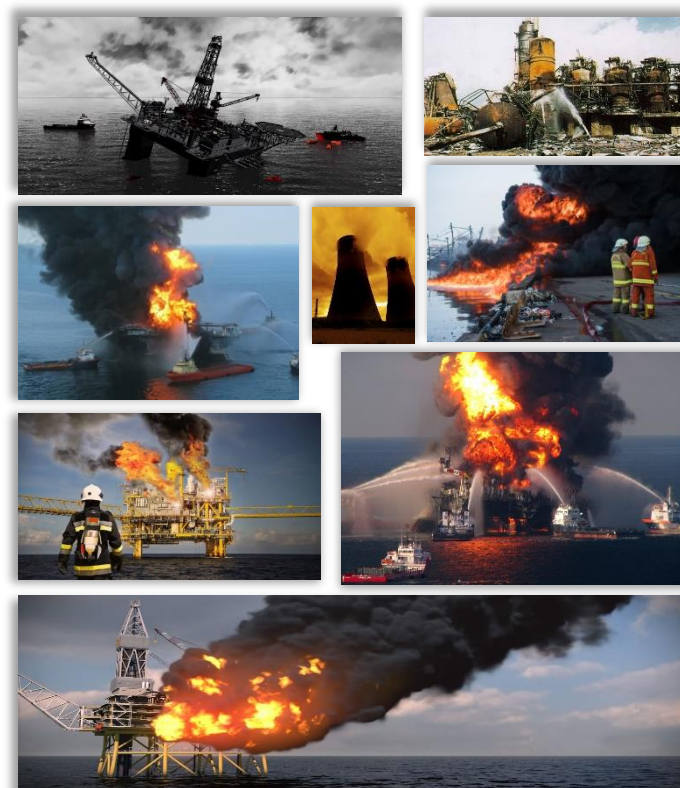


Major Accident Hazard (MAH) Category

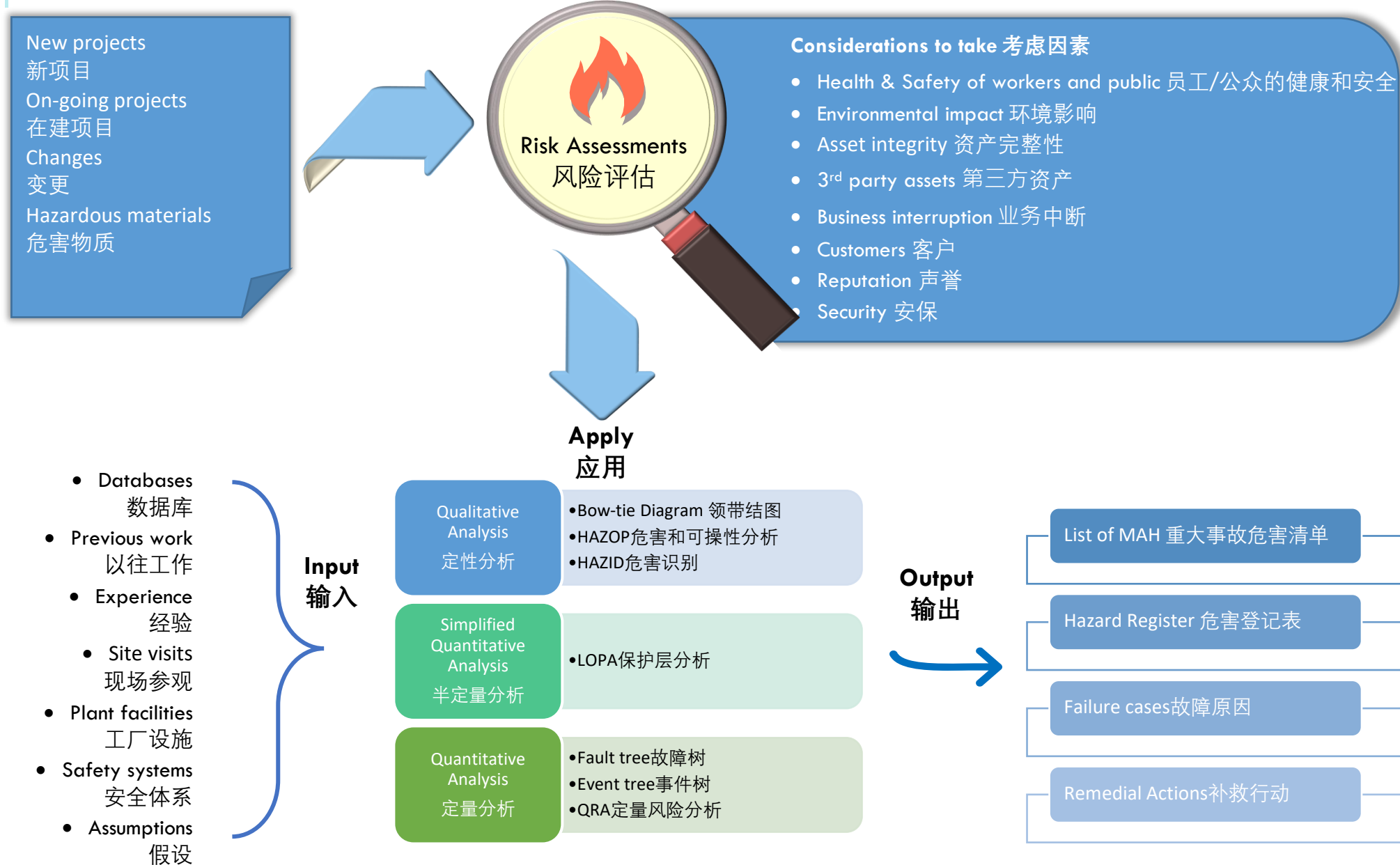
重大事故危害类别

- Loss of Containment (Process Units)
泄漏（工艺装置）
- Loss of Containment (Storage Tanks)
泄漏（储罐）
- Uncontrolled Combustion
失控燃烧
- Dropped Objects
坠物
- Boat/ Ship Collision to SPM, East, West Jetties
SPM、东西码头与船只发生碰撞
- Unauthorised Personnel Intrusion into HYBN
未经授权的人员入侵 HYBN
- Structural Collapse
结构性坍塌
- Personnel Transfer Accidents
人员转运事故
- Chemical Spillage /External Fires
化学品泄漏/外部火灾
- Indoor Building Fires
室内建筑火灾
- Occupational Accidents
职业伤害
- Personnel screened positive of contagious disease
传染病阳性人员



Risk Assessments

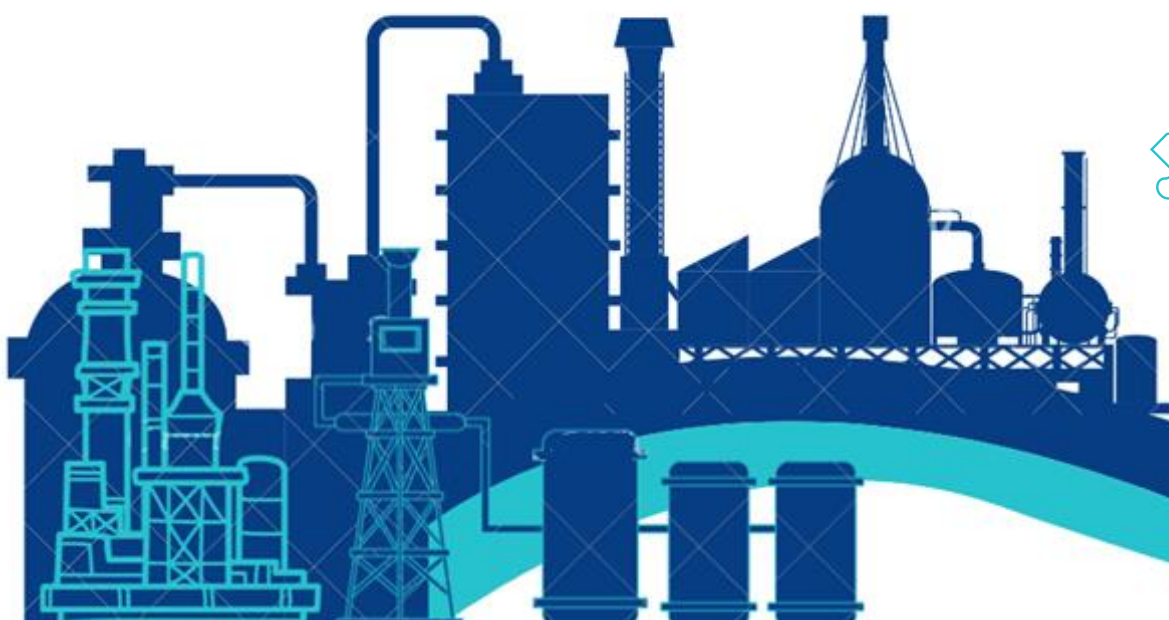
风险评估



10 Seconds Thought

十秒思考

Have you conducted a risk assessment of your position/workplace?
您有对您所在的岗位/工作场所进行风险评估吗？



Effects from changes may take years to appear!

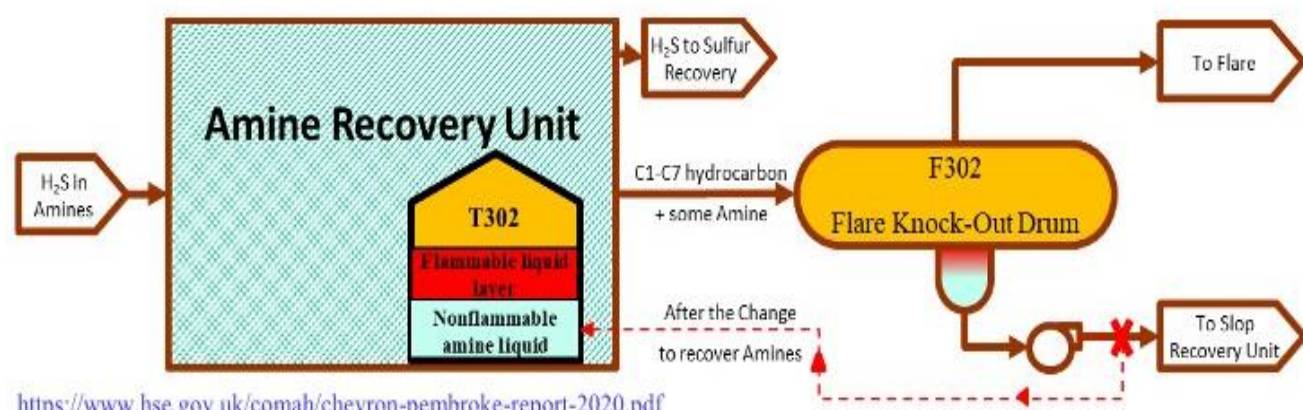


Fig 1. Original Flows. Some Amine lost to Slop Unit

On June 2, 2011, a tank exploded at a refinery in the United Kingdom (UK) which killed four contractor employees and seriously injured another. The force of the explosion blew the five-ton steel tank roof over 55 meters (180 ft.) and narrowly missed striking a pressurized sphere of highly flammable butane. The cause of the explosion was ignition of a flammable atmosphere within the tank. The probable ignition source was static electricity.

More than 10 years before the incident, the facility changed the Amine Recovery Unit (ARU). To recover and reuse amine contained in a waste hydrocarbon stream (slop) from the Flare Knockout Drum were rerouted back to Tank 302 in the ARU rather than to the slop system that was designed to safely dispose of the waste stream. The facility had not documented this practice. This change resulted in accumulation of flammable liquid hydrocarbons on top of the amine liquid in T302. Some operators were aware of this hazard because they periodically drained the flammable liquid from tank 302.

The tank was being cleaned in preparation for maintenance. Neither the details of the tank drain system, nor instructions for proper draining of the hydrocarbons were used when preparing the tank. A vacuum truck removing liquids through a manway at the top of Tank 302 when the explosion occurred. A non-conductive hose was connected to the vacuum truck which caused a static charge, the probable ignition source. The permit issued for the cleaning work did not include the presence of flammable liquids.

Did You Know?

- Management of Change (MOC) is included in all Process Safety regulations.
- Many of the biggest incidents in our industry have happened because a change had unintended effects on the process.
- Changes of all types - equipment, chemicals, technology as well as operating and maintenance procedures - require review and approval.

What Can You Do?

- Watch for changes to process flow routing and other conditions (pressure, temperature, composition, etc.) that might not get recorded either on drawings or in the procedures.
- Be alert to the impact of incremental changes. The effects of an unmanaged changes can be subtle and go unnoticed for a long time - even years.
- Follow your procedures for changes. Some companies have different systems to manage various types of changes.
- A procedure may be updated following a change. Read the procedure carefully and do not proceed until you understand how to do the task safely.

Any change to a process needs to be managed.

变更的影响可能数年后才显现

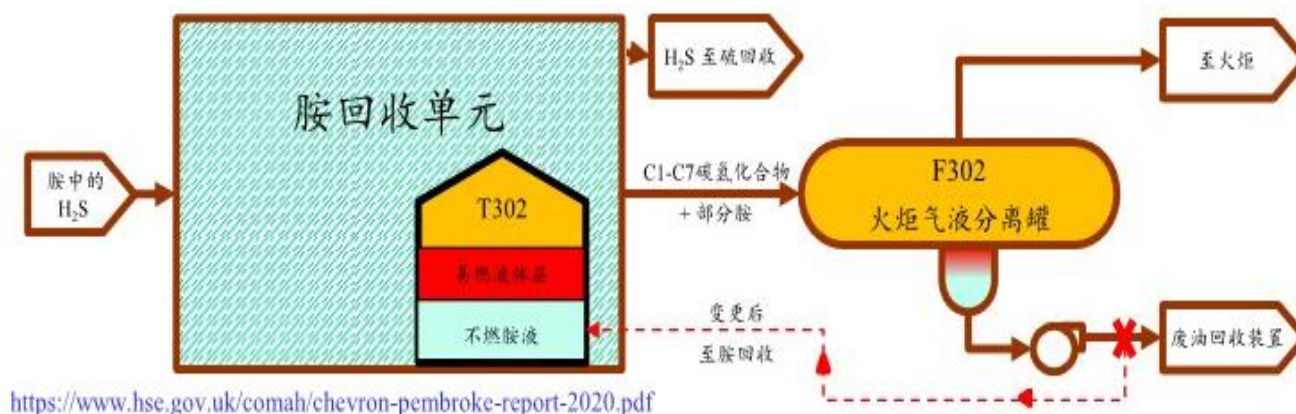


图1. 原始流向 部分胺进入废油回收装置

2011年6月2日，英国某炼油厂的一个贮罐发生爆炸，造成4名承包商人员死亡，另有1人重伤。爆炸将重达5吨的钢制罐顶掀飞到55米开外（180英尺）的地方，差点砸到了高度易燃的带压的丁烷球罐。爆炸的原因是罐内的易燃气体被点燃，而点火源可能是由静电引起的。

此次事故发生的10多年前，工厂对胺回收单元（ARU）进行过改造，以回收和再利用来自火炬气液分离罐的碳氢化合物废液中的胺，流体被改道返回ARU中的T302贮罐，而未流入到原设计用于安全处理废油的回收装置。该工厂并没有记录这次改动，而这种变更会导致易燃的液态碳氢化合物积聚在T302贮罐中的胺液顶部。部分操作人员明白存在这一危险，他们定期地要从T302贮罐排放走这些易燃液体。

事故发生前，由于要为罐体上的维修工作做准备，人们正在清空罐体。在此过程中，既没有使用贮罐排水系统的细节资料，也没有使用正确排放碳氢化合物的指导文件。爆炸发生时，一辆真空贮罐车正通过T302贮罐顶部的人孔，连接了一根非导电型的软管来清除液体，软管产生了静电，很可能这就是点火源。而为此次清空作业签发的许可证上，并没有涉及存在易燃液体的内容。

你知道吗？

- 所有的工艺安全管理规定都包含有变更管理（MOC）的内容。
- 行业中发生过的许多严重事故，都是因为所做的变更对工艺产生了未曾料想的影响。
- 所有类型的变更，有如设备、化学品、技术、操作以及维护规程等，都需要审核和批准。

你能做什么？

- 要注意在工艺介质流向路线和其它条件（压力、温度、成分等）上的变更，这些变更或许不被记录到图纸或规程中。
- 要警惕微小渐进的变更所带来的影响。未受控的变更带来的影响可能很微小，并且在很长一段时间（可能达数年）内都不会被注意到。
- 要遵守你工厂的变更制度，一些公司会通过不同的制度来管理不同类型的变更。
- 规程可能会在变更实施后而更新，请仔细阅读所需的规程，在你尚不清楚如何安全完成作业任务之前，请勿开始操作。

工艺上的任何变更都要受控