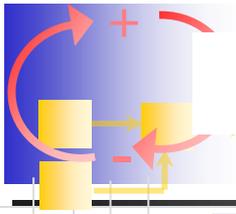
Concept Question 2

- In our organization we pursue mainly:
 - Programs — sets of directly related projects
 - Portfolios — sets of indirectly related projects
 - Individual single projects
 - Not applicable



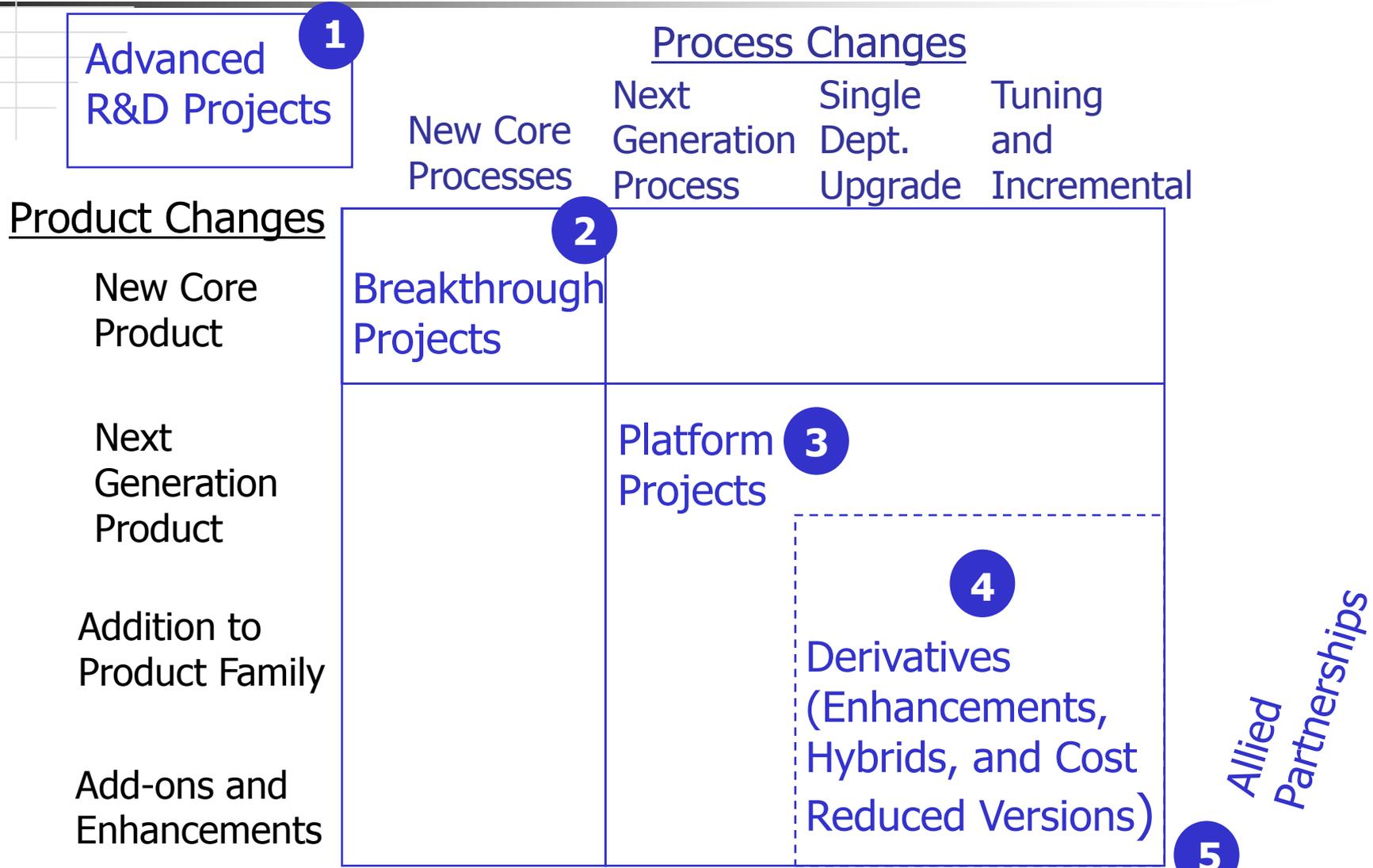
Portfolio of Projects

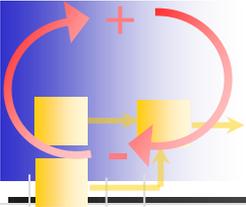
- A **portfolio of projects** is a collection of projects owned or managed by the same organization that are only *indirectly* related
 - Projects may not be directly related to each other, as in a program, i.e. outputs from one don't necessarily feed into the other
 - Usually no or only minimal commonality and standardization
 - Portfolio is chosen with diversity of projects, some of them may be “negatively correlated”
 - Mix of large scale potentially less risky and small risky projects that act as “pathfinders”
 - Project portfolio may not have a single manager



Project Portfolio Planning

Source:
(Wheelwright
& Clark, 1992)



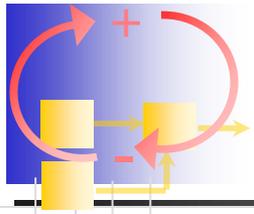


Aggregate Project Plan Classifications

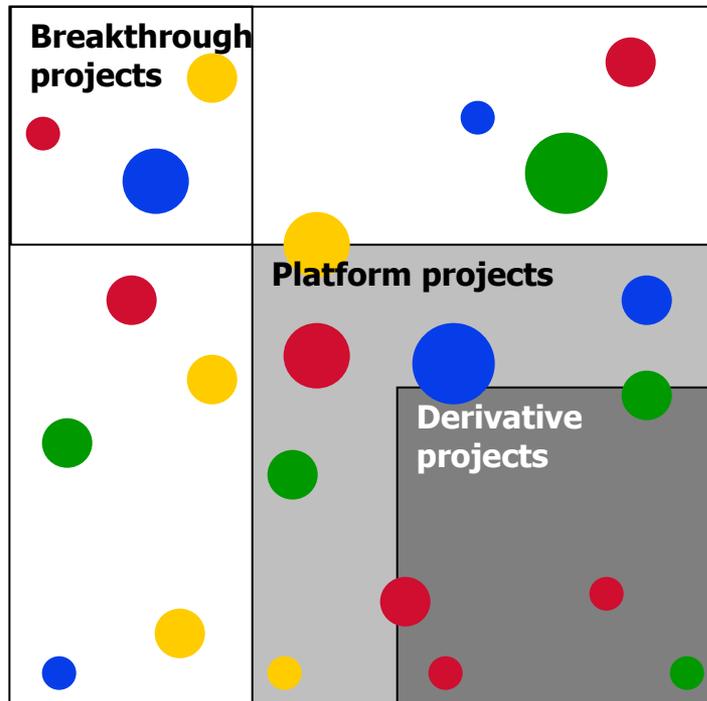
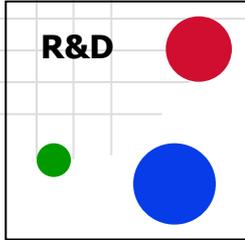
Source:
(Wheelwright
& Clark, 1992)

- Advanced R&D Projects
 - Innovations and technology development that provides a precursor to commercial development
- Breakthrough Projects
 - Projects that involve significant change in the product and process establish a new core product and process
- Platform Projects
 - Projects provide a base for a product and process family that can be leveraged over several years
- Derivative Projects
 - Cost-reduced versions of an existing product or platform or add-ons or enhancements to an existing production process
- Allied Partnerships
 - Partnerships in any of these project areas to leverage development resources and activities

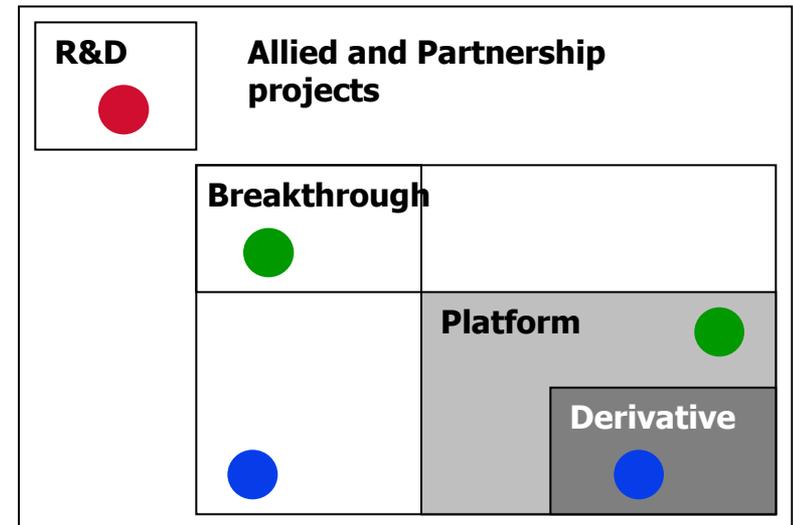
Project Planning at PreQuip – Part 1



- PreQuip's Development Projects (30) before the Aggregate Project Plan

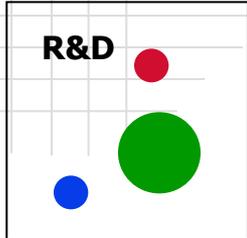
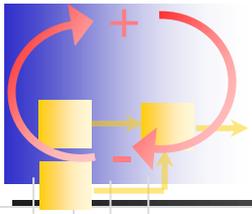


- Mass spectrometers
- Liquid chromatographs
- Gas chromatographs
- Data processing and handling products

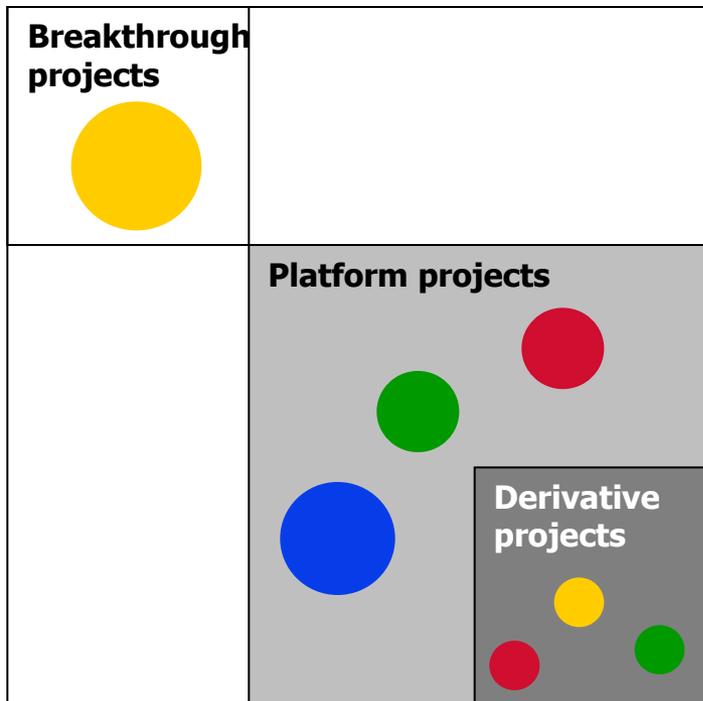


Adapted from: Wheelwright, S.C. and Clark, K. B., 1992, "Creating Project Plans to Focus Product Development," *Harvard Business Review*, 70(2), pp. 70-82.

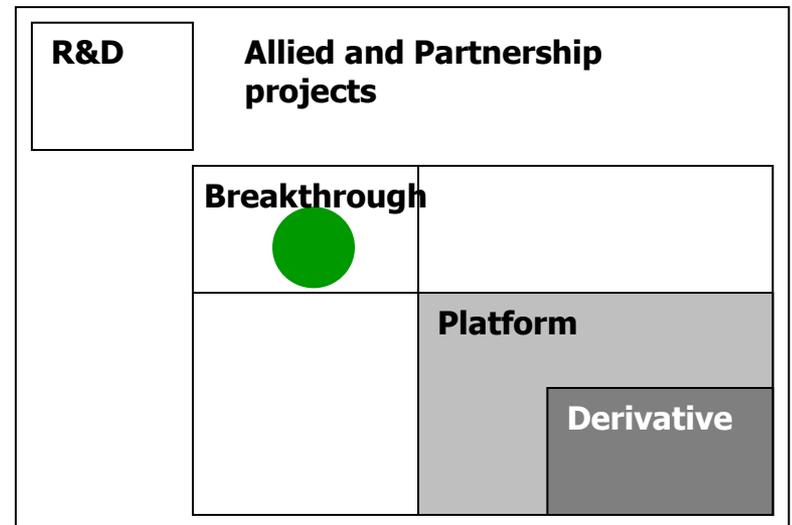
Aggregate Project Planning – Part 2



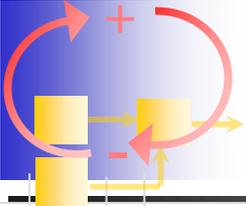
- PreQuip's Development Projects (11) after the Aggregate Project Plan



- Mass spectrometers
- Liquid chromatographs
- Gas chromatographs
- Data processing and handling products

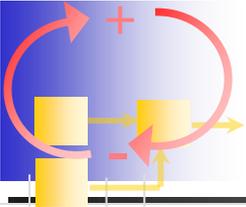


Adapted from: Wheelwright, S.C. and Clark, K. B., 1992, "Creating Project Plans to Focus Product Development," *Harvard Business Review*, 70(2), pp. 70-82.



Concept Question 3

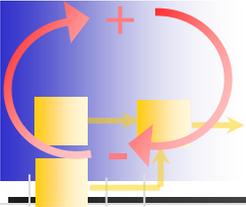
- What is the most challenging issue you have encountered working in a multi-project environment?
 - Conflicts due to financial resource contention
 - Inefficiency due to multi-tasking
 - Staffing dynamics (trying to get the “A” team)
 - Friction between program and project manager
 - Enforcing standard work procedures
 - Ensuring commonality at the parts and module level
 - Other



Portfolio Management Issues

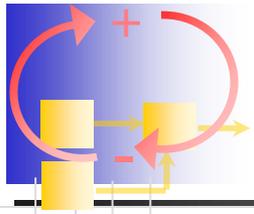
- Risk Correlation across Portfolio
- Constraints on Shared Resources
 - Late and over-budget projects delay ramp-up of downstream projects
 - Shared resources (e.g. test facilities) can also create bottlenecks
 - Staff working simultaneously on multiple projects create inefficiencies and delays

Typically dealt with via exogenous inputs to single-project models, or via portfolio models



Program Manager Challenges

- Creating a *vision* for the program as a whole
- Scheduling and prioritization of individual projects in the program
- Dealing with project interdependencies
 - Resource contention, CAPEX phasing
 - Staffing, avoid firefighting
 - Ensuring learning and commonality across projects
- Program Manager is a very different and more strategic role than project manager
 - Typically requires more strategy and diplomacy than individual project management



Discussion / Q&A

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Fall 2012

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