

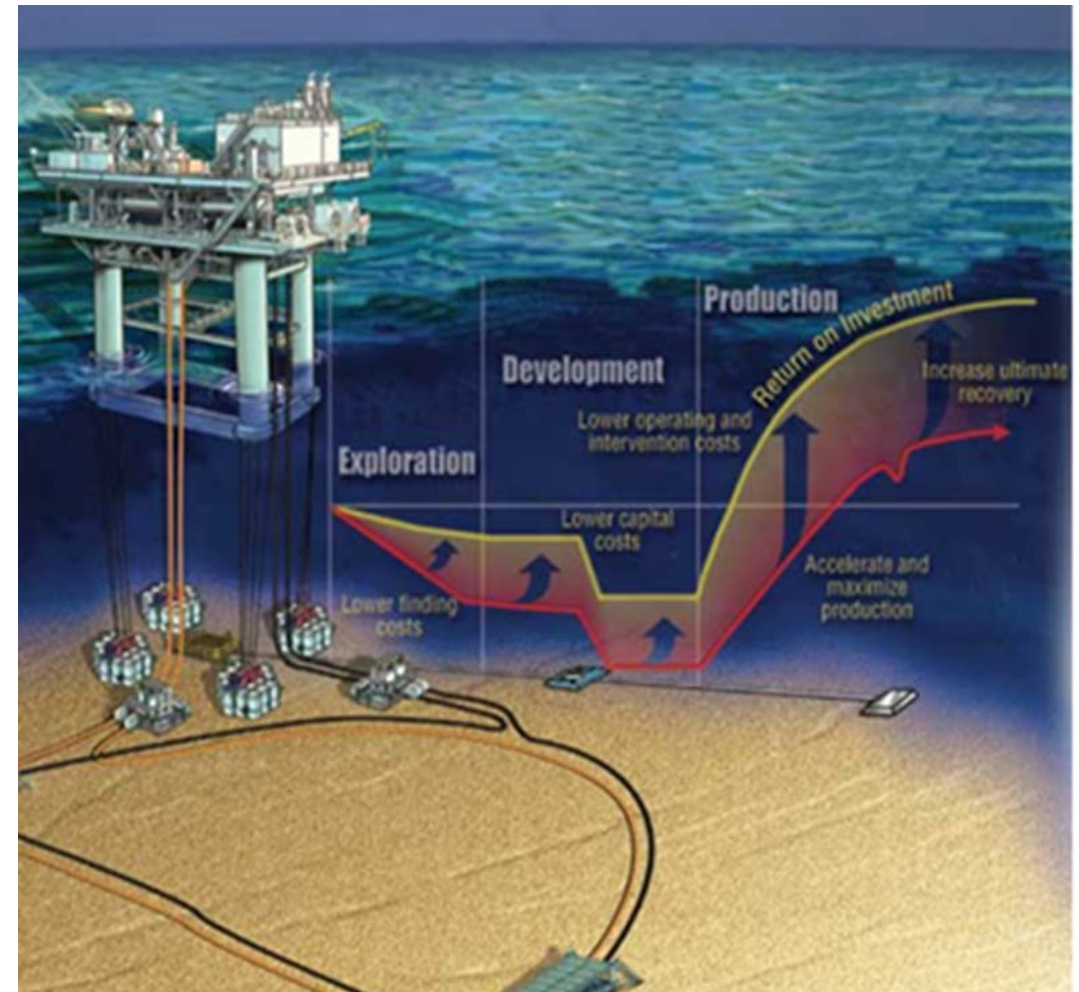
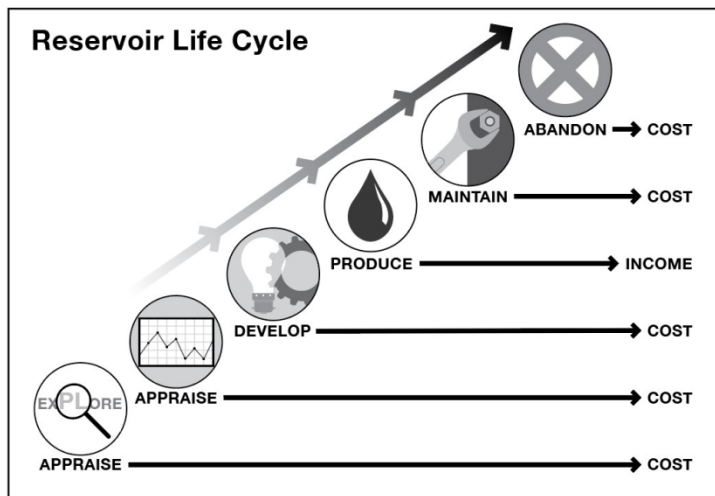
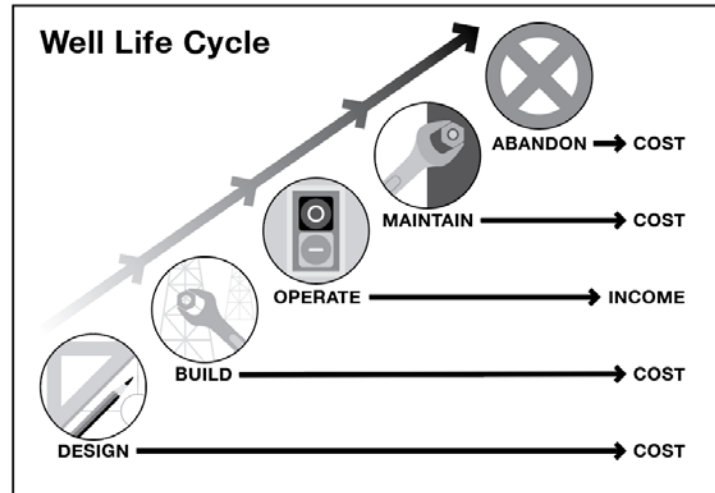
‘Damage Control’ The neglected part of Deepwater safety.

Note: *Everything you need to know about your business is contained within its failures. **Everything!***

Peter Aird
Kingdom Drilling Services Ltd.



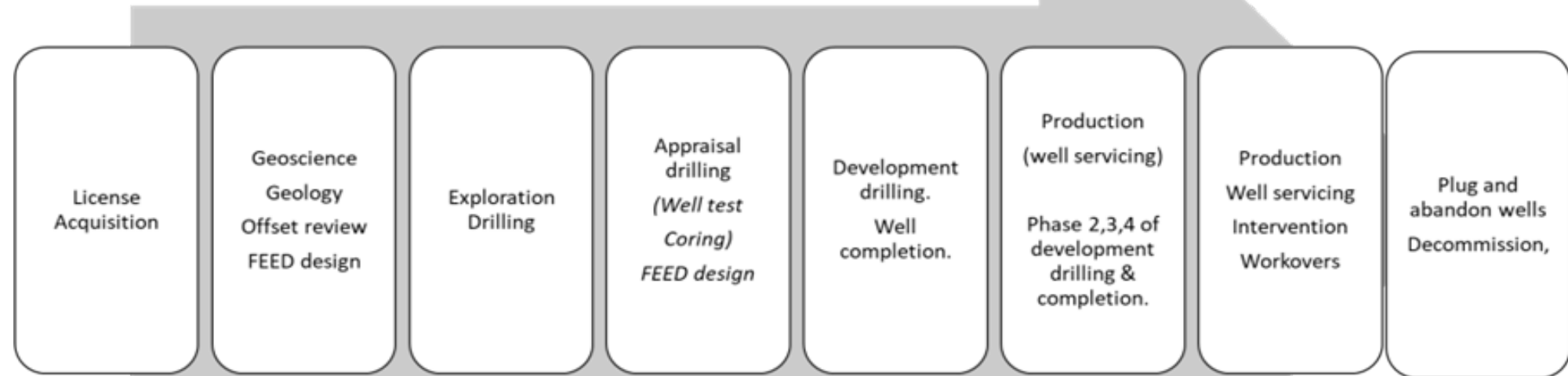
Deepwater 'Life - Cycles'



MCEDD
DEEPWATER DEVELOPMENT

Deepwater 'Programs & Projects'

Program & Project's '**Life-Cycle**' approach?



What do deepwater projects demand to succeed?

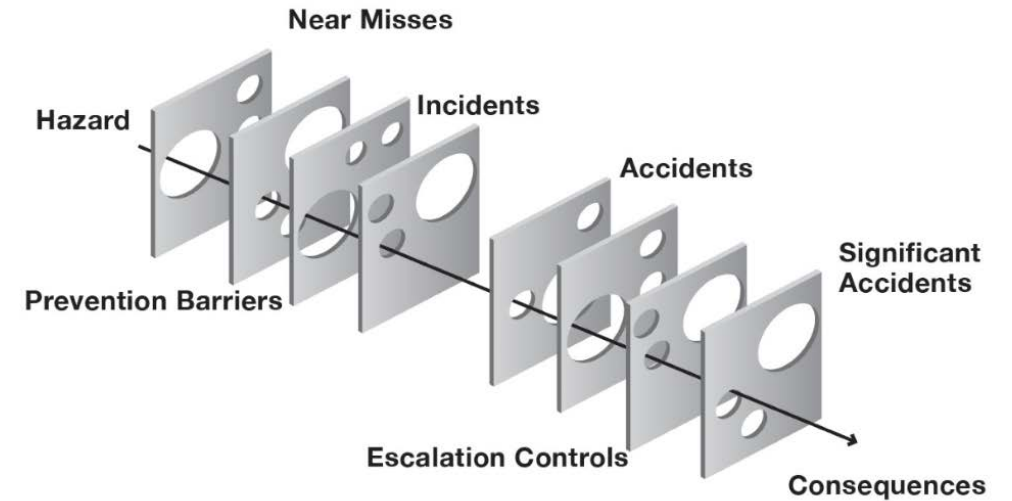
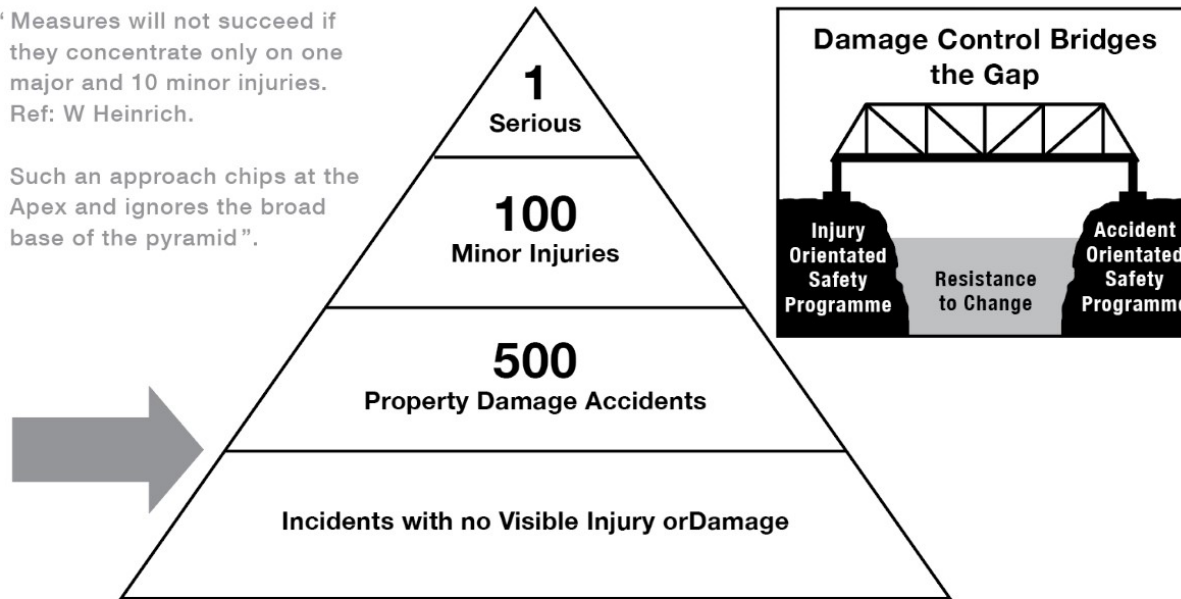
Deepwater; *Damage, failure, loss & waste*

Loss Control, Safety Pyramid Compilation

Source: 1965 Luken's Study

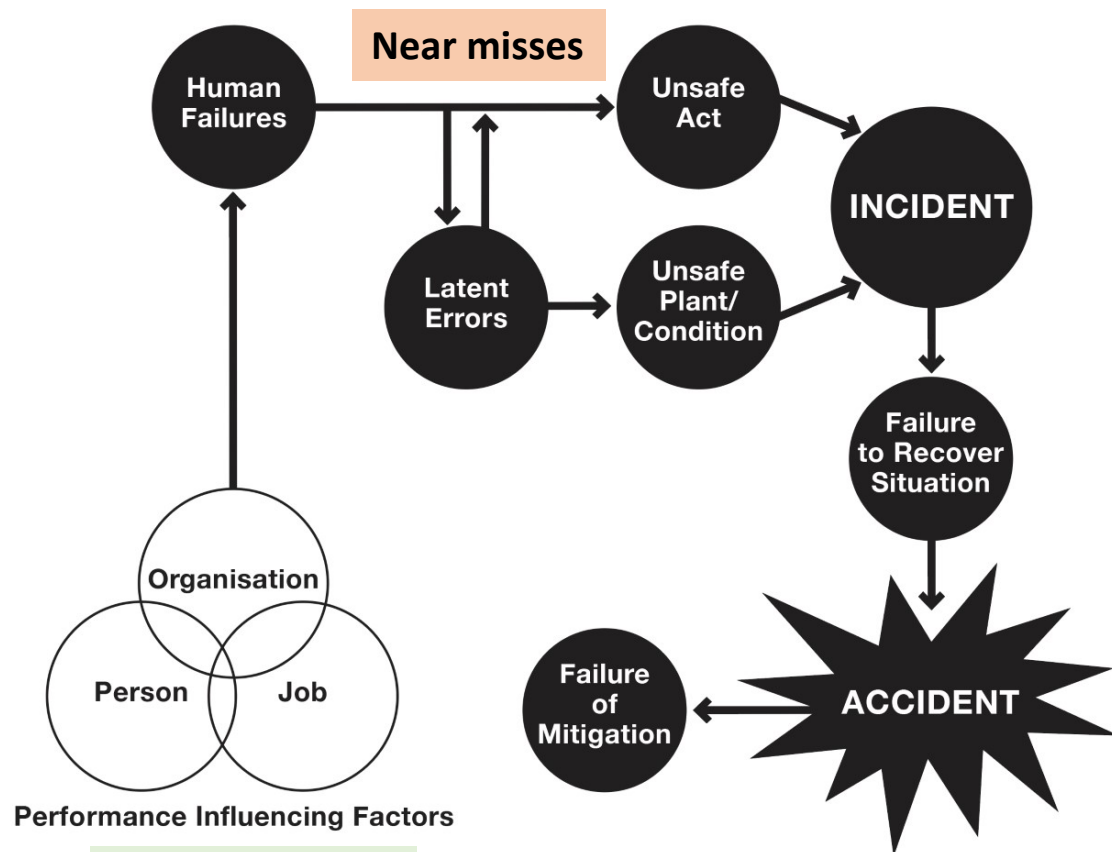
"Measures will not succeed if they concentrate only on one major and 10 minor injuries. Ref: W Heinrich.

Such an approach chips at the Apex and ignores the broad base of the pyramid".



1. Why is 'damage' neglected?
2. Why the resistance to change?

Damage Control - Outline



1. Processes
2. Property / Plant
3. Productivity
4. People
5. Environment

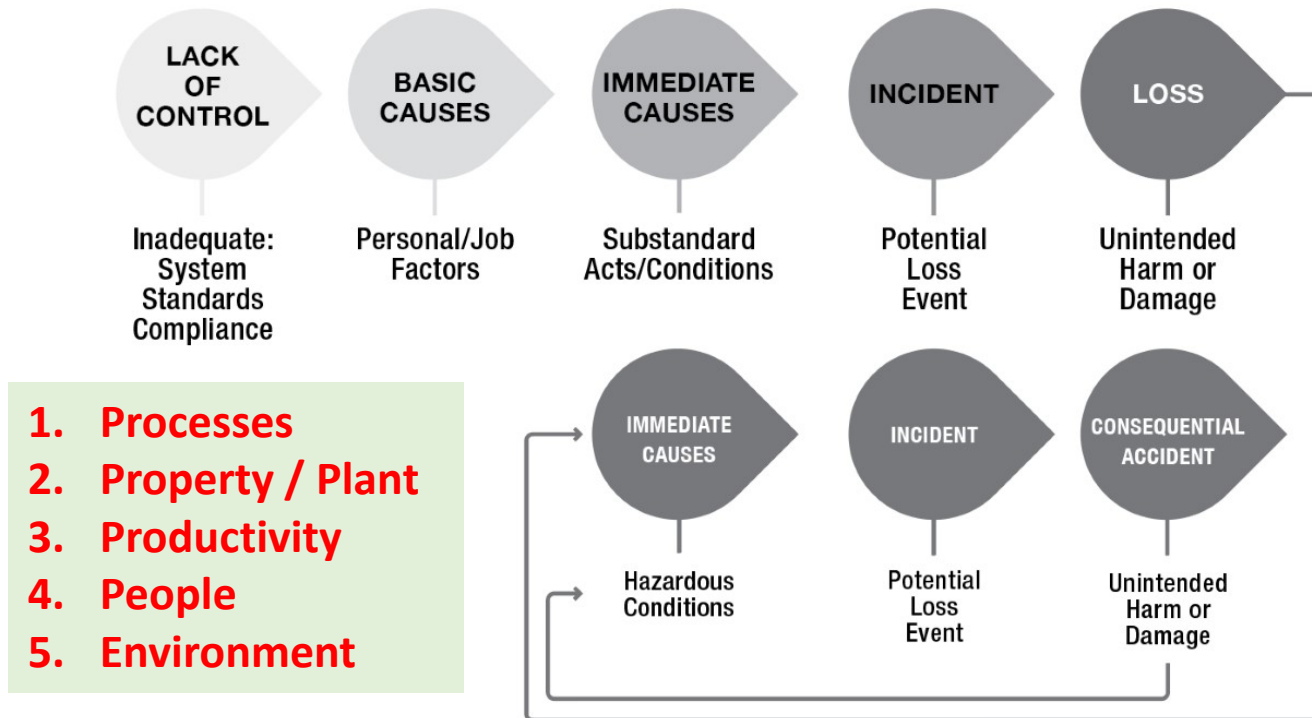
Source: UK HSE website

1. 1988, *Safety Awakening*
2. 1988–2018, *Resistance*
3. 2018+, *Commendation/Correction.*

1. 1988: Loss control, *Safety* Awakening

The Consequential Accident Sequence

Source: The Property Damage Accident (The Neglected Part of Safety), Bird & Germain, 1997



• ‘S.E.E.’ the results!

• S Safe

- Control all loss / waste.

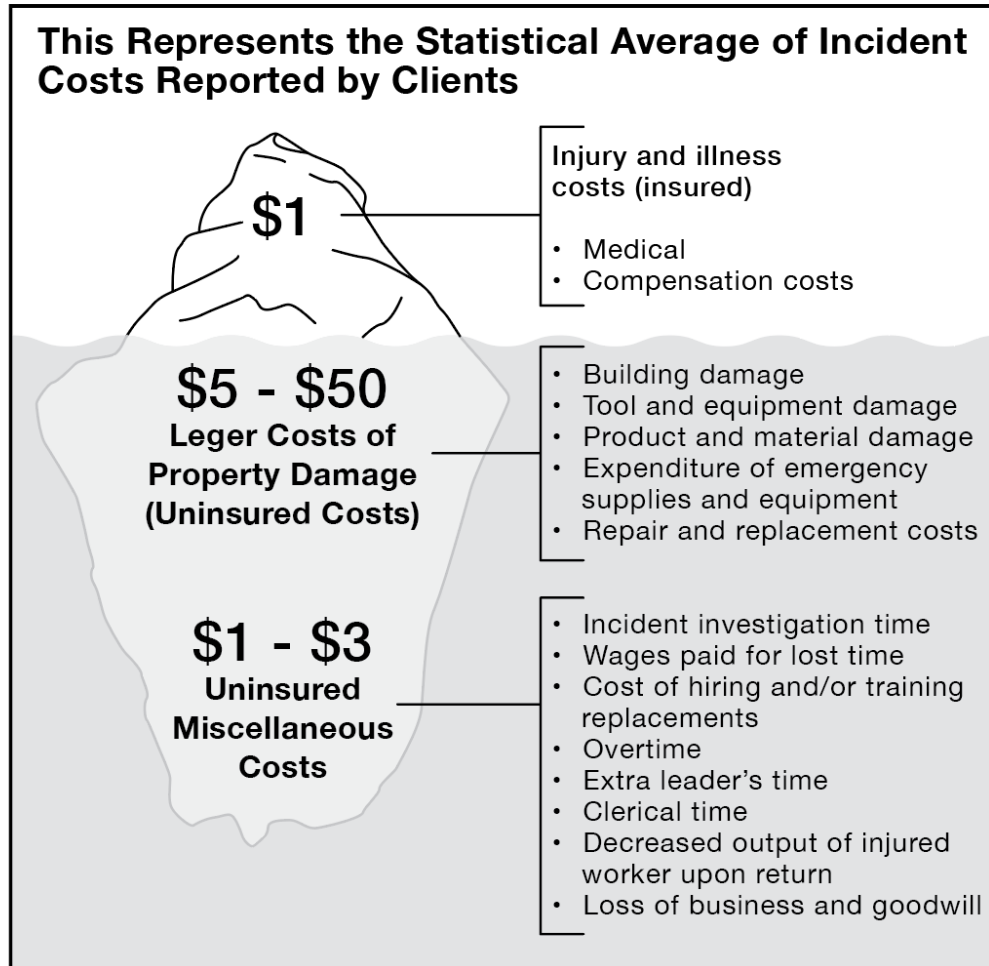
• E Effective

- Doing the right things.

• E Efficient

- Getting things right first time.

1. Deepwater Loss Control, 1988-2018.



1. Total well time (TWT) = **Productive time (PT)** + **Significant lost (SL).....(1)**

2. **PT = Managed time (MT) + Loss (L) + Waste (invisible loss) (W).....(2)**

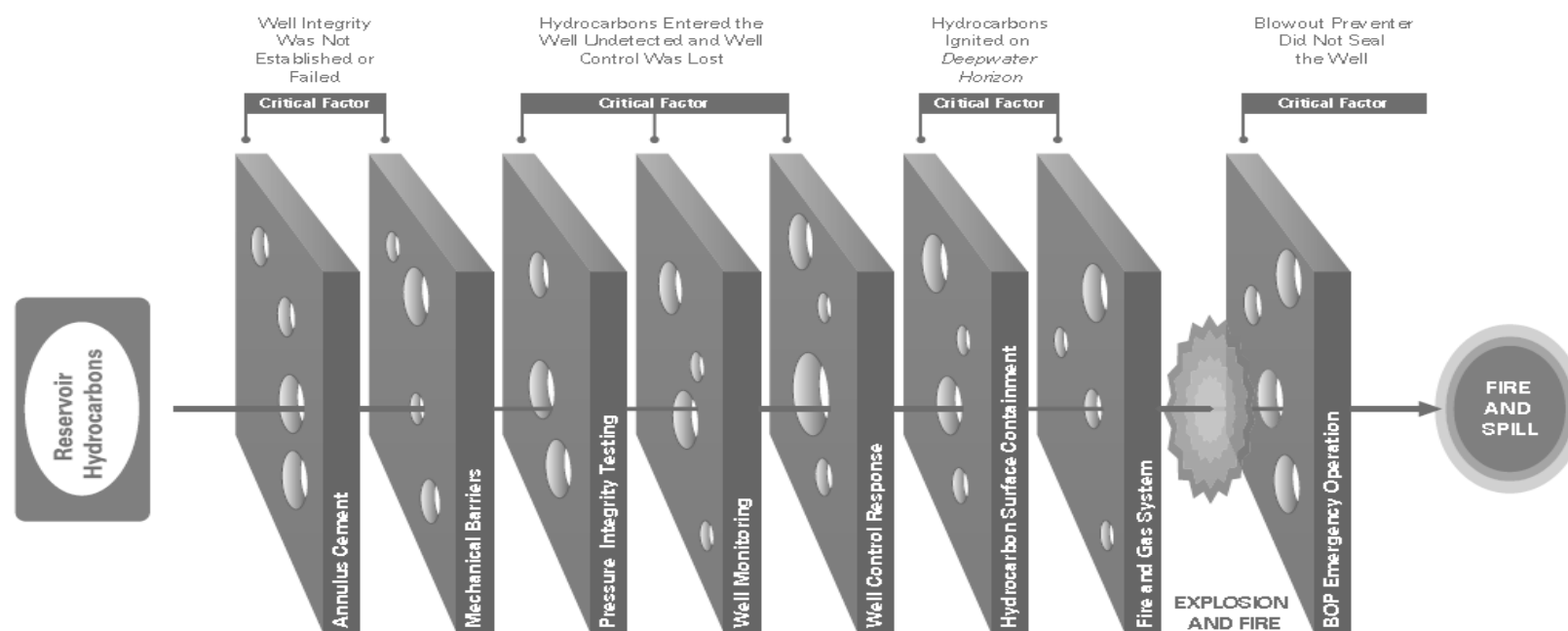
3. **Well efficiency = MT / TWT.....(3)**

1988-2018: 50% loss / waste = average norm.

Note: Metrics evolved by P Aird, based on work done by Oliver Whelan in BP in late 90's

Deepwater Case study 1: Macondo

>\$60billion in consequential Damage, failure, loss and waste?



Adapted from James Reason (Hampshire: Ashgate Publishing Limited, 1997).

Macondo critical barriers breached and their relationships.

Source: Operators Deepwater Horizon, Accident Investigation Report Sept. 8th 2010.

MCEDD
DEEPWATER DEVELOPMENT

Well No	Drilling operations metrics					
	Well time (TWT)	Productive time (PT)	MLT (MLT)	Significant loss (SL)	Loss (L)	Waste (W)
well 1	114 days	85 days	54 days	29 days	13 days	19 days
well 2	53 days	48 days	33 days	5 days	6 days	9 days
well 3	56 days	50 days	28 days	6 days	11 days	11 days
Totals	223 days	183 days	115 days	40 days	31 days	38 days

Well No	Drilling operations metrics					
	Well time (TWT)	Productive time (PT)	MLT (MLT)	Significant loss (SL)	Loss (L)	Waste (W)
well 1	78 days	58 days	41 days	20 days	5 days	13 days
Totals	78 days	58 days	41 days	20 days	5 days	13 days

TWT =

78 days

SL + L + W =

38 days

We = MLT/TWT

51.98%

Well No	DW Drilling operations metrics					
	Well time (TWT)	Productive time (PT)	Managed Time (MT)	Significant loss (SL)	Loss (L)	Waste (W)
2017	84 days	60 days	40 days	24 days	4 days	16 days
Totals	83.7 days	59.6 days	40.2 days	24.1 days	3.5 days	15.9 days

Managed time (MT) = Productive time (PT) - Loss (L) - Waste (W)

Deepwater Exploration Cases studies:

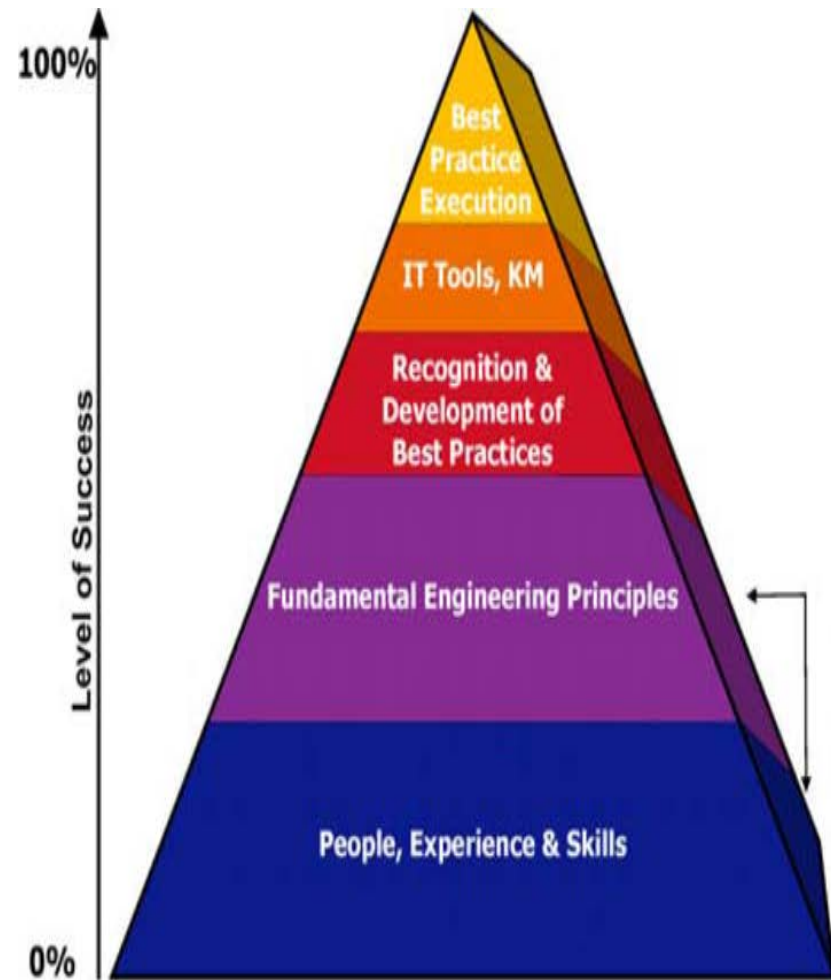
2010 (3), 15 (1) & 2017 (1) well's.

Evident, Loss of control?

1. 2010 wells; 49% loss & waste
2. 2015 well; 48% loss & waste
3. 2017 well; 52% loss & waste



3. Deepwater, *Triangle of success?*



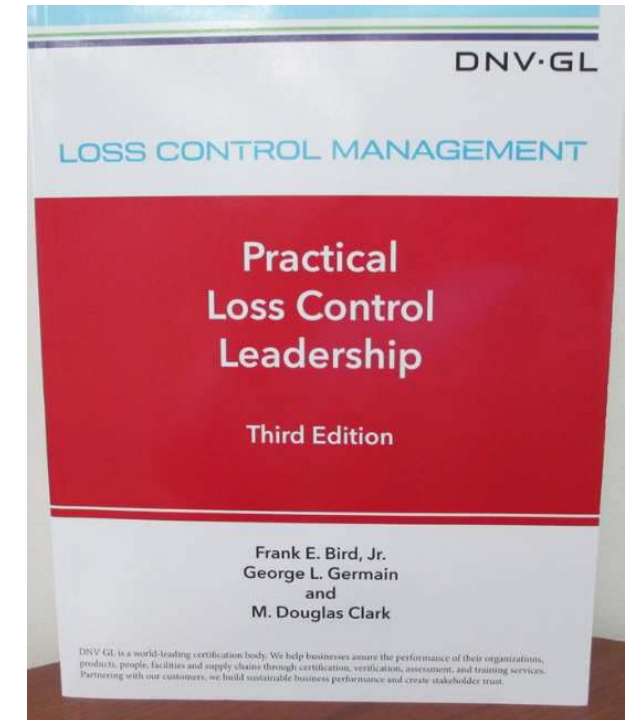
The Triangle of Success

1. Organizational & People change?
Human factors? Intelligence trap? Big crew change?
2. Wider skills set & development training?
3. What else for best practice assurance?

3. *Commendation / Correction*

1. Manage, Measure & Control all Deepwater Loss & Waste – **SEE** the results.
 1. Integrate loss control into existing programs.
 2. Institute Practical Loss Control Leadership
<http://www.dnvglstore.com/product-p/17210696-plclbook.htm>
 3. Learn from **Everything** that goes right or wrong
www.failsafe-network.com

Macondo Findings.... “There is a wide scope to improve to ensure that lessons are learned not just from major accidents but from Every lost time event inclusive of all near-misses and unexpected occurrences”.



Useful References & Sources.

- International loss control institute, Practical loss control leadership Bird/Germain, First Edition, March 1986.
- The property damage accident, the neglected part of safety, Bird/Germain 1997.
- Aird, P. Stene, F. “Frontier deepwater exploration in the Norwegian Sea” , SPE57749, 2000 SPE/IADC drilling conference, New Orleans.
- DNV-GL, Loss control management ‘Practical loss control leadership, third edition. Bird/Germain/Clark, 2015. <http://www.dnvglstore.com/product-p/17210696-plclbook.htm>
- IADC/SPE-178850-MS, True Lies: Measuring Drilling and Completion Efficiency. John De Wardt, Peter Rushmore, Phillip Scott. 2017
- Latent cause analysis, failsafe-network, 2018. www.failsafe-network.com

