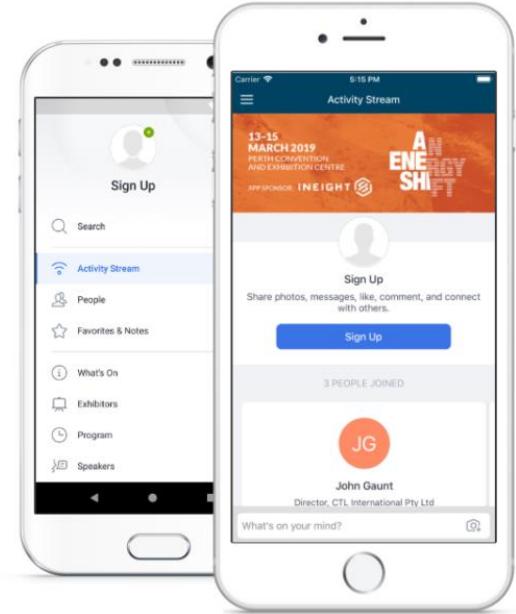


# #AOG 2019

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- Download the free-to-download AOG 2019 app
- Search for 'AOG 2019' to find the app.
- Connect and network with peers in the oil and gas industry at this year's event
- Plan your day by selecting which sessions you want to attend.
- Don't forget hashtag #AOG2019"



# Structural Integrity Management - Through the lifetime of an asset

Ruth Baker



# Structural Integrity

Fit for  
Purpose  
for the  
remaining  
lifetime



Rottneest Bridge Failure  
112 year old structure  
3 injuries

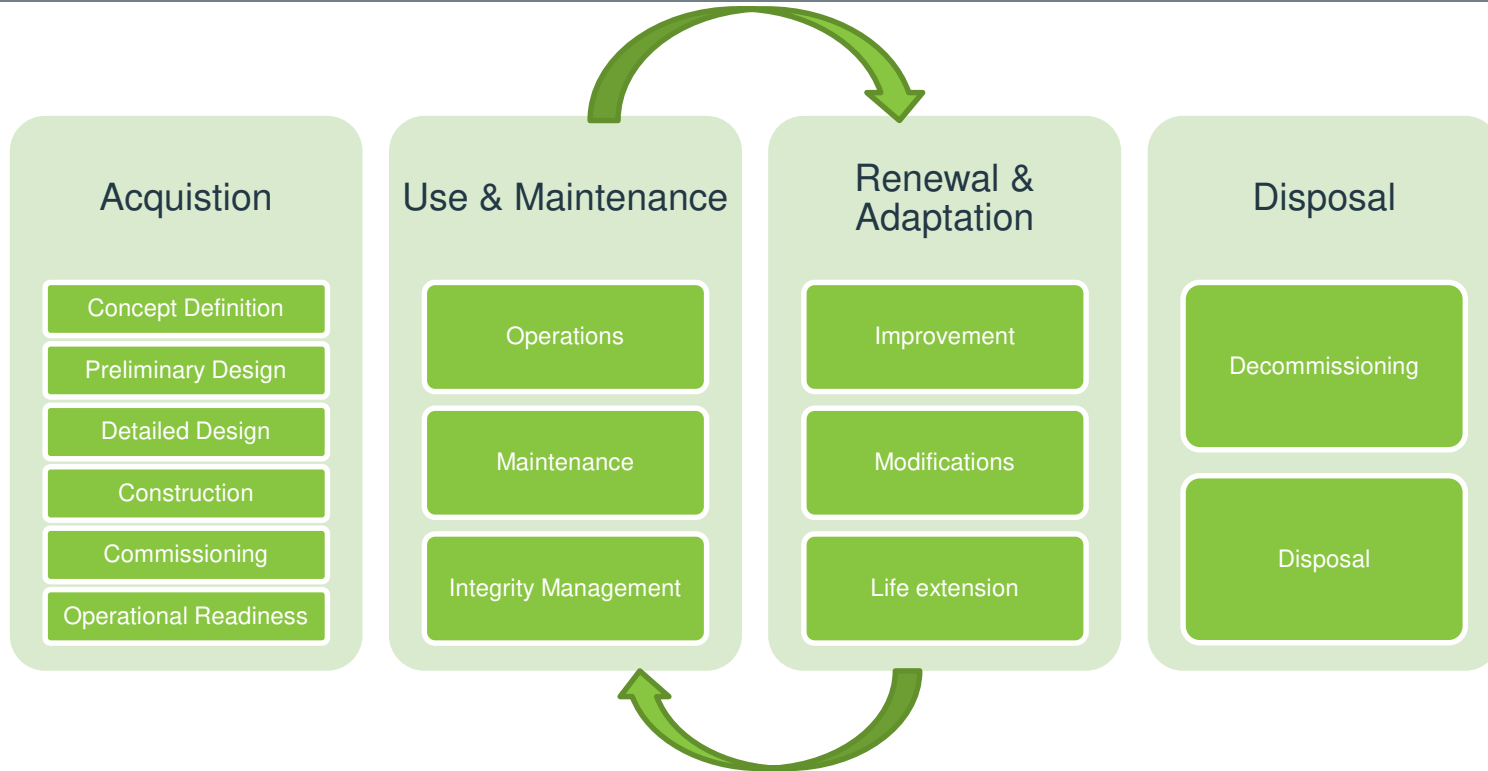
Semi  
Submersible  
with Fatigue  
Crack

Progressive  
Failure  
123 deaths

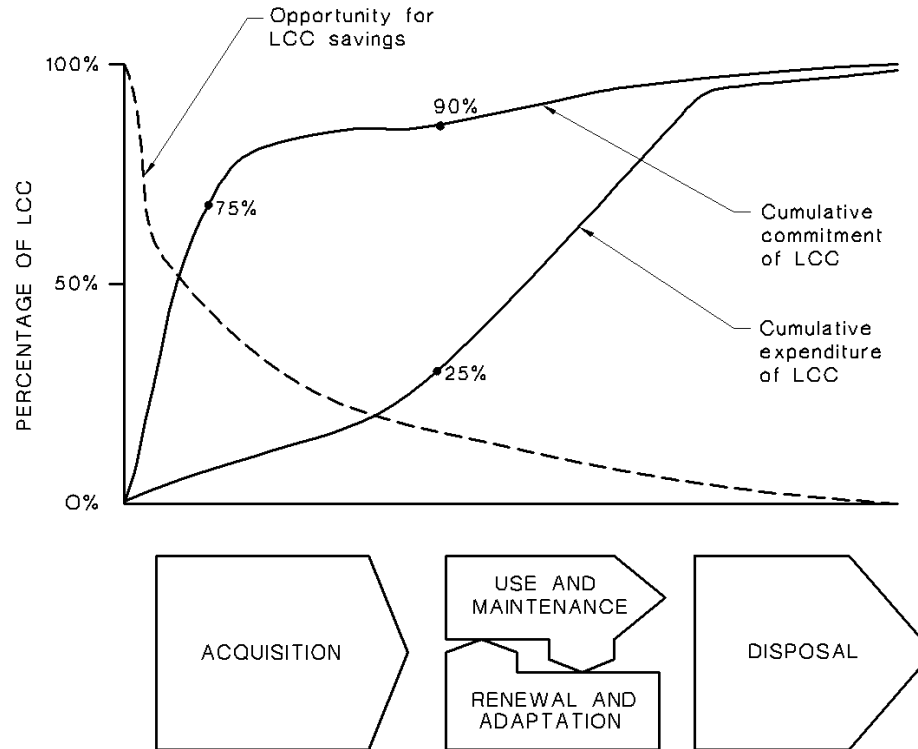


# The Asset Life Cycle

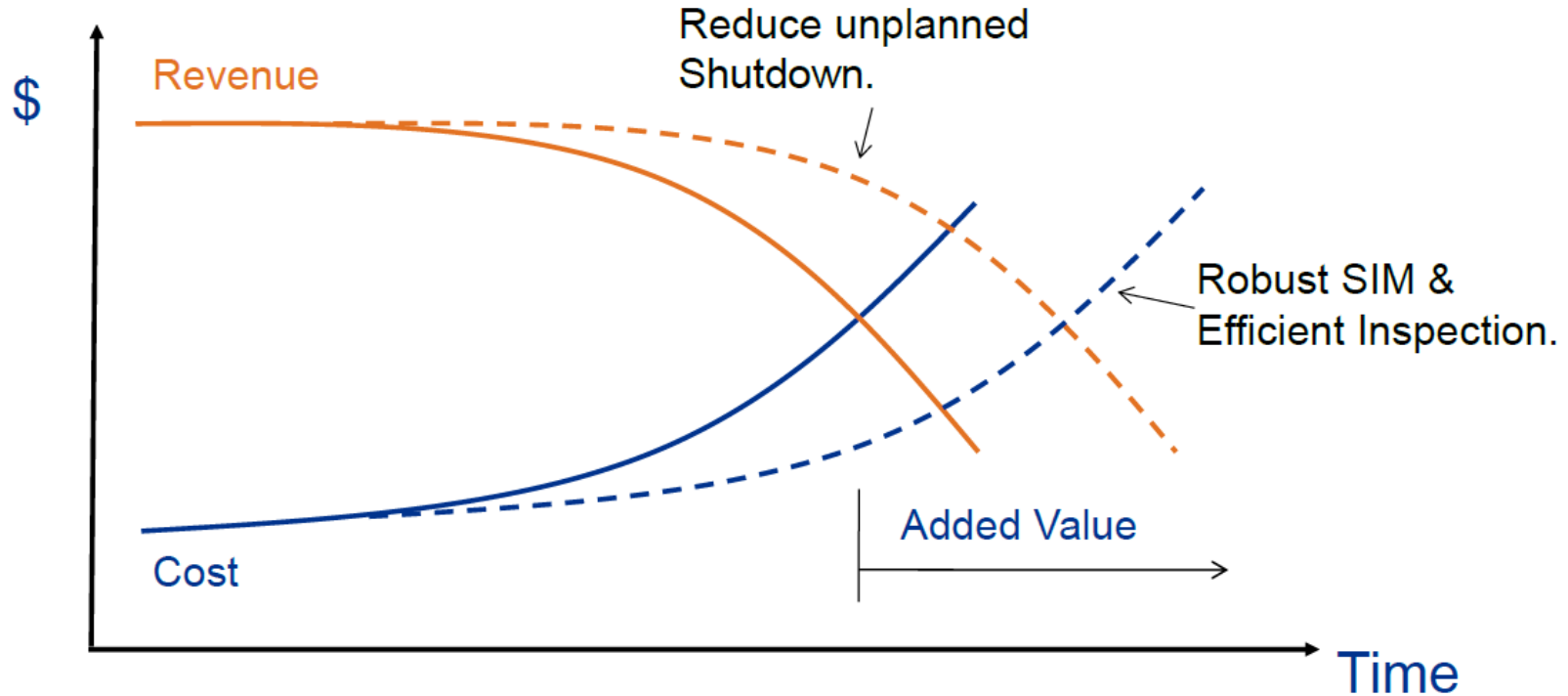
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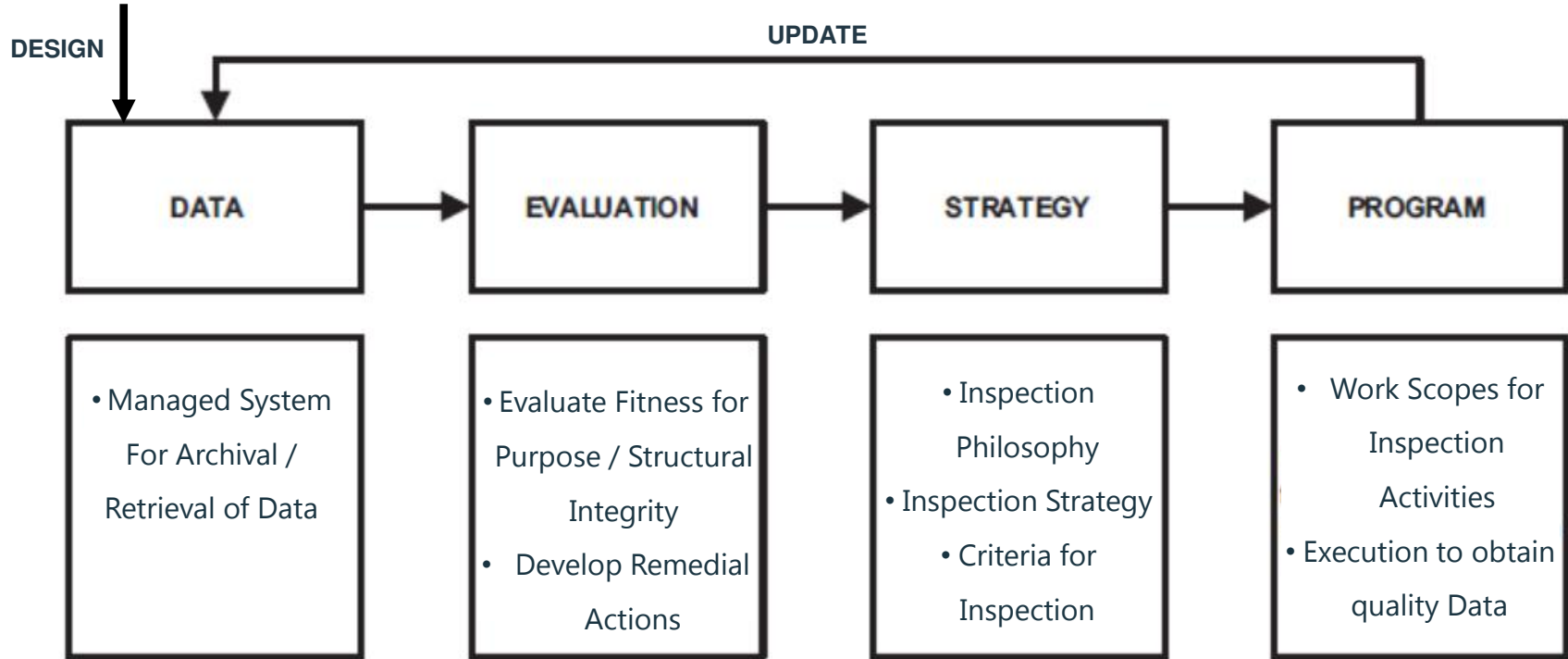
# Percentage Costs through out the Life Cycle



# SIM and OPEX



# Structural Integrity Management



# Structural threats...

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## Understand and quantify risks to a structure:

Corrosion

Coating  
Breakdown

Concrete Cracking

Fatigue Cracking

Foundation  
Settlement/  
Erosion

Lack of  
Inspectability

Overload from  
Upgrades /  
Additions

Accidental Events

Depletion of  
Cathodic  
Protection

Revised Met-  
ocean Data



# Assessing Risk...

Consequence					Increasing Annual Frequency							
Severity Rating	People	Assets	Environment	Reputation	0	A	B	C	D	E		
					$<10^{-6}$	$\geq 10^{-6}, <10^{-4}$	$\geq 10^{-4}, <10^{-3}$	$\geq 10^{-3}, <10^{-1}$	$\geq 10^{-1}, <1$	$\geq 1$		
					Practically non credible failure	Rare Failure	Credible failure		Probable failure	Frequent failure		
					Could occur but has not necessarily been observed in E&P industry	Has rarely occurred in E&P industry	Has occurred several times in E&P industry	Has occurred in operating Company	May occur several times a year in operating company	Will Occur routinely in an individual plant		
0	Zero injury	Zero damage	Zero Effect	Zero Impact	Tolerable							
1	Slight injury	Slight damage	Slight Effect	Slight Impact								
2	Minor injuries	Minor Effect	Minor Effect	Minor Impact								
3	Major injuries	Local Damage	Local Effect	Considerable Impact	Compulsory impact reduction for 3 <sup>rd</sup> parties on shore		Intolerable for 3 <sup>rd</sup> parties on shore		Compulsory impact reduction			
4	Single Fatality	Major Damage	Major Effect	National Impact	SPE 2010				Intolerable			
5	Multiple Fatalities	Extensive Damage	Extensive Effect	Major International Impact								

# Assessing Risk.. to Influence Design

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## Identify

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Determine the **threats** to the structure.



## Assess

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Review all available data to fully **assess the risks** the threats pose.



## Respond

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Solve critical operational problems, either by **mitigating** or by altering the basis of design.

# Align Design with Operational Strategies

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## Align

- Ensure final design supports key structural integrity management strategies

## Evaluate

- Develop structural analysis models to support fitness for service evaluations

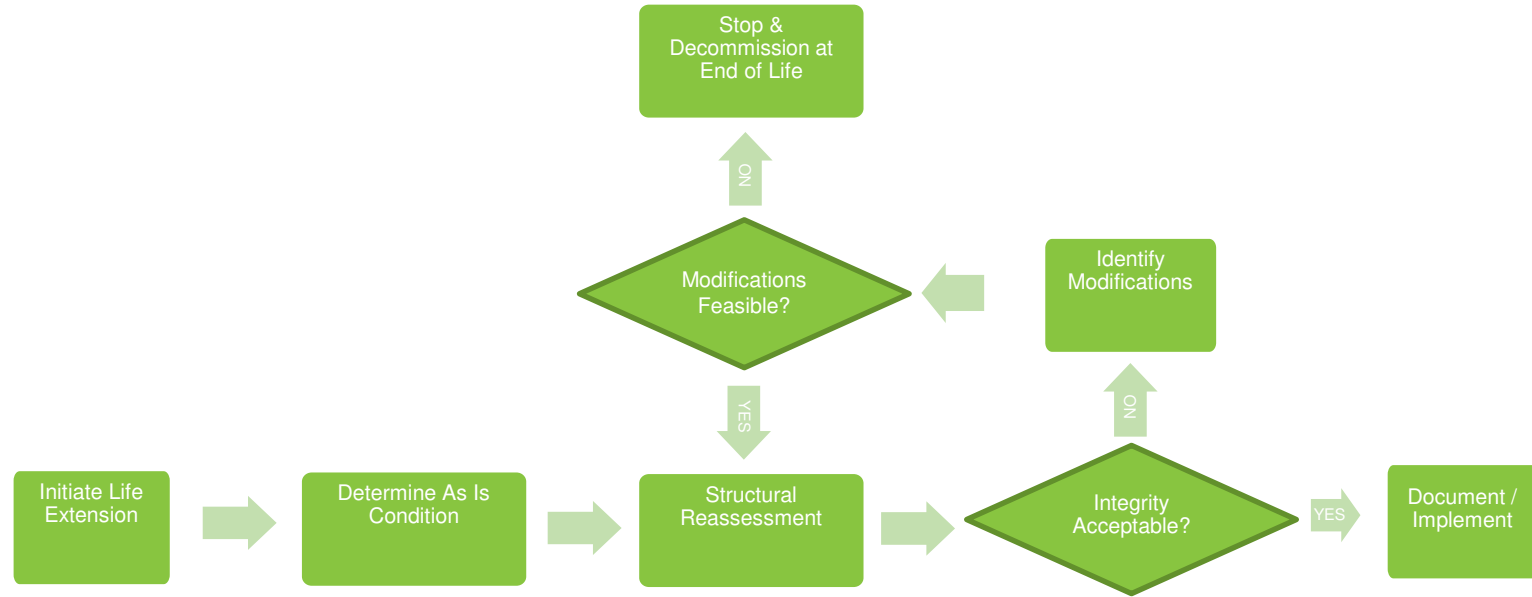
## Inspect

- Select risk based or prescriptive inspection planning strategy
- Baseline inspections

## Monitor

- Identify monitoring required throughout lifetime
- Baseline measurements

# SIM to Support Life Extension



# SIM Through the Lifetime of an Asset

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Fit for  
**Purpose** for  
the remaining  
lifetime

High  
commitment of  
**life cycle costs**  
by the end of  
EPC

Assess  
**Operations**  
during **Design**

Understand the  
**risk** to your  
structure  
during all  
phases of life

Mitigate the  
**risks safely** and  
cost effectively

**Decrease**  
unplanned  
**shutdowns &**  
**rationalise IM**  
**costs**

Adds value  
during **Life**  
**Extension &**  
**Decommission**  
**ing**  
Assessment

# Decommissioning

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.....but not prematurely!

wood.

Thank you.