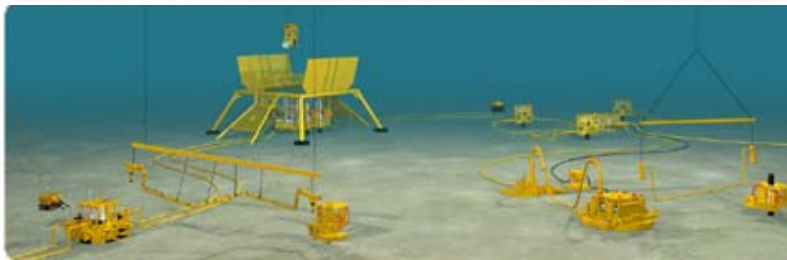


Seafloor Processing

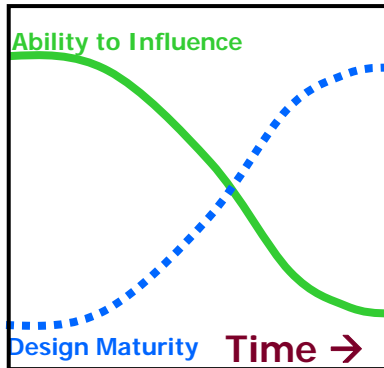
Environmental impact from the beginning to the beginning



Seafloor getting crowded



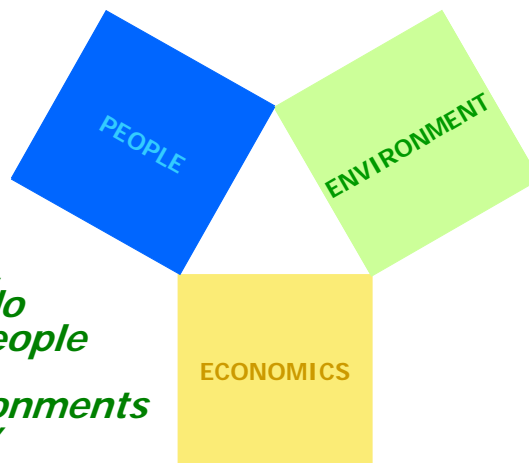
Environmental Impact



- Environmental impact occurs at various times



HSE Objectives



*"At all times,
all of us will do
no harm to all people
and
no harm to all environments
for all time."*



What are the big questions?

Design considerations

- Systems level
- Subsystems level

Manufacture/Installation/Operation

- Employees

Design for the full life cycle

- End-of-Life Issues**
- Equipment/Systems
 - Retrieve
 - Re-use, recycle, redeploy
 - Refurbish/rebuild/remanufacture
- Environment**
- Restore
- Economics**
1. Installation – critical path time savings
 2. Capital costs



Full Life Cycle Design



- Manufacture/Installation/Operation**
- Employees
 - Equipment/Systems
 - Environment
- End-of-Life Issues**
- Equipment/Systems
 - Retrieve
 - Re-use, recycle, redeploy
 - Refurbish/rebuild/remanufacture
- Environment**
- Restore
- Economics**
1. Installation – critical path time savings
 2. Capital costs



Full Life Cycle Design

Ecology-Ecology
Is it creating healthy habitat?

Ecology-Equity
Is the product and production safe for local and global communities and ecosystems?

Ecology-Economy
Is it enabling efficient use of natural resources?

Equity-Equity
Is it enhancing stakeholders' health and safety?

Equity-Economy
Is it making efficient use of financial resources?

Equity-Equity
Is it improving the quality of life of all stakeholders?

Equity-Economy
Is the product or process achieved while providing fair benefits and wage practices?

Economy-Equity
Is the product contributing to the wider economic health of the community?

Economy-Economy
Can we make and sell the product at a profit?

Eco-Design Principle

"The goal is not to balance economy, ecology and social equity but to optimize and maximize value in all areas of the triangle through intelligent design."

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Full Life Cycle Design

- Impact may occur throughout all phases, from manufacturing to de-commissioning
- Definition of zero-harm
- Design for 'biological nutrients' and 'technical nutrients' to maintain a closed-loop cycle
- Consider both optimized use of materials for today's requirements as well as for future requirements
- Design issues of re-use, recycle and redeploy can be complemented with retrieval, refurbishment, rebuilding, remanufacturing and restoration

HARC

Questions?



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