



煉油石化工業製程安全及設備完整性評估服務

Process Safety and Mechanical Integrity Assessment Services for the Refining and Petrochemical Industry

控制風險，邁向安全及永續發展

Control risk, forward safety and sustainable development

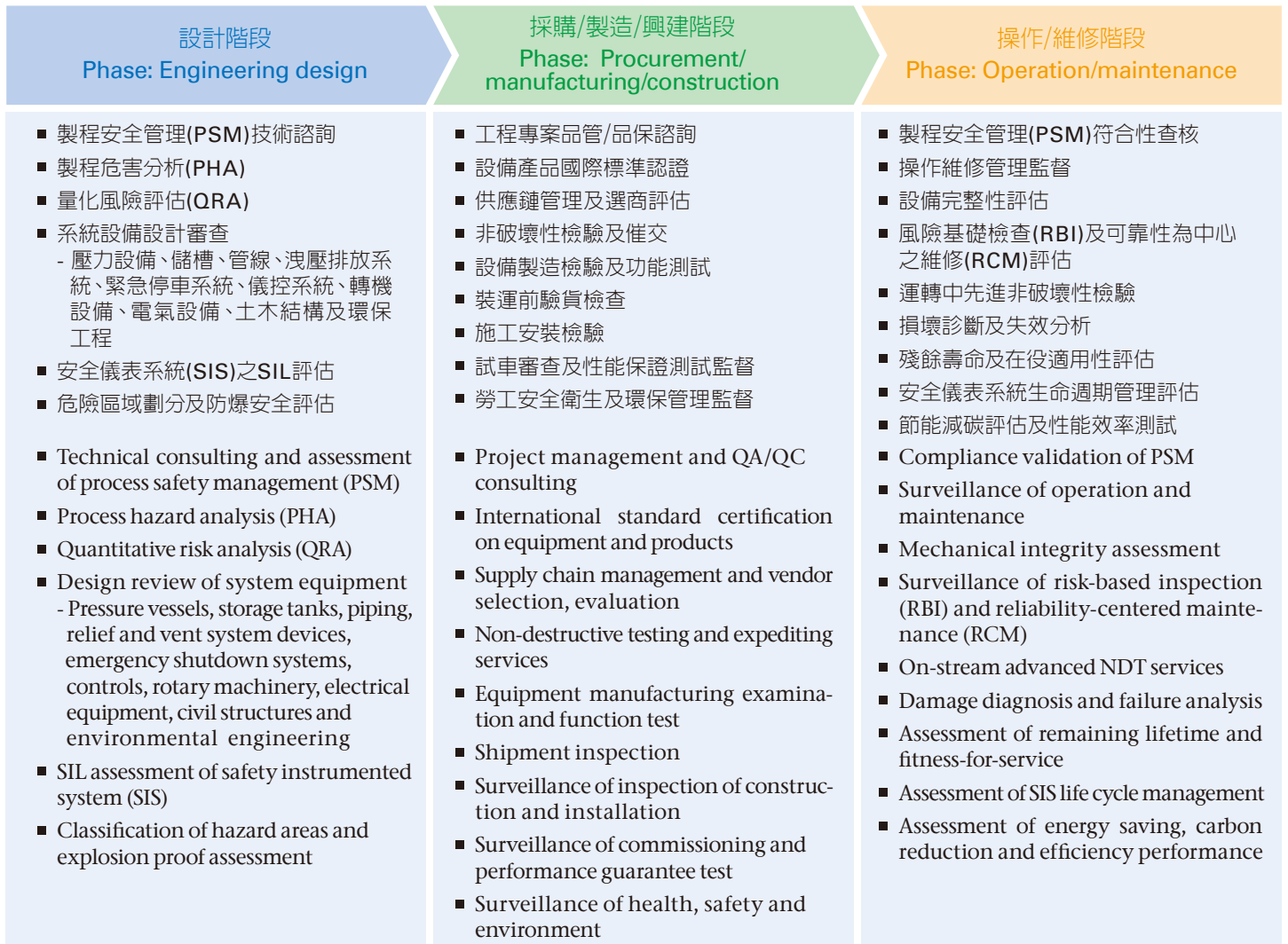


TÜV德國萊因為全球權威驗證機構，在煉油石化工業領域提供完整生命週期的供應鏈檢驗與安全驗證服務。並以製程安全管理系統為架構，深入製程危害分析、量化風險評估、設備完整性、安全儀表系統之安全完整性、損壞診斷及失效分析、防爆安全等技術評估，以確保全廠設備系統之可靠性及安全性。

TÜV Rheinland is a global authoritative Notified Body that provides complete life cycle supply chain inspection and safety verification services for the refining and petrochemical industry. Under the process safety management system structure, we conduct process hazard analysis, in-depth quantitative risk assessment, mechanical integrity checks, safety integrity checks of safety instrumented system, damage diagnosis and failure analysis and explosion-proof safety assessment. With our services, the reliability and safety of all your plant equipment and systems can be ensured.

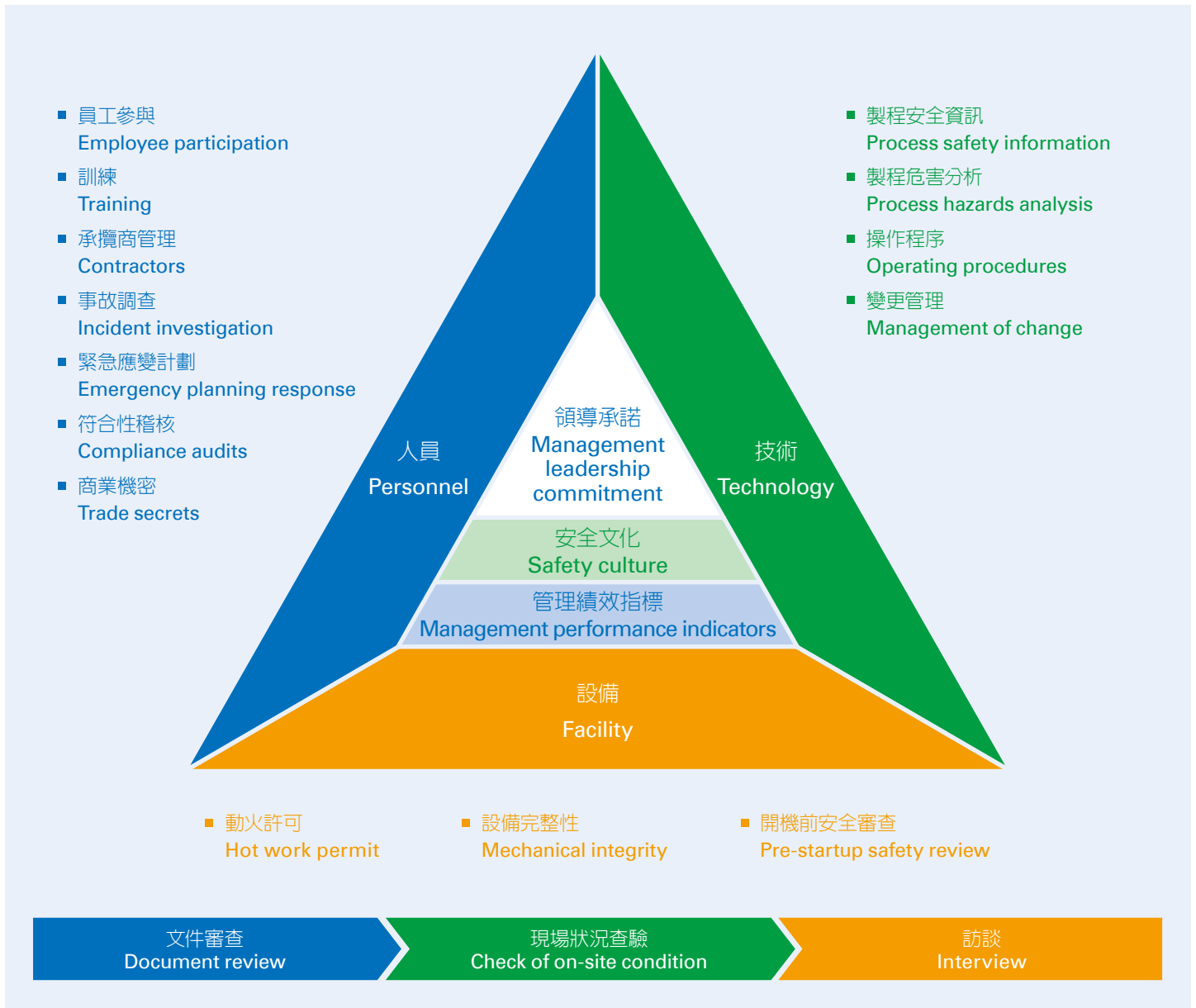
全方位安全完整性解決方案

Total solution of safety integrity



製程安全管理系統評估

Assessment of process safety management system



TÜV德國萊因豐富的製程安全管理驗證經驗
具備優質的務實特色：

- 14個單元的完整技術諮詢
- 3個階段的專業輔導流程
- 3種方法的符合性查核
- 超過200項的實務查核要點
- 機動的駐廠落實度驗證
- 精準地鑑別出符合程度及改善潛力
- 持續的風險改善計畫及安全追蹤機制
- 量化的管理績效指標

TÜV Rheinland has extensive experience in the high-quality, pragmatic validation of process safety management with the following features:

- Comprehensive consultation on 14 elements of PSM
- Three phase professional consultation process
- Three categories of approach to verification audit
- More than 200 practical audit items
- Flexible on-site verification for degree of implementation
- Precise identification of compliance gaps and improvement potential
- Continuous risk improvement plan and safety tracing mechanism
- Quantitative indicators of management performance

製程風險及設備完整性評估

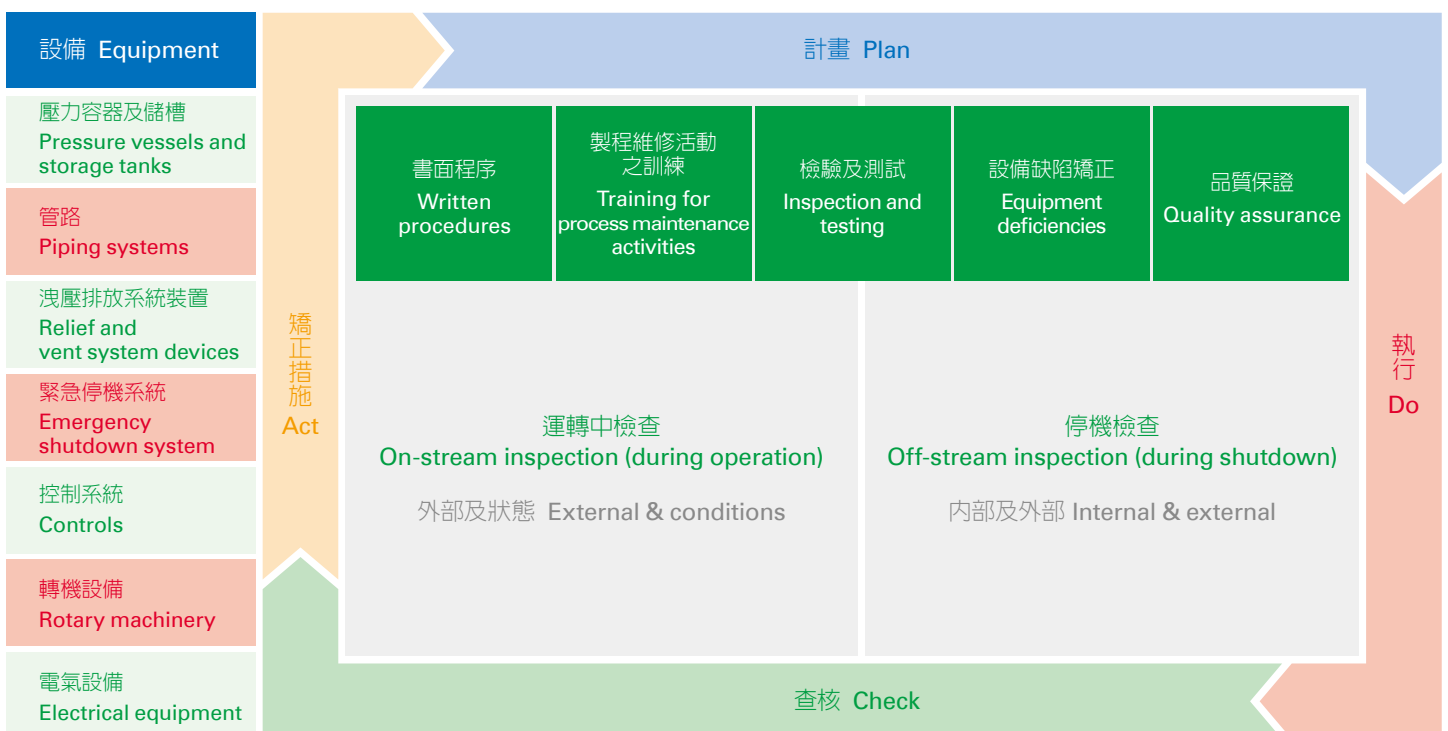
Assessment of process risk and mechanical integrity

延續數百年的工廠安全檢驗經驗，TÜV德國萊因團隊持續為在役石化廠安全把關，主要技術策略專注於：

- 以風險管理基礎，運用量化風險分析(QRA)、危害與可操作分析(HazOp)、故障樹分析(FTA)、失誤模式與影響分析(FMEA)、保護層分析(LOPA)等方法
- 以防漏、防爆及失效防制之安全策略為起點，擴大為七大關鍵系統進行設備完整性評估
- 壓力設備、儲槽及管線系統以損害機制原理進行腐蝕環路分析，並支援工廠RBI軟體工具選用諮詢
- 運用API在役檢查標準(API 510/570/653/581等)鑑別設備風險等級，並訂定合理有效的檢驗計畫、檢測方法、檢測報告及修理改善策略
- 分析損壞機制及腐蝕趨勢，確保診斷機制有效循環
- 兼顧運轉中檢查及停機檢查，預知掌握非計畫性停機的潛在因素
- 以可靠性為中心的維修(RCM)技術，檢視轉機設備及電氣設備之失效趨勢管理及系統可靠性

With more than a century of experience in plant safety inspection, the TÜV Rheinland team safeguards in-service petrochemical plants. Our strategic focuses are as follows:

- With risk-based management, we adopt the approaches of quantitative risk assessment, hazard and operability study, failure mode and effect analysis, fault tree analysis, layers of protection analysis, etc.
- Starting with a safety strategy of ensuring that your plant is leak-proof, explosion-proof and subject to failure prevention and control, we extend that to seven key systems for assessing mechanical integrity
- Based on damage mechanisms, we conduct corrosion loop analysis for pressure equipment, storage tanks and piping systems. Furthermore, we provide assistance and consultation on RBI software tool selection
- We adopt API in-service inspection codes (API 510/570/653/581, etc.) to identify equipment risk classes. We also formulate reasonable and effective inspection plans, inspection methods, inspection reports and repair strategies
- We analyse damage mechanisms and corrosion trends to ensure an effective diagnosis mechanism cycle
- Taking into account both on-stream and off-stream inspections, we allow you to predict and control the potential factors of unplanned system shutdowns
- Based on reliability-centered maintenance (RCM), you will be able to monitor failure trends and system reliability for rotary machinery and electrical equipment



建構安全自動控制系統的可靠防線

Build a reliable defense with safety instrument and control systems

在自動控制安全系統及組件的功能安全驗證市場上，TÜV德國萊因領航全球技術，並亦依據 IEC 61508 及 IEC 61511標準要求，協助煉油石化廠建構安全儀表系統(SIS)安全生命週期管理系統，從危害風險評估、保護層配置、開立技術規範、設計與製造、安裝試車、操作維護、變更管理到除役停用、驗證、功能安全管理、評估與稽核等11個階段，導入具體的失效預防及控制做法，使安全儀表系統達到要求的安全完整性等級(SIL)。TÜV德國萊因迄今已訓練全球菁英技術人員取得超過六千張FS Engineer (TÜV Rheinland)工程師證書，協助工廠掌握營運風險及控制故障之專業能力。

In the functional safety certification of automation safety systems and components, TÜV Rheinland is a global leader. Also in accordance with the requirements of the IEC 61508 and IEC 61511 standards, we assist petrochemical plants to build SISs through a safety lifecycle management system that covers 11 stages, including hazard risk assessment, the allocation of safety functions to protection layers, design and engineering, installation, commissioning and validation, operation and maintenance, modification, decommissioning, verification, management, assessment and auditing. We introduce specific failure prevention and control practices to achieve the required safety integrity level (SIL) of SIS. TÜV Rheinland has trained and issued more than 6,000 FS Engineer (TÜV Rheinland) globally. We help plants to master operational risk and the professional ability to control failure.



德國萊因，值得您信賴的合作夥伴

TÜV Rheinland, your reliable partner

- 系統化鑒別出工廠製程安全管理系統之符合性及改善潛力
- 減降潛在風險並提升設備完整性之有效性、落實度與完善度
- 工安達到國際水準並與全球石化廠安全管理技術接軌
- 打造安全保證及公信標準制度，建立石化企業之專業形象與信譽
- 維繫正常安全生產作業，穩定石化工業市場供料需求及活絡經濟
- Systematically identify the degree of compliance and level of improvement in the plant's PSM system
- Mitigate potential risk and raise the effectiveness, fulfillment and completeness of mechanical integrity
- Meet international standards of petrochemical plant safety management
- Build safety guarantee and credibility. Establish professional corporate image and prestige
- Support the operation of safety process and stabilise the market supply of petrochemical products



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