

KBC TURNAROUND OPTIMISATION PROGRAM



+250

**SUCCESSFUL
TURNAROUNDS
WORLDWIDE**

Turnarounds typically represent the largest contributor to lost availability. They must be well prepared for in order to minimize losses and mitigate the risks associated with turnaround overruns. It's a sad statistic that some 85% of turnarounds fail to meet stated success criteria, often resulting in significant and avoidable business losses.

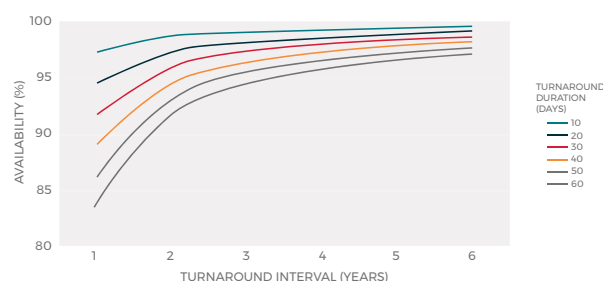


Figure 1: Availability loss due to turnarounds by duration & interval

KBC Turnaround Optimisation Program

The KBC Turnaround Optimisation Program™ (TOP) enables oil and gas organizations to apply global turnaround best practices – strategic planning, scope definition, optimal planning, scheduling, contracting and execution - to achieve maximum benefits through reduction in cost, duration and unpredictability, without compromising on safety and quality.

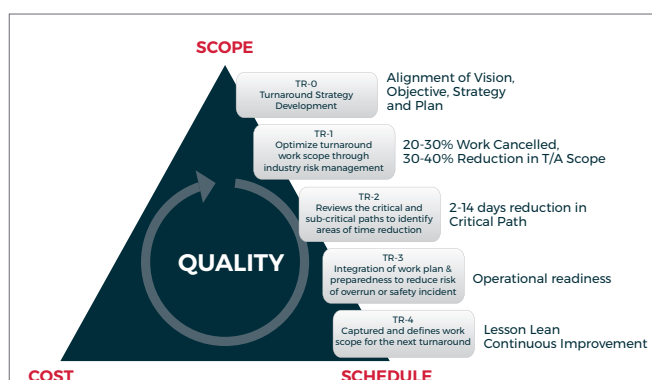


Figure 2: KBC TOP Model: Holistic approach (optimize budget + maximize benefits)

Turnaround Reviews

Our Turnaround Review (TR) workshops optimize turnarounds with global best practice delivered by multi-functional experts.

Our workshops are led by highly experienced subject matter experts with backgrounds in maintenance, reliability, inspection, process engineering and operations with an average of over 20 years' experience within the energy and chemical industry. Our subject matter experts work collaboratively with a cross-functional client team.

The KBC TR workshops can be customized and focused according to the individual requirements of the client and the turnarounds.

OVERVIEW	SCOPE	COST	SCHEDULE	PREPAREDNESS	LATEST IDEAL TIMING
Strategic Review TRO	●	●	●		Run Cycle (2)
Workscope Review TR1	●	●			-12 Months
Executive Review TR2	●	●	●		-6 Months
Preparedness Review TR3				●	-3 Months
Execution TRE	●	●	●		SDM
Close Out Review TR4	●	●	●	●	+1 Month

Figure 3: KBC TOP turnaround review timings

TR-0 Review strategy (gap analysis for full potential realization)

- Top down / bottom up cross functional diagnostic by KBC subject matter experts.
- Create optimum turnaround run length based on identification and mitigation of run length constraints, analysis of market drivers and optimum turnaround efficiency with comparison to global benchmarks.
- Enable clients to develop a bankable master turnaround schedule for the next two run lengths.

TR-1 Risk based work scope optimization (typical 30% - 40% scope reduction)

- Right work scope through risk-based optimization and consistent risk management.
- Identify and mitigate undiscovered emergent work risks.
- Cross functional review to ensure full buy in from all stakeholders.

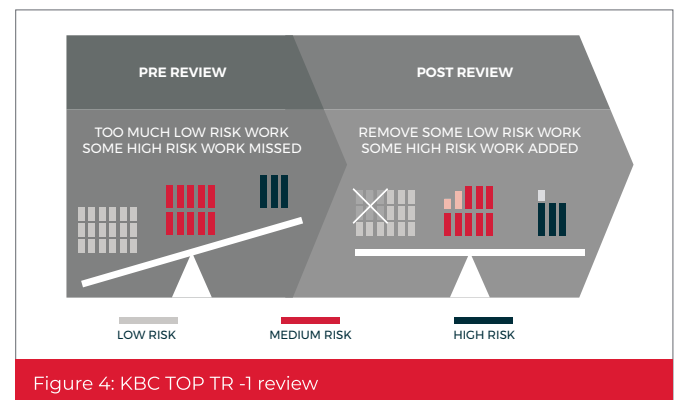


Figure 4: KBC TOP TR -1 review

TR-2 Turnaround schedule optimization (typical 2 - 14 days duration reduction)

- Ensure optimization of fully integrated plan from normal operation to normal operation including shutdown/start-up, main mechanical work and projects.
- Identify and mitigate overrun risks through subcritical path and emergent work risk reviews.



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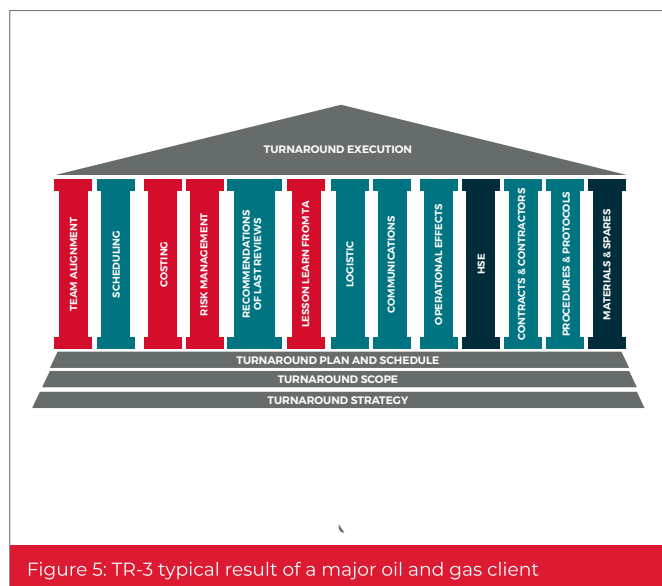


Figure 5: TR-3 typical result of a major oil and gas client

TR-3 Turnaround readiness (risk identification and mitigation)

- Stage gate risk identification for the execution phase of turnaround.
- Involve turnaround contractors for on boarding and alignment.
- Determine mitigation mechanisms to reduce and eliminate threats based on KBC global experience.

TR-4 Lessons learnt (continuous improvement)

- Independent and focused turnaround performance review.
- Ensure foundation set up for following turnarounds.
- Develop a turnaround improvement action plan as part of the ongoing improvements or as input to a full Operational Excellence transformation.



Figure 6: KBC Operational Excellence Management System

KBC TOP with operational excellence

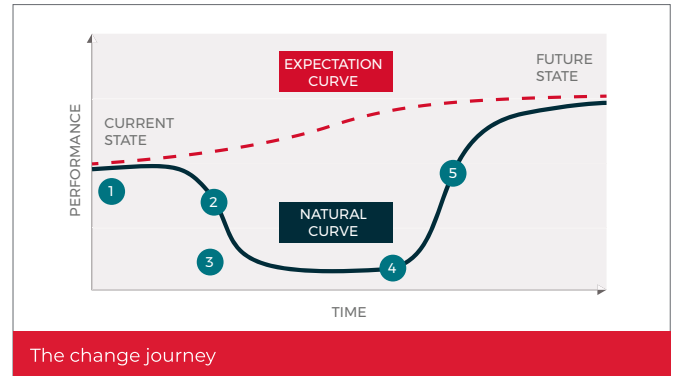
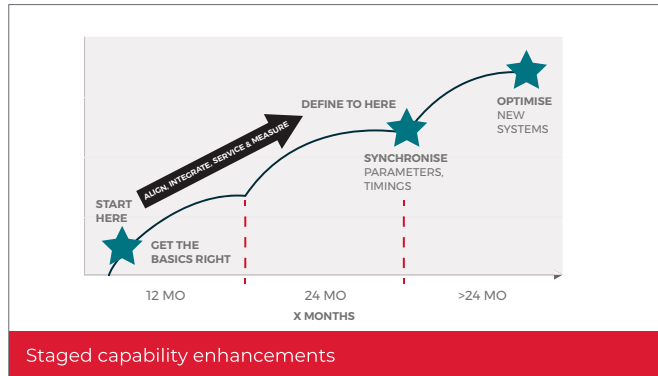
Through KBC's experience of working with clients all around the world we realize that targeting improvements in turnarounds without following a structured approach and without improving 'organizational DNA' can provide immediate quantifiable financial benefits, but often does not result in long term sustainable financial gains. On a site level this lost opportunity is often in the range of tens of millions of dollars.

KBC TOP delivers immediate targeted financial gains that can be used as a basis for a wider integrated reliability, availability and maintenance project delivered through the KBC OpX[®] model to achieve overall operational excellence.



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Figure 7: KBC TOP journey through OpX



Advantages of TOP with OpX

- Aligning operational excellence themes to management business plans according to market demands
- Achievement of world-class performance through the alignment of people, systems, and tools
- Accomplished through the application of best practices in a practical, aligned manner
- Delivers baseline performance and enables long-term strategic goals
- Ensures long, sustainable results and the opportunity to be industry leaders



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Why KBC

KBC, a wholly-owned subsidiary of Yokogawa Electric Corporation, is all about excellence in the Energy and Chemical Industry. Living excellence in all we create and in all the services we deliver, and leaving a sustainable legacy of operational excellence among our customers.

We make excellence real for our customers through the actions of our people fused with our technology and best practices. We provide leading software and expert services, powered by the cloud, to assure process operations achieve their full potential.

- Simulation, optimization, scheduling and production accounting software
- Strategic and technical consulting services
- Operational technology and IT services
- Data and applications as cloud services
- Advanced automation technologies

Our customers achieve operating performance that surpasses ordinary standards, now and into the future.

We deliver superior results, sustained.