

Brief Probe into Safety Production Solutions in Petrochemical Industry

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**Safety Case
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Flammable

Explosive

High
Temperature

High
Pressure

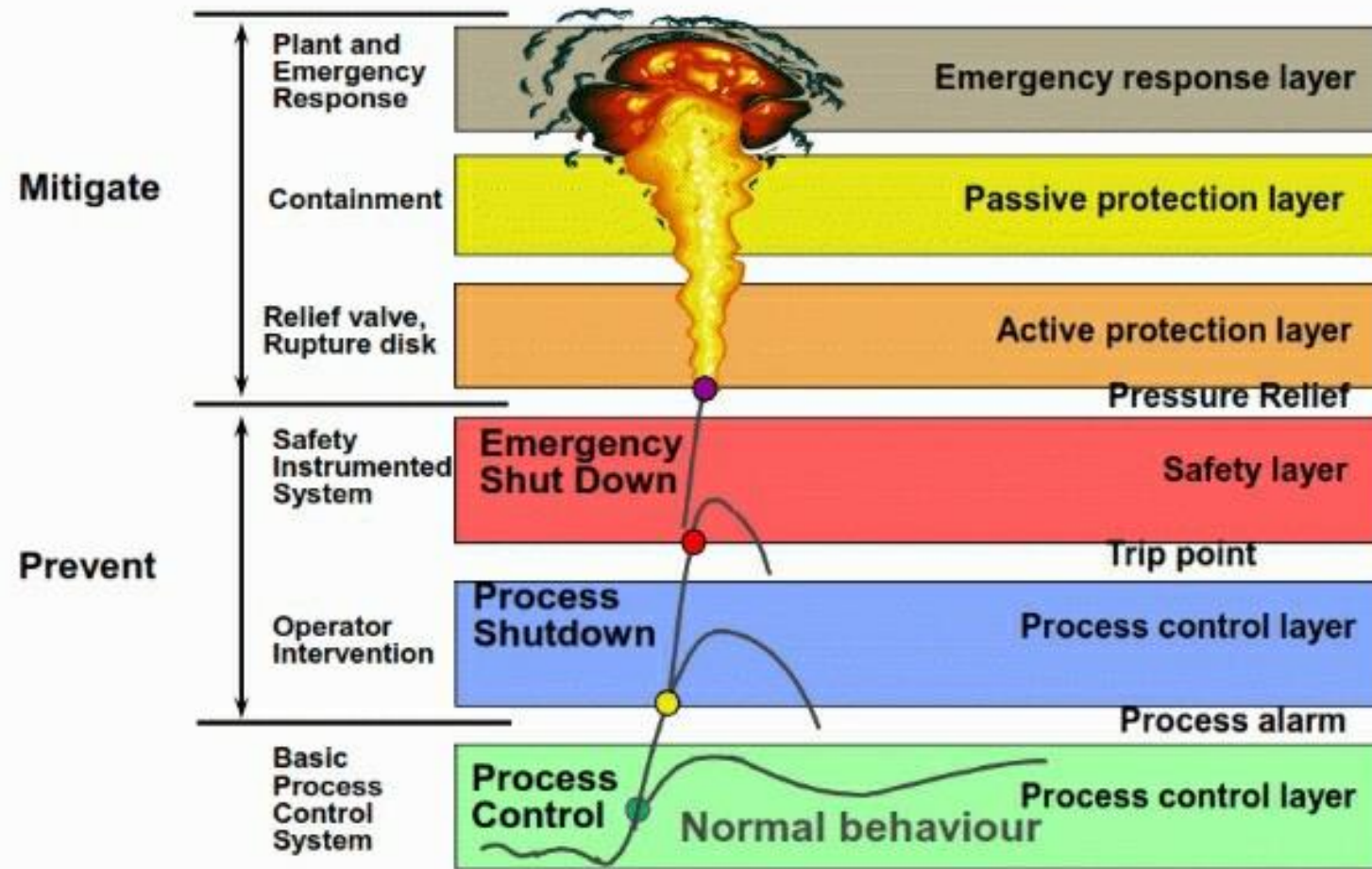


SAFETY

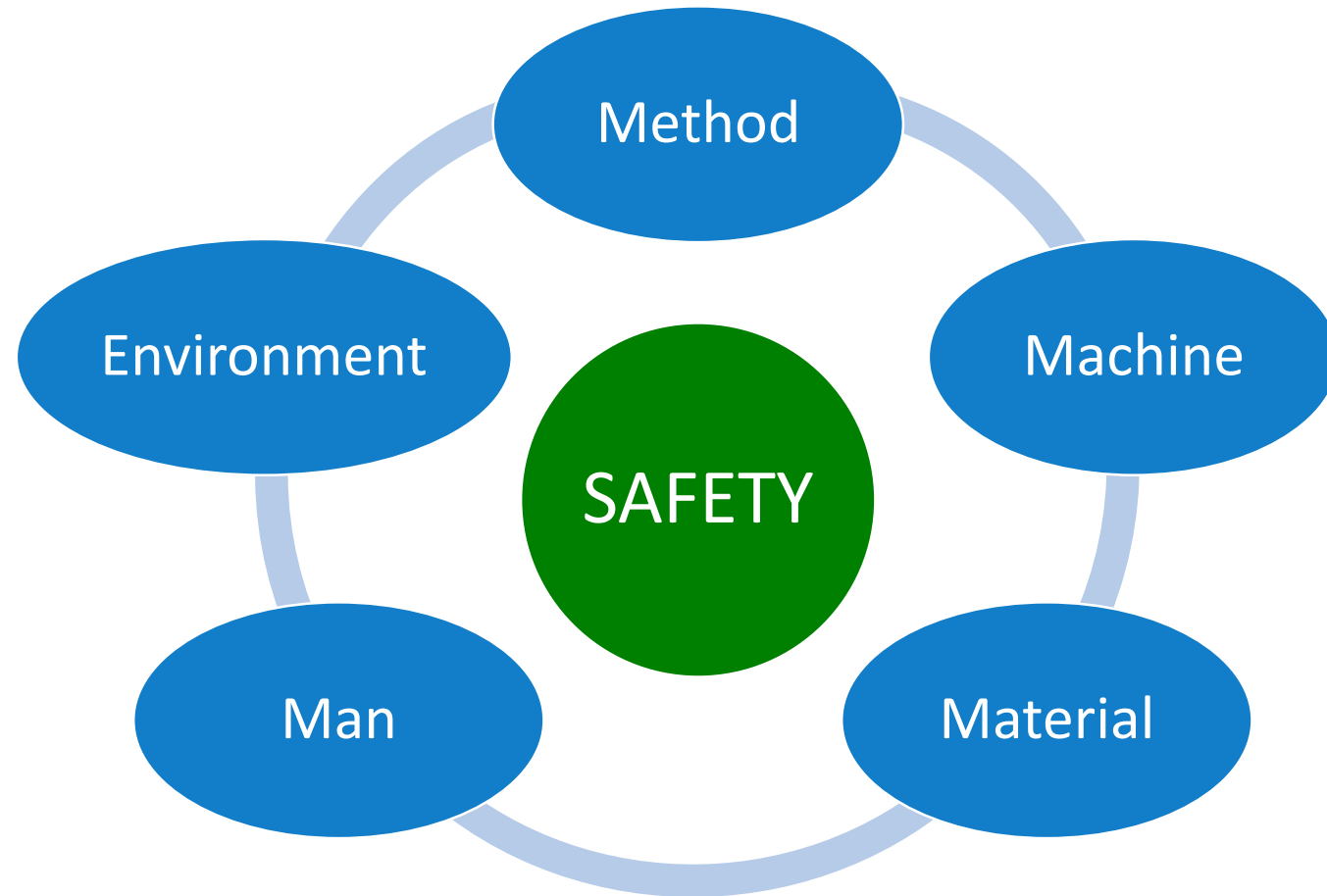


The image is a composite. The top half features a tall, cylindrical industrial distillation column with multiple levels of platforms and ladders, set against a clear blue sky with light, wispy clouds. The bottom half shows a large, complex industrial facility, likely a refinery or chemical plant, with numerous tall distillation columns, a dense network of pipes, and structural steel frameworks. The sky in this section is overcast and grey. A green horizontal band with the word 'SAFETY' in white capital letters separates the two images.

LOPA - Layer of Protection Analysis



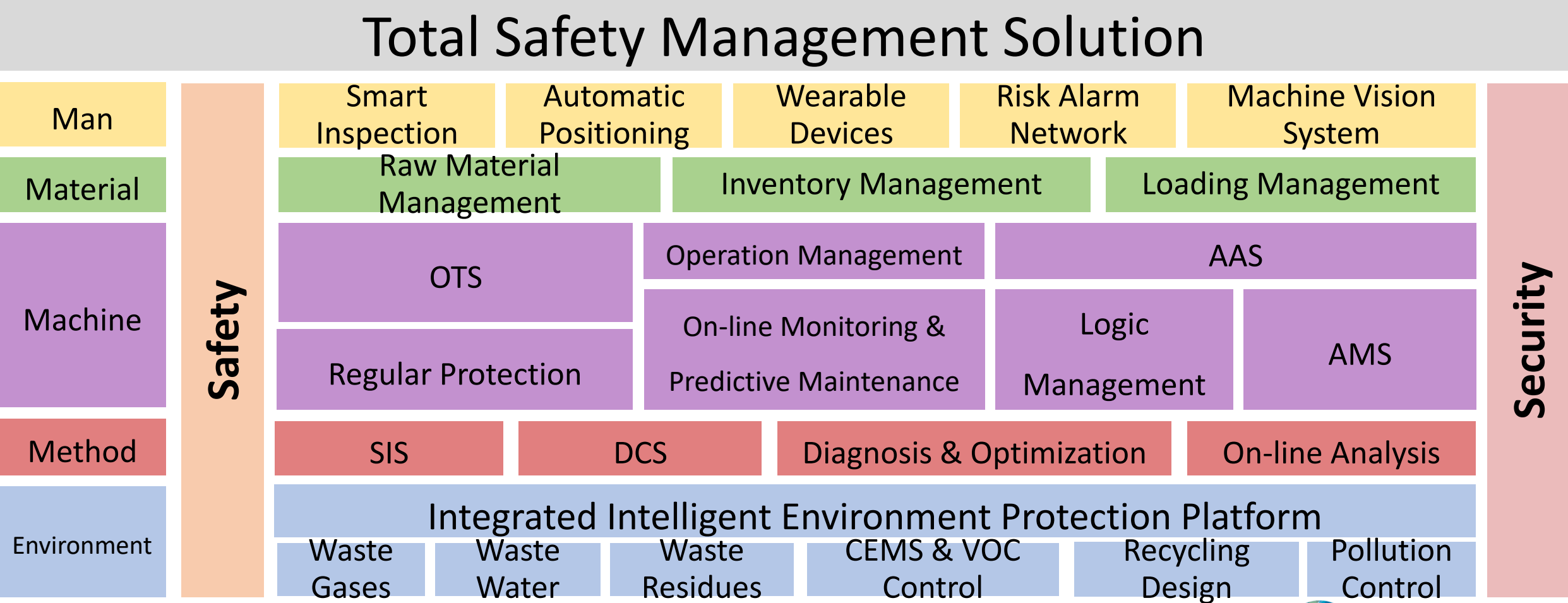
Total Quality Management – 4M1E



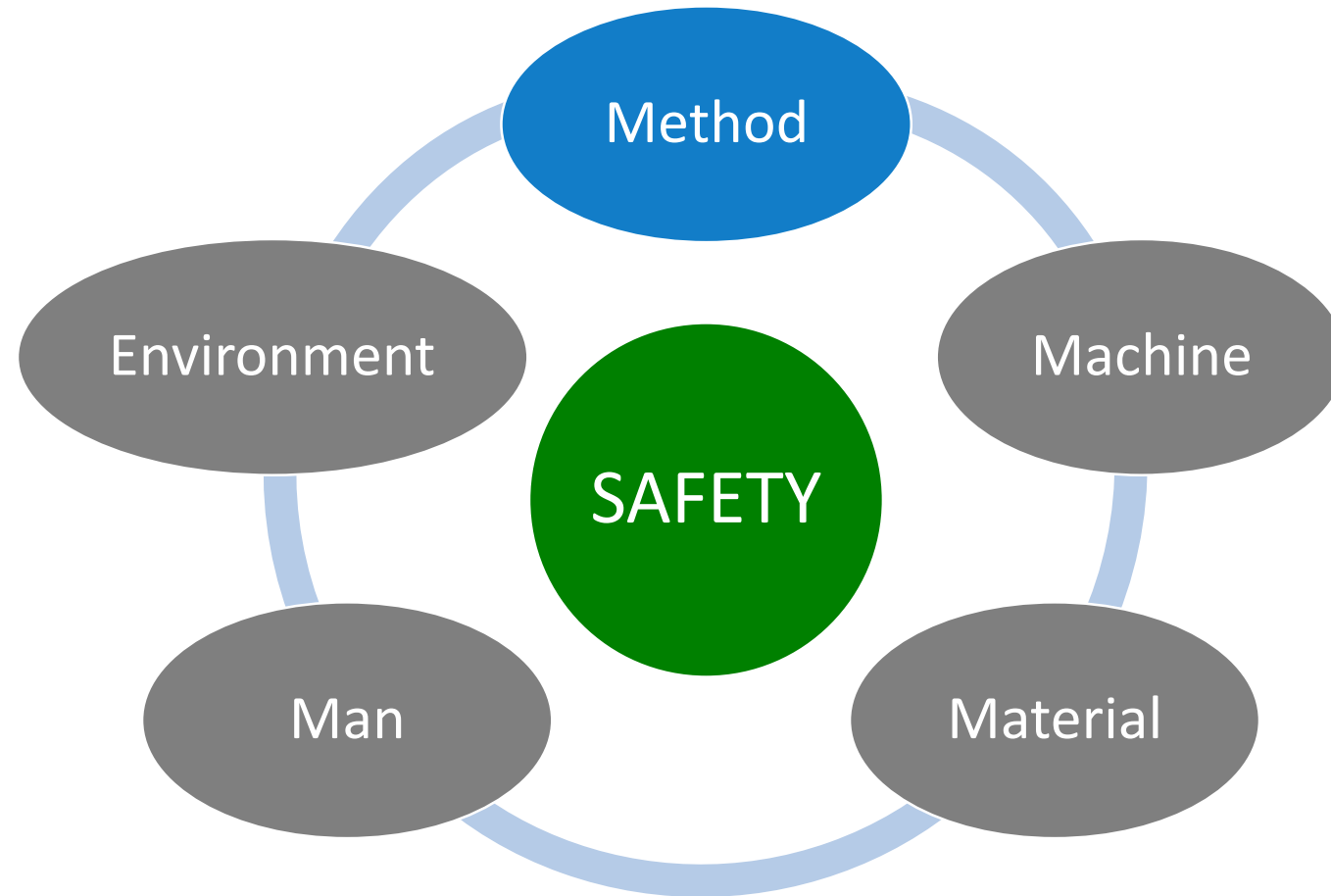
Total Quality Management – 4M1E

Method	Production Process, Different operation conditions, Batch recipes, Abnormal operation data
Machine	Rotating equipment, Static equipment, Wrong feed, Machine faults
Material	Raw materials and final products, Industrial wastewater, waste gases & residues, Special production wastes, Liquid materials, Solid materials
Man	Aloft work, Hot work, Special equipment work, Confined space work, Excavation work, Hazardous resources work
Environment	Environment safety, Government regulations & laws

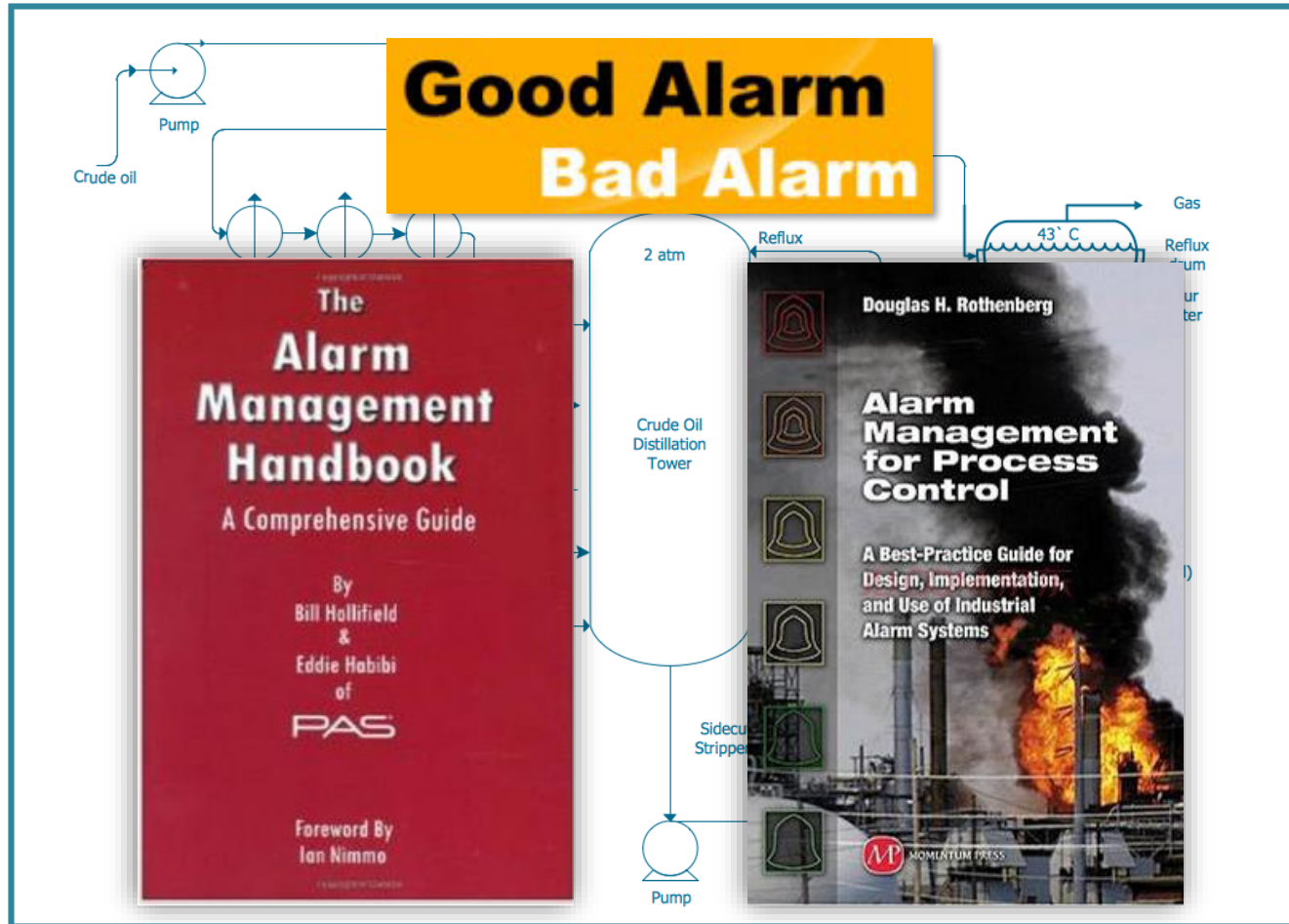
SUPCON Total Safety Management Solution



Total Quality Management – 4M1E



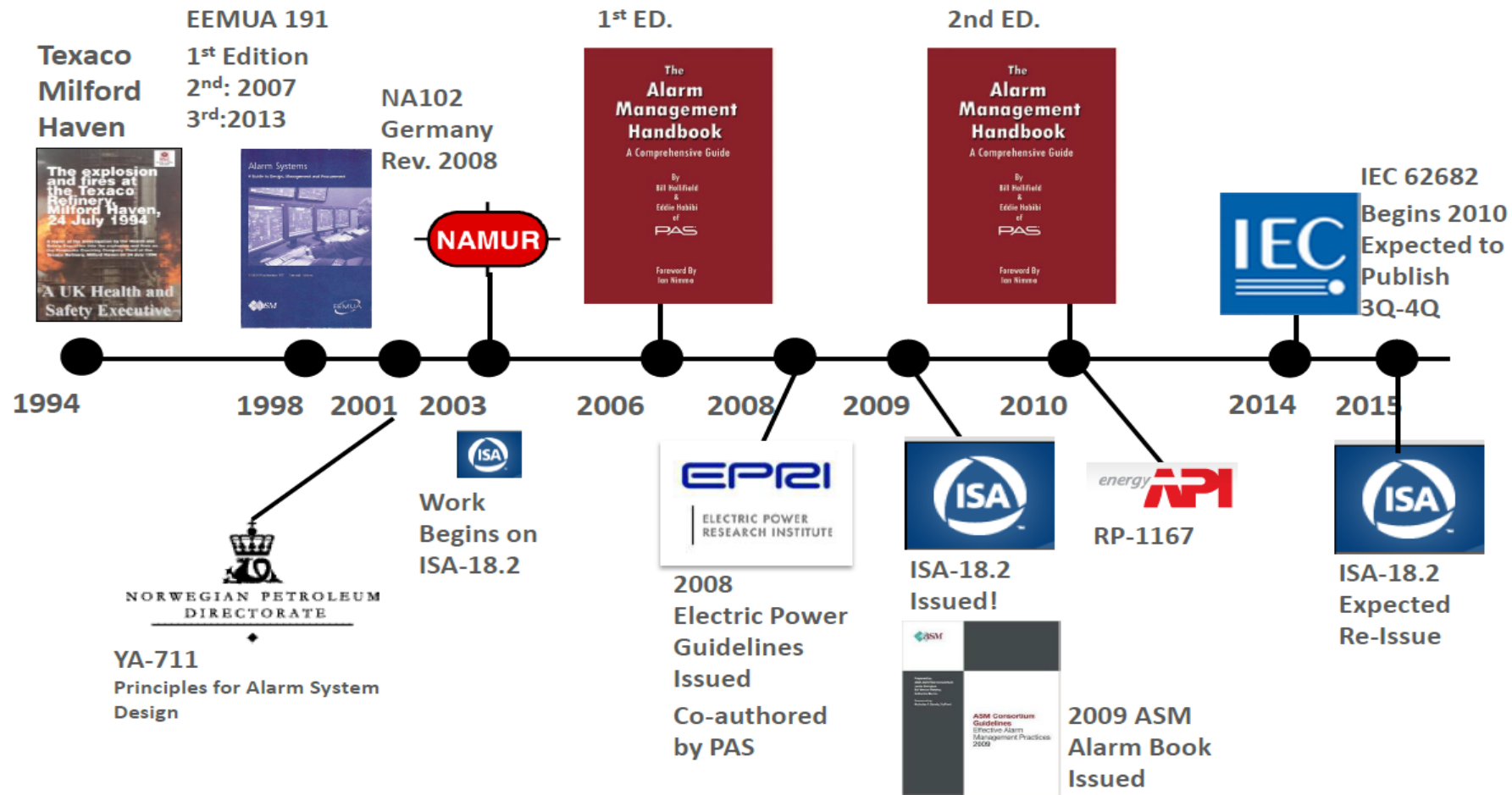
Process Safety - Advanced Alarm Management



■ **ALARM FLOOD**

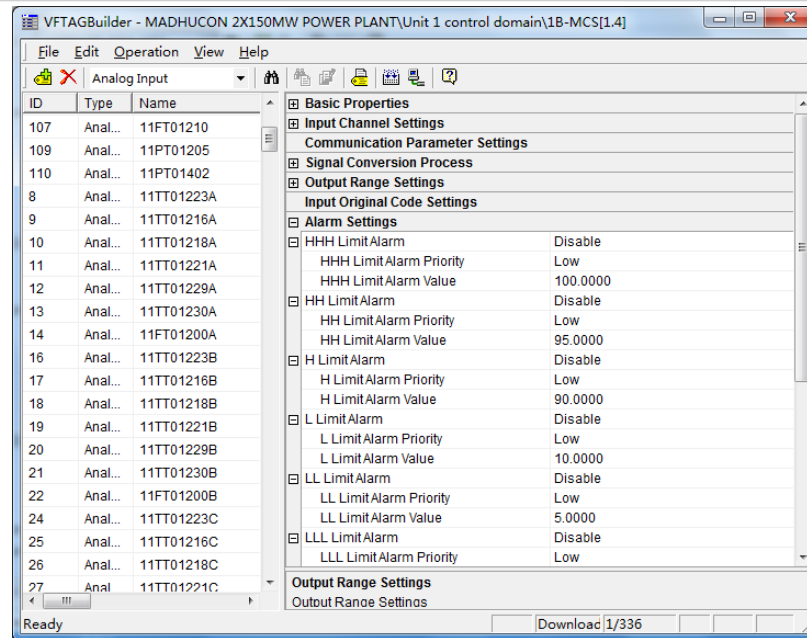
■ **OVERLOADED OPERATORS**

Alarm Management Standards



Flexible Alarm Management Based On Classification

Alarm Pri...	Alarm Icon	Alarm Description	Alarm Color	Alarm Icon Font ...	Data Logging O...	Alarm Shelving	Latch	Re-alarm
0	Nonshape	Log			Yes	Disable	Disable	Disable
1	Rectangle	Low			No	Enable	Enable	Enable
2	Rectangle	Middle			No	Enable	Enable	Enable
3	Rectangle	High			No	Enable	Enable	Enable
4	Rectangle	Urgency			No	Enable	Enable	Enable
5	Rectangle	Safe Related			No	Enable	Enable	Enable



Alarm Shelving

Alarm Shelving

No.	Name	Shelve Cau...	Shelve ...	Default Shel...	Maximum S...	Notify Time	Switch User	Effectiv...	Lowest User ...
1	Plant Maintenance	Plant Maint...	One-shot	60min	24h	5min	Release S...	Single ...	Operator
2	Shutdown	Shut-down ...	One-shot	30min	12h	5min	Hold Shelv...	Single ...	Operator
3	Nuisance	Nuisance A...	Continu...	15min	1h	5min	Release S...	Single ...	Operator
4	Customized	Customized	Continu...	5min	30min	5min	Release S...	Single ...	Operator

Process Alarm

Process(4792) | Shelved(3) | Device State

	Time	Tag	Description	Alar...	Value	Device Name
3	2016-01-18 16:29:52.057	11TE02V332A	VFC WORKING OIL COOLER OILHH		99.334	
3	2016-01-18 16:29:52.057	11TE02R907A	REHEAT STEAM FROM BOILER LL		-12.331	
3	2016-01-18 16:29:52.057	11DEA02LT100	DEAERATOR LEVEL-1		17.304	
3	2016-01-18 16:29:52.057	11DEA02LT100A	DEAERATOR LEVEL-1			
3	2016-01-18 16:29:51.043	11TE02M902	MAIN STEAM FROM BOILER HH			
3	2016-01-18 16:29:51.043	11V02VT_410B	TURBINE NO.3 SHAFT VIBRATION LL			
3	2016-01-18 16:29:50.029	11V02VT_410A	TURBINE NO.3 SHAFT VIBRATION HH			
3	2016-01-18 16:29:50.029	11V02VT_409B	TURBINE NO.2 SHAFT VIBRATION LL			
3	2016-01-18 16:29:49.015	11TE02V292A	VFC LUBE OIL COOLER OIL OUTHH			
3	2016-01-18 16:29:49.015	11TE02R907	REHEAT STEAM FROM BOILER LL			
3	2016-01-18 16:29:49.015	11PT02M922	MAIN STEAM FROM BOILER HH			
3	2016-01-18 16:29:46.987	11V02VT_409A	TURBINE NO.4 SHAFT VIBRATION LL			
3	2016-01-18 16:29:46.987	11V02VT_408B	TURBINE NO.3 SHAFT VIBRATION LL		0.091	
3	2016-01-18 16:29:45.973	11TE02V272A	VFC LUBE OIL COOLER OIL OUTHH		354.220	
3	2016-01-18 16:29:45.973	11PT02M923	MAIN STEAM FROM BOILER HH		126.914	

Alarm Amount:4793

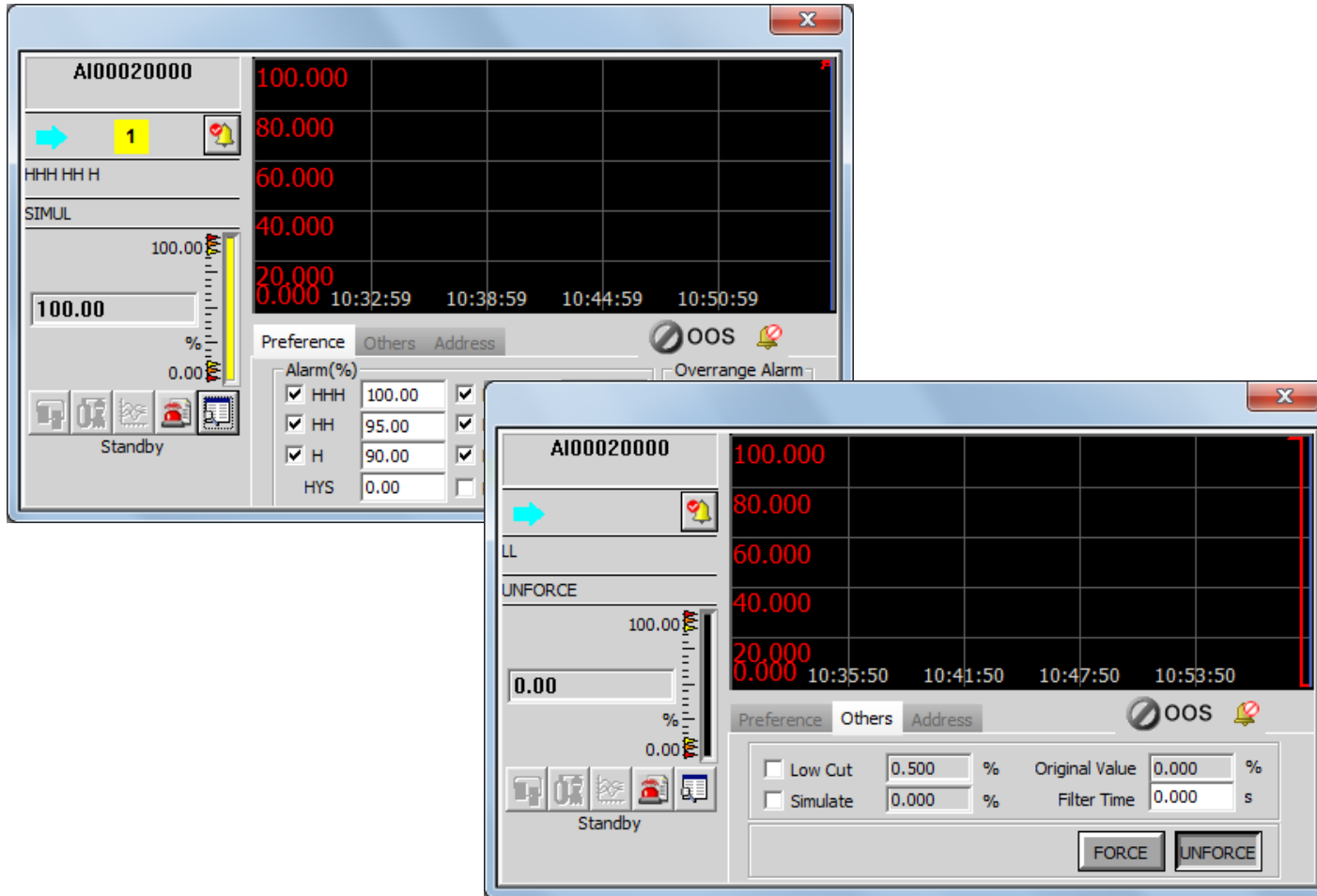
Process Alarm

Process(4794) | Shelved(10) | Device State

	Time	Tag	Description	Alar...	Shelving Shelf	Shelve C
3	2016-01-18 16:31:06.079	11V02VT_408B	TURBINE NO.3 SHAFT VIBRATION LL	Shutdown		Shut-down Ma
3	2016-01-18 16:31:05.065	11V02VT_408A	TURBINE NO.3 SHAFT VIBRATION HH	Shutdown		Shut-down Ma
3	2016-01-18 16:31:05.065	11V02VT_407B	TURBINE NO.2 SHAFT VIBRATION LL	Shutdown		Shut-down Ma
3	2016-01-18 16:31:03.037	11V02VT_408A	TURBINE NO.3 SHAFT VIBRATION HH			Shut-down Ma
3	2016-01-18 16:31:03.037	11V02VT_407B	TURBINE NO.2 SHAFT VIBRATION LL			Shut-down Ma
3	2016-01-18 16:30:51.883	11V02VT_409A	TURBINE NO.4 SHAFT VIBRATION LL			Shut-down Ma
3	2016-01-18 16:30:49.855	11V02VT_409A	TURBINE NO.4 SHAFT VIBRATION HH			Shut-down Ma
3	2016-01-18 16:30:42.757	11V02VT_406A	TURBINE NO.1 SHAFT VIBRATION LL			Customized
3	2016-01-18 16:30:39.715	11V02VT_406A	TURBINE NO.1 SHAFT VIBRATION HH			Customized
3	2016-01-18 16:30:26.533	11V02SE_401E	TURBINE SPEED FROM			Nuisance Alar

Alarm Amount:10

Alarm Disable & Shield



Process Alarm Shielded	
Name	
Local Domain	
Alarm Group 0	Release
Alarm Region 0	Shield
Alarm Region 1	Shield
Alarm Group 1	Shield
Alarm Region 0	Shield
Alarm Region 1	Shield
Alarm Group 2	Shield
Alarm Region 0	Shield
Alarm Region 1	Shield
Alarm Group 3	Release
Alarm Region 0	Shield
Alarm Region 1	Shield
Alarm Group 4	Shield
Alarm Region 0	Shield
Alarm Group 5	Shield
Alarm Group 6	Shield
Alarm Group 7	Shield

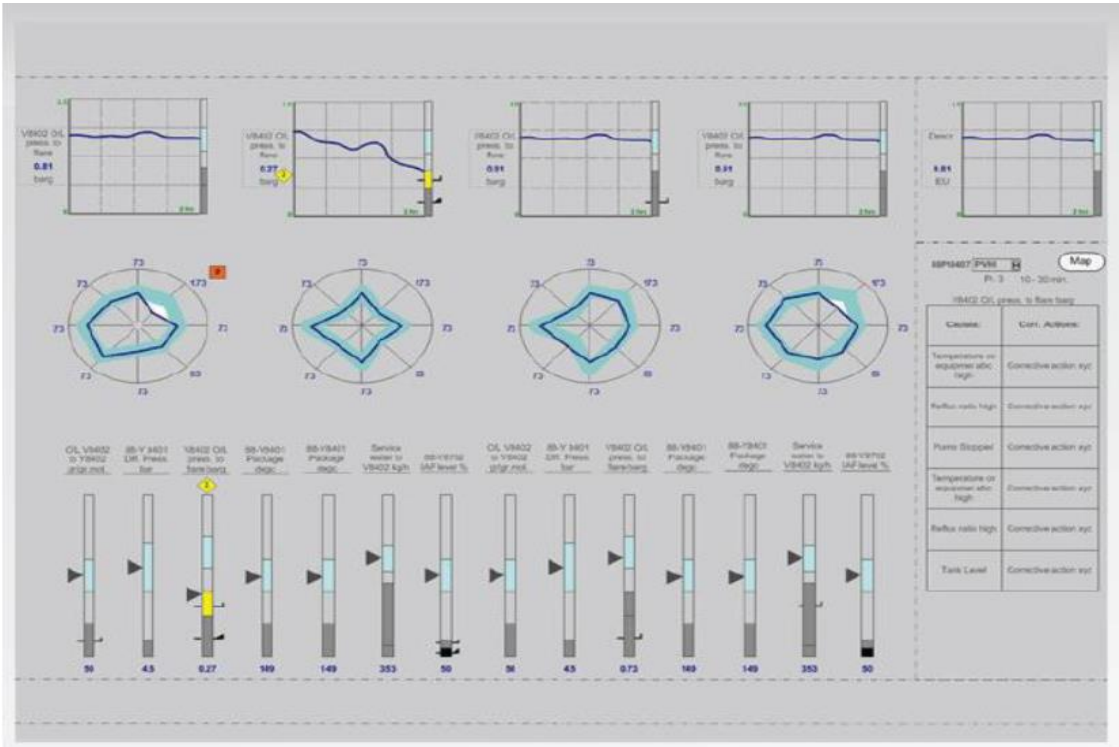
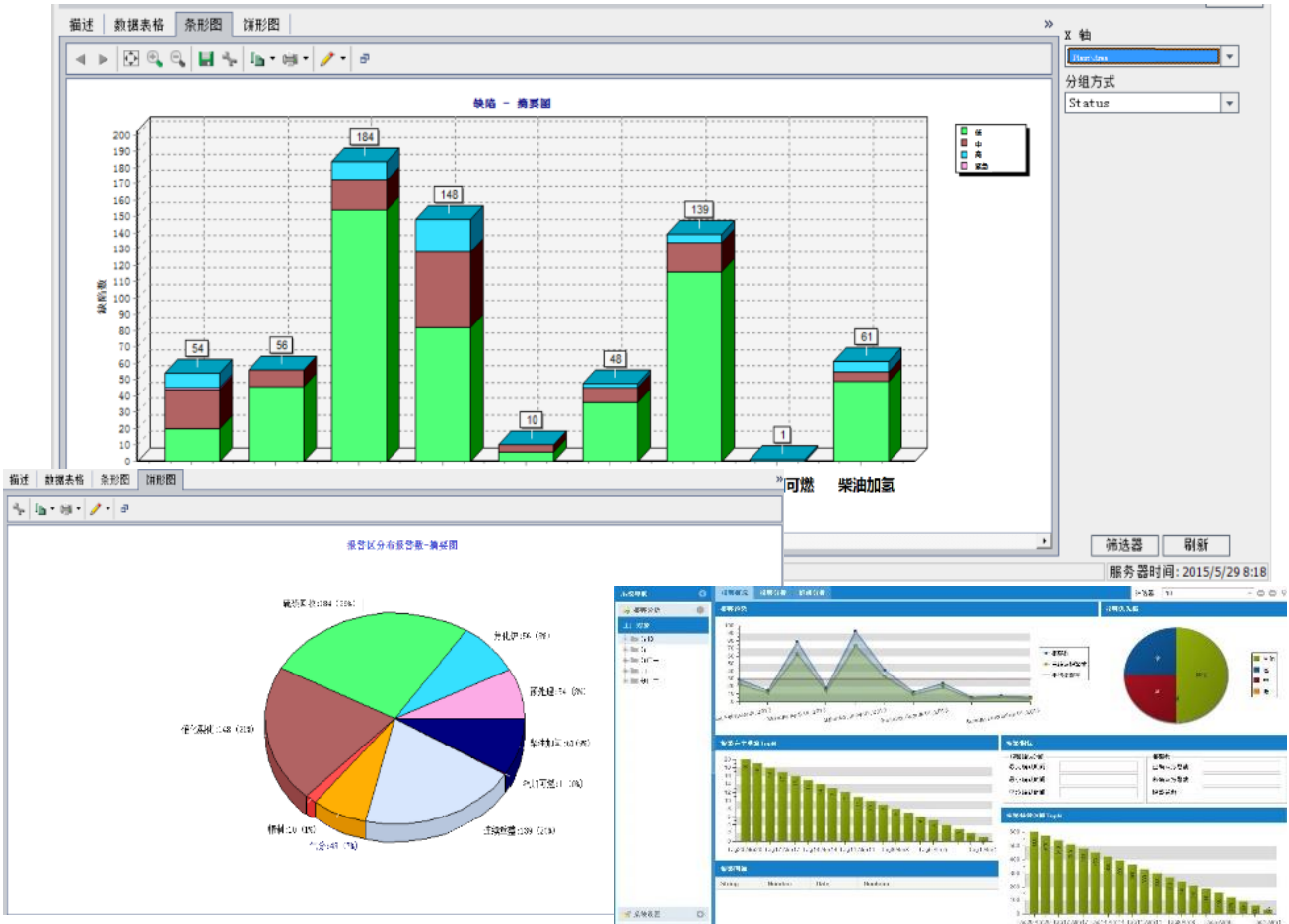
Alarm Eclipsing



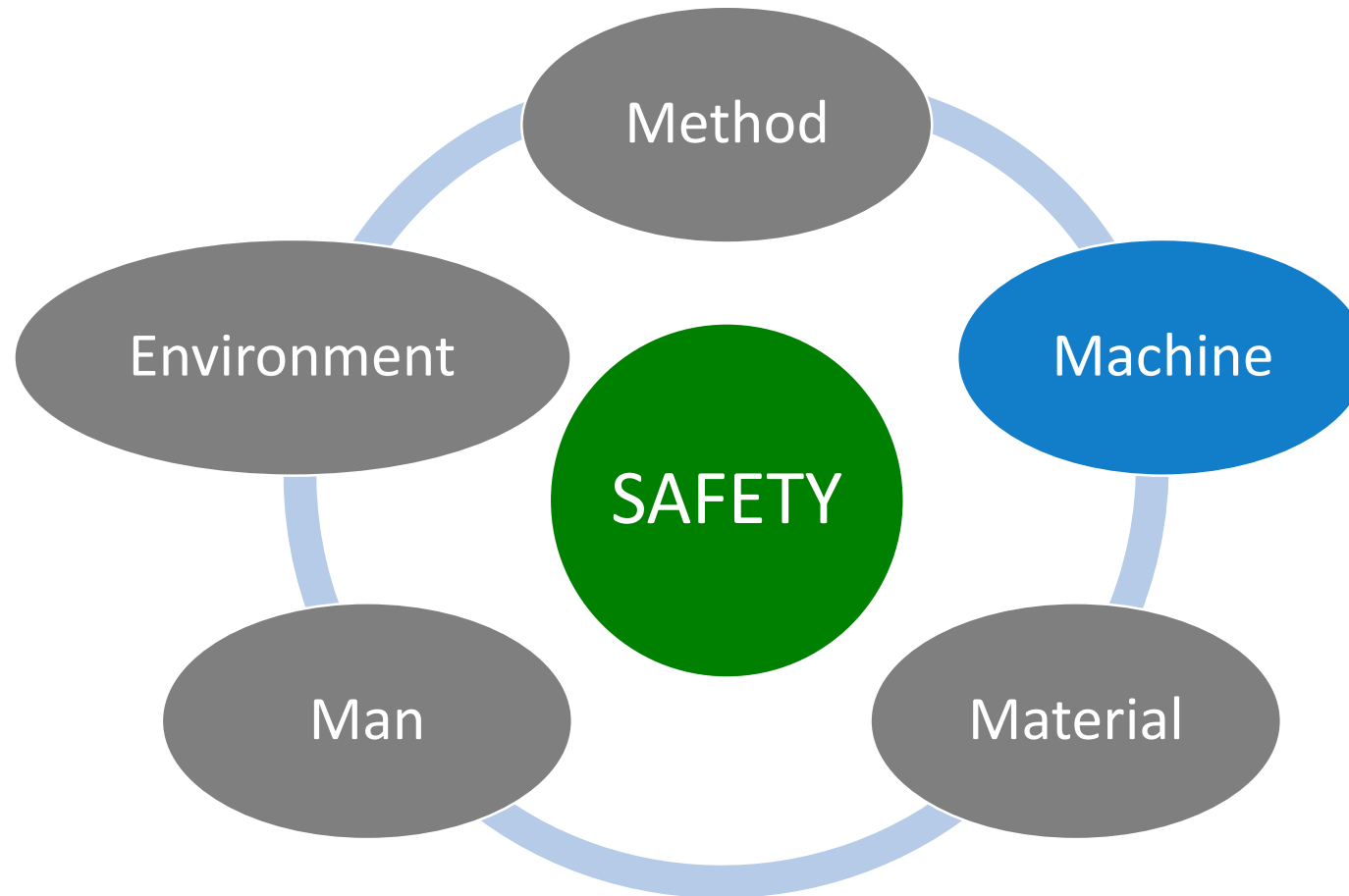
Process Alarm Filter(Range : Tag(AI00020000))									
Process(10)		Shelved(0)		Device State					
	Time	Tag	Description	Alar...	Value	Device Name			
➡ 3	2016-01-19 13:40:48.000	AI00020000	Standby	LLL	25.000	MAIN			
2	2016-01-19 13:40:48.000	AI00020000	Standby	LL	25.000	MAIN			
1	2016-01-19 13:40:48.000	AI00020000	Standby	L	25.000	MAIN			
Alarm Amount:3				✓	🔄	⚙️	🔍		
				✗	1	2	3		
					4	5	🔍		

Process Alarm Filter(Range : Tag(AI00020000))									
Process(8)		Shelved(0)		Device State					
	Time	Tag	Description	Alar...	V				
➡ 3	2016-01-19 13:40:48.000	AI00020000	Standby	LLL	0.0				
Alarm Amount:1				✓	🔄	⚙️	🔍		
				✗	1	2			

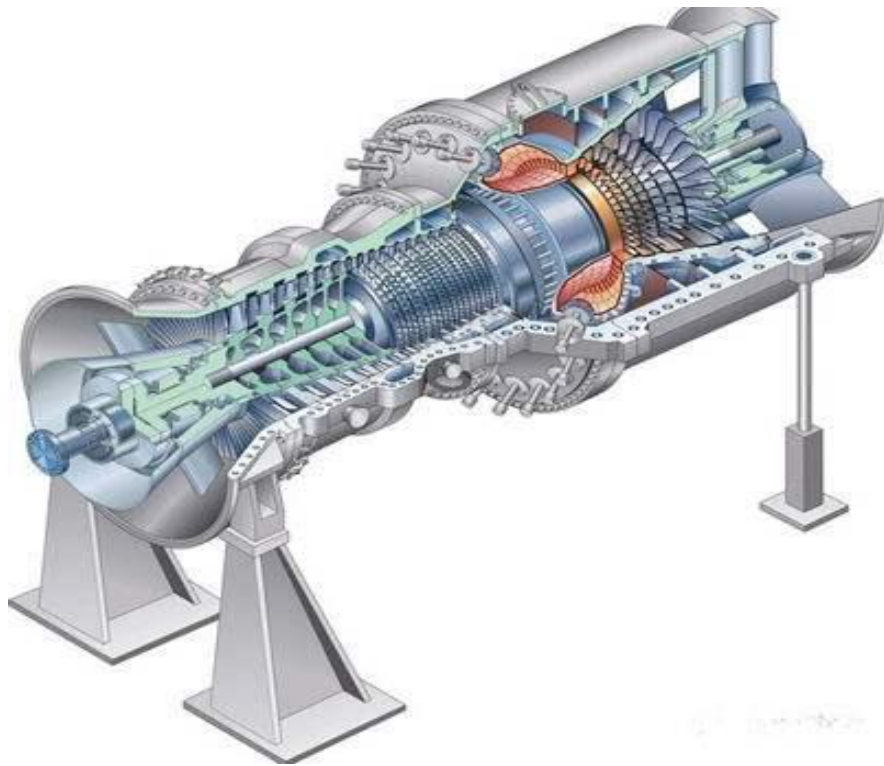
Alarm Statistics & Analysis



Total Quality Management – 4M1E

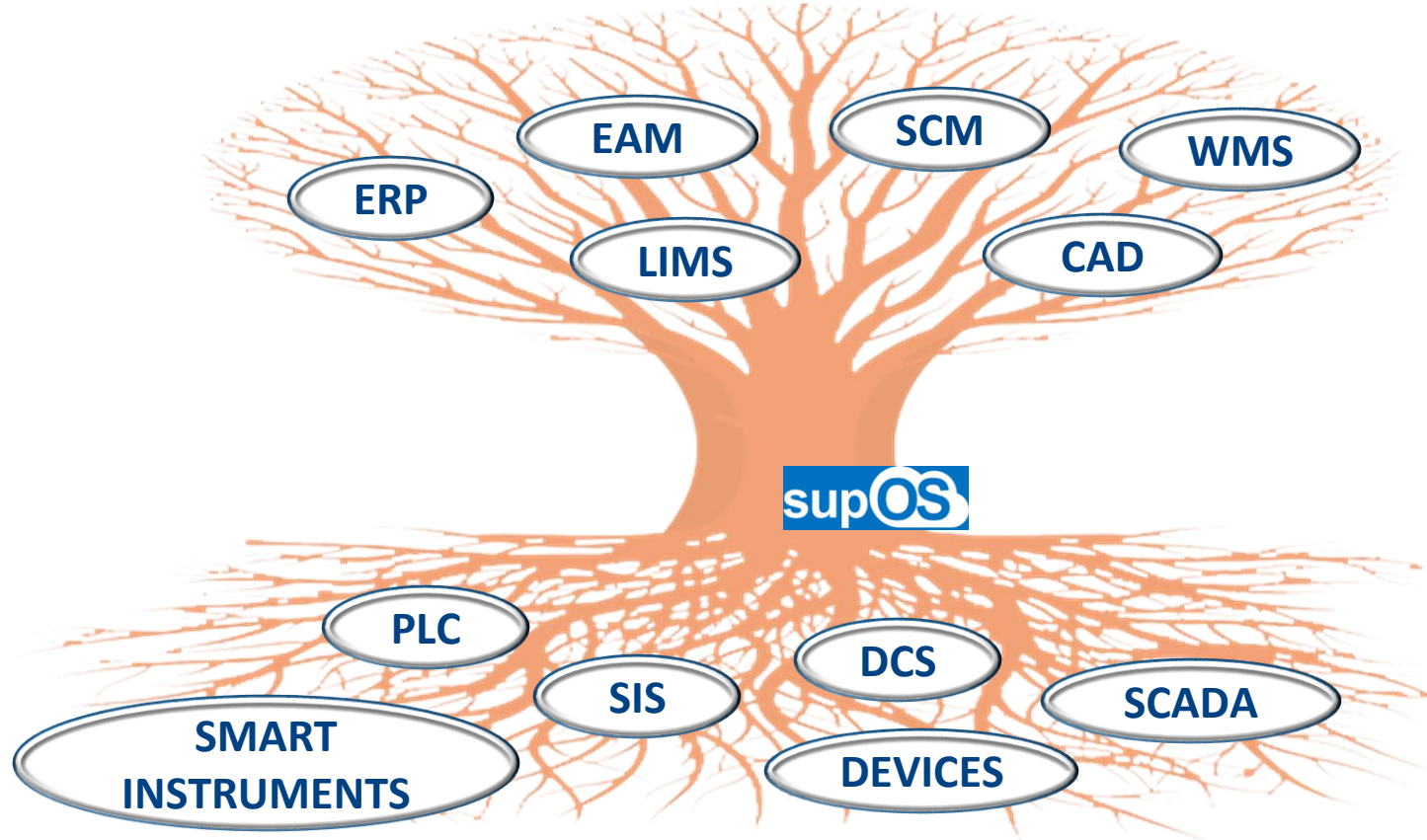


Predictive Maintenance



- **AR**
- **5G**
- **Big Data**
- **Industrial AI**

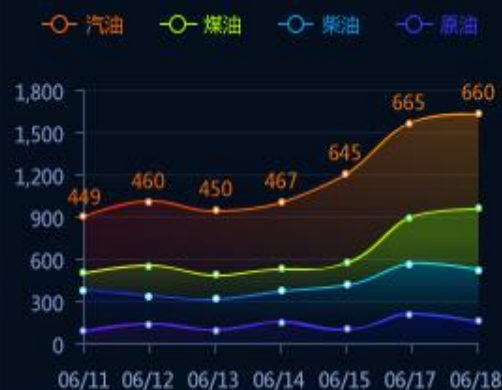
Industrial Operating System



Smart Devices+ Intelligent Operations

- Real time process data
- Operation data
- Procurement data
- Inventory data
- LIMS data
- Device data
- GIS data
- Video & audio data
- Energy consumption data
-

产品价格趋势图



应急事故统计



核心数据展示

报警率

56个

工艺平稳率

98.0%

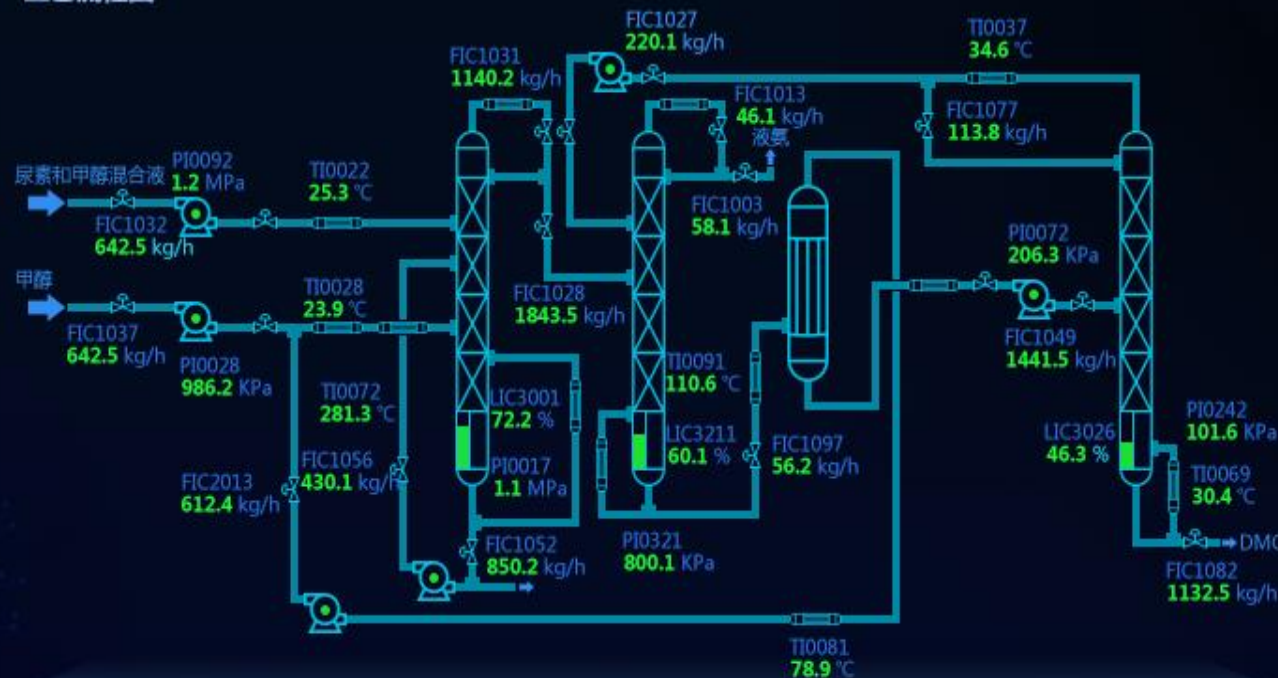
自控率

88.1%

设备完好率

99.6%

工艺流程图



能效分析

收益率

名称	收益率	名称	收益率
常减压装置	96.5%	甲乙酮装置	92.3%
强化装置	99.1%	80T强化装置	94.3%
气分装置	99.8%	加制氢装置	89.3%
聚丙烯装置	97.3%	MTBE装置	89.3%
50T强化装置	99.9%		

名称	日耗率	月累计	年累计	日单耗
电	303010	5672591	34436143	44.66
循环水	309164.32	5516462	14398215.44	45.57
汽	1149.38	20077.28	111229.24	0.17

环保管理

安全管理

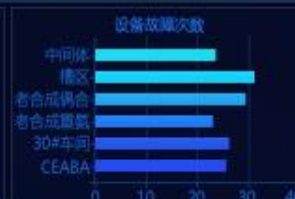
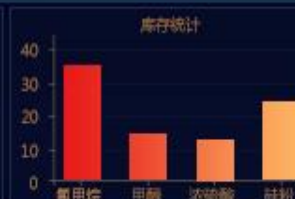
HSE管理

车间环保超标率统计

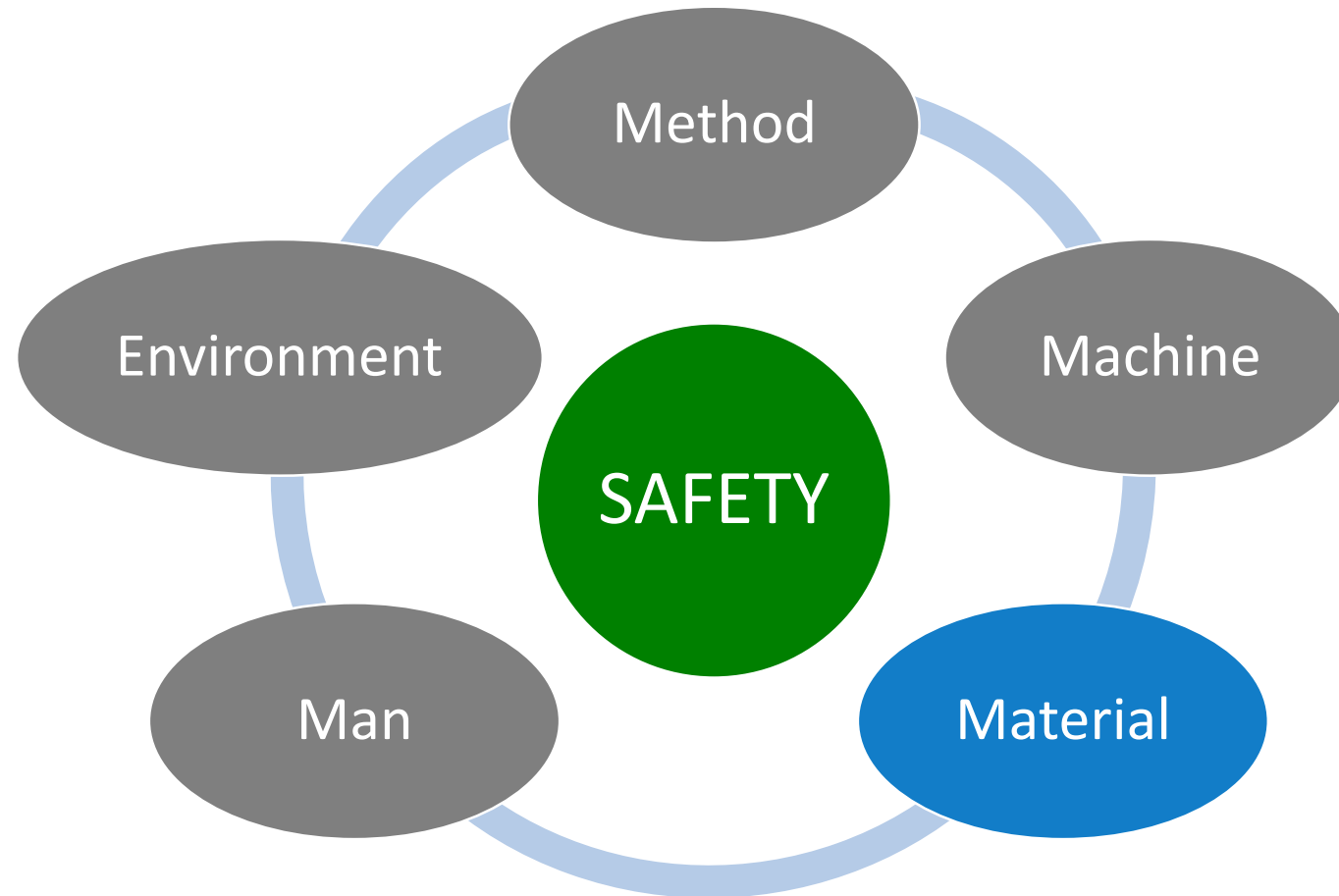
车间名称	日超标额	月超标额
中间体	2.08	0.61
槽区	3.69	0.90
老合成偶合	0.15	0.06
老合成重氮	3.08	0.69
30#车间	1.34	0.71
CEABA	0.17	0.13

车间超标情况

老合成重氮	新合成重氮	30#车间	CEABA
新合成偶合	槽区	老合成偶合	



Total Quality Management – 4M1E

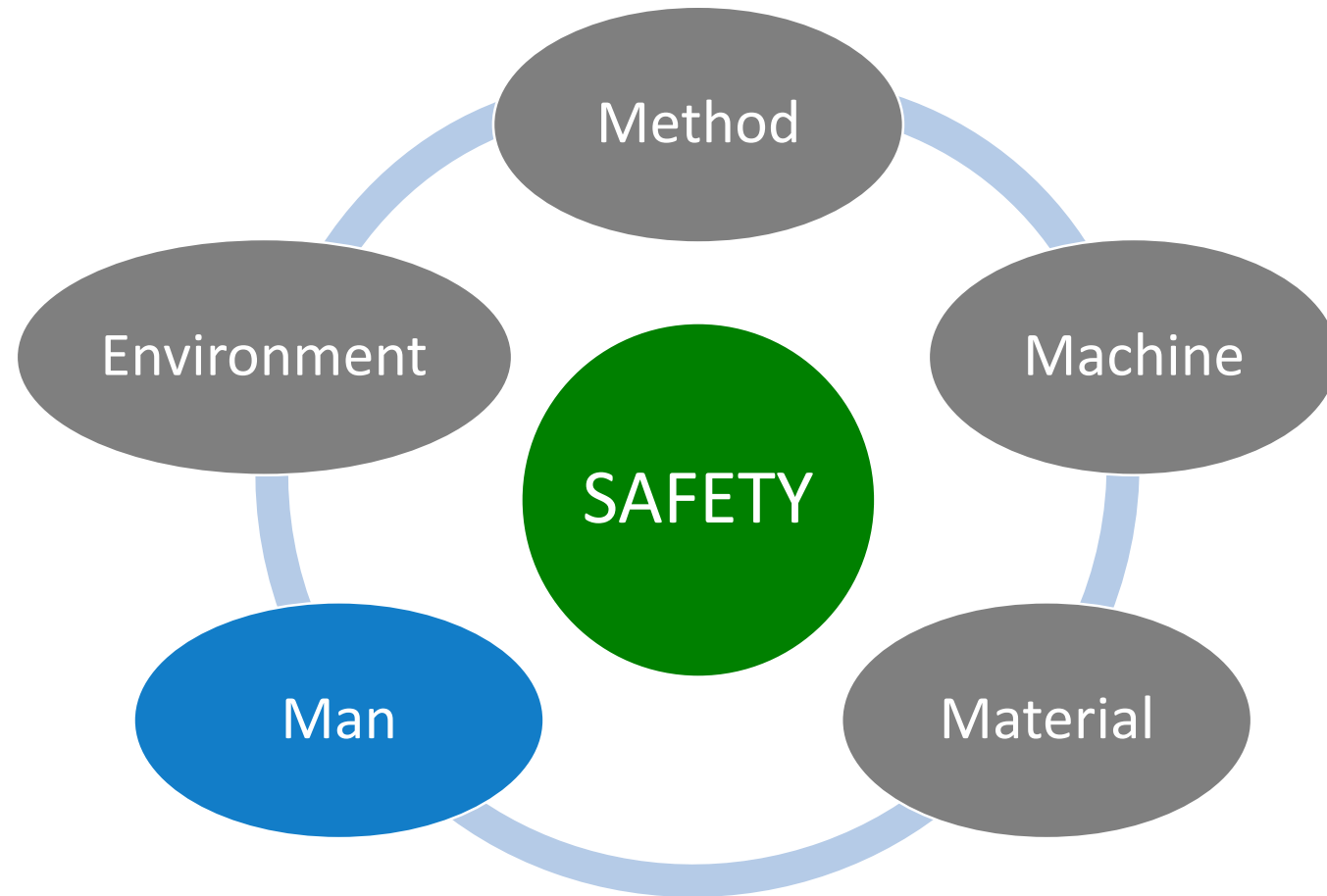


Material Safety



- Intelligent Oil Movement & Loading System
- Inventory Management & Scheduling System
- Barcode Identification & Goods Tracked System
- Automated Guided Vehicle

Total Quality Management – 4M1E



4M1E – Man



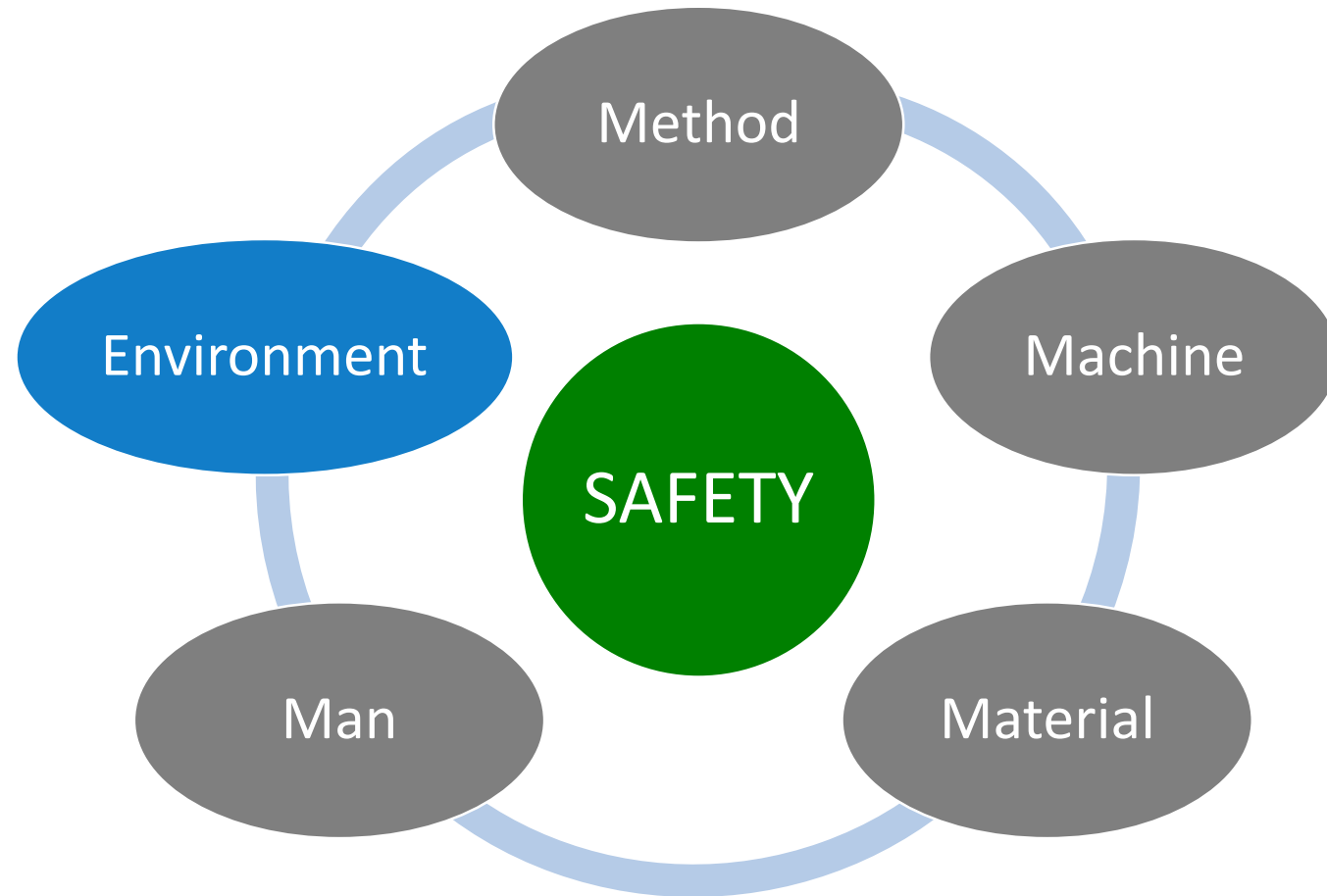
- **WHO**
- **WHERE**
- **WHAT**
- **RISK**

4M1E – Man

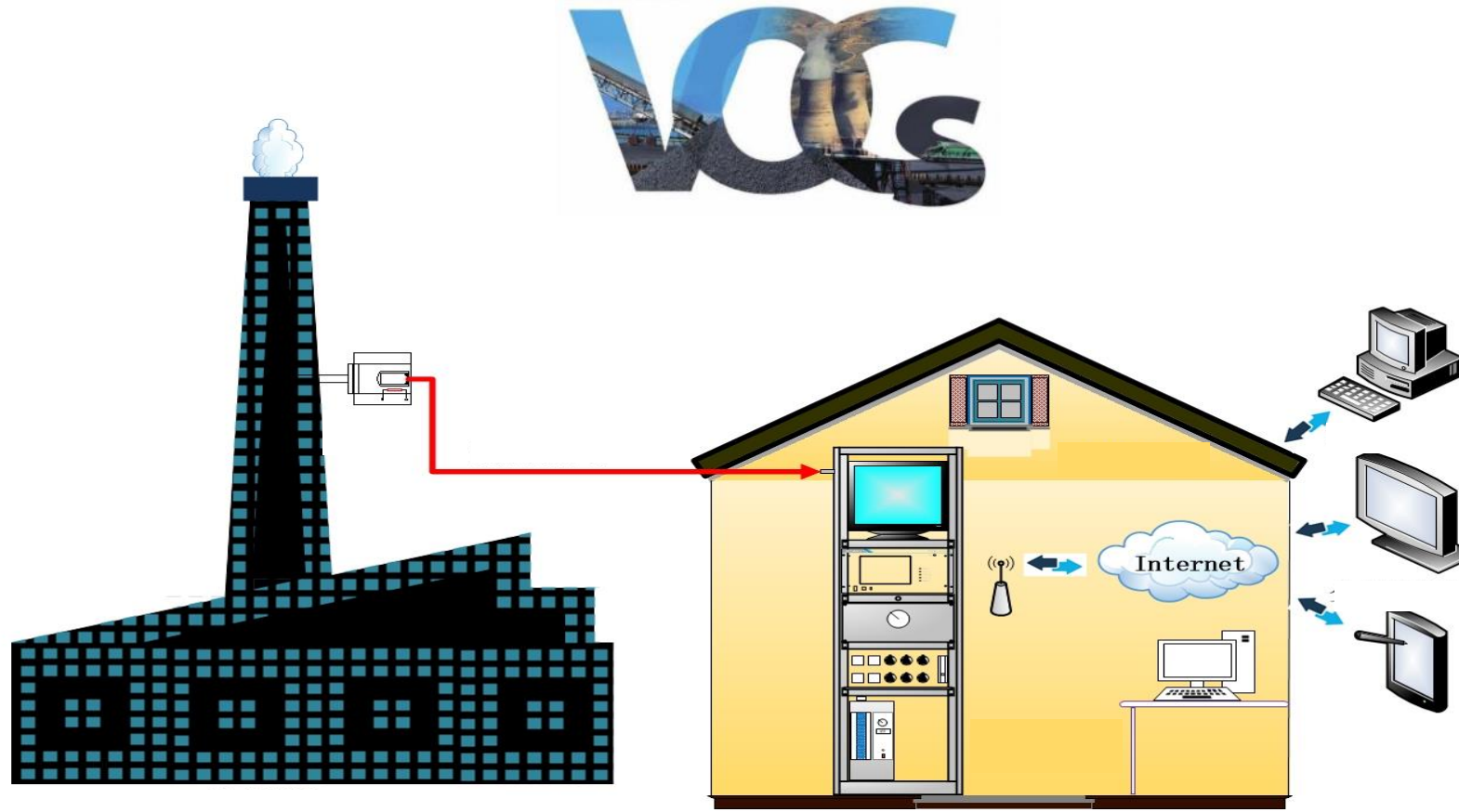


- **GIS + 3D Plant**
- **Personnel Positioning**
- **Wearable Devices**
- **AR**
- **5G**

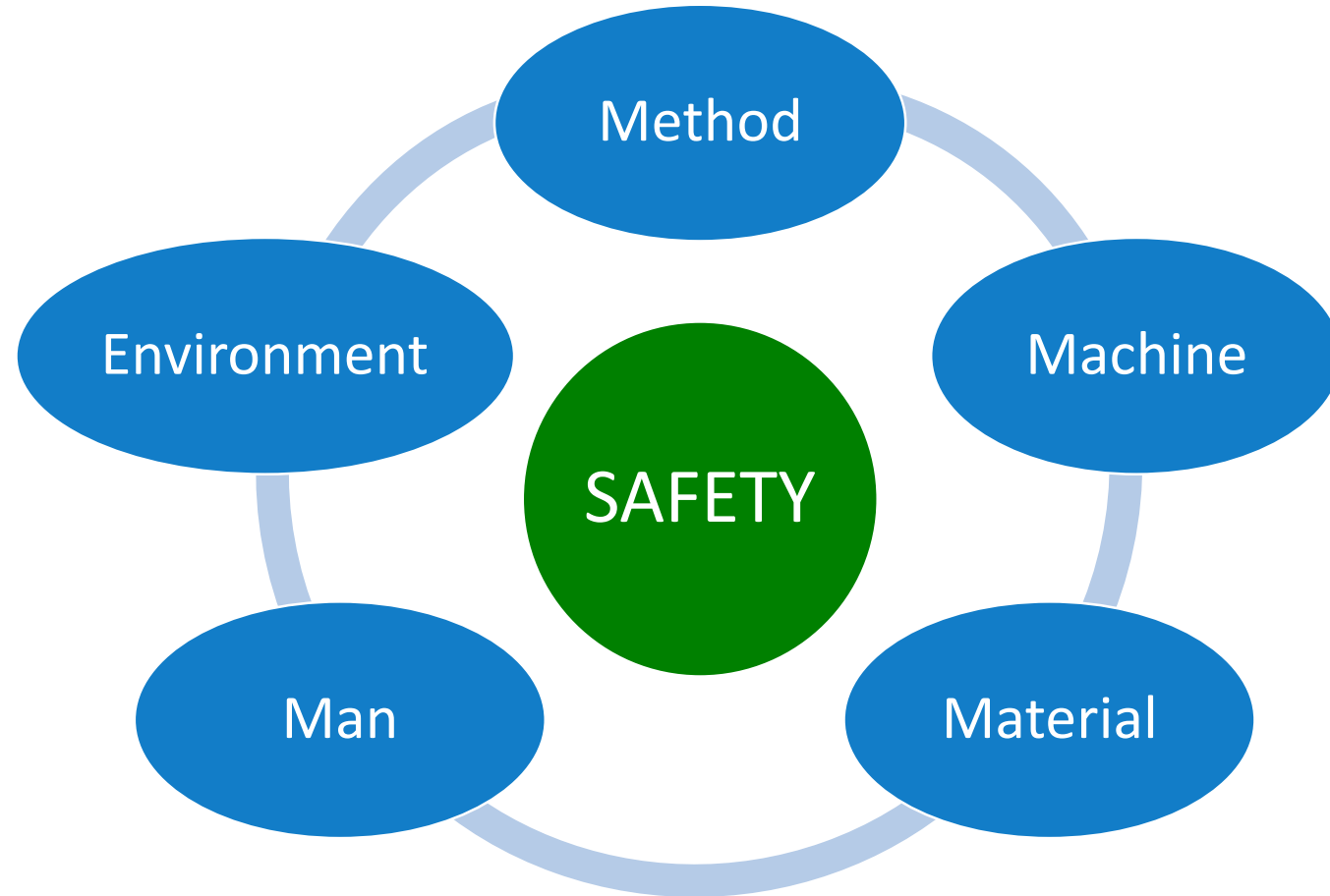
Total Quality Management – 4M1E



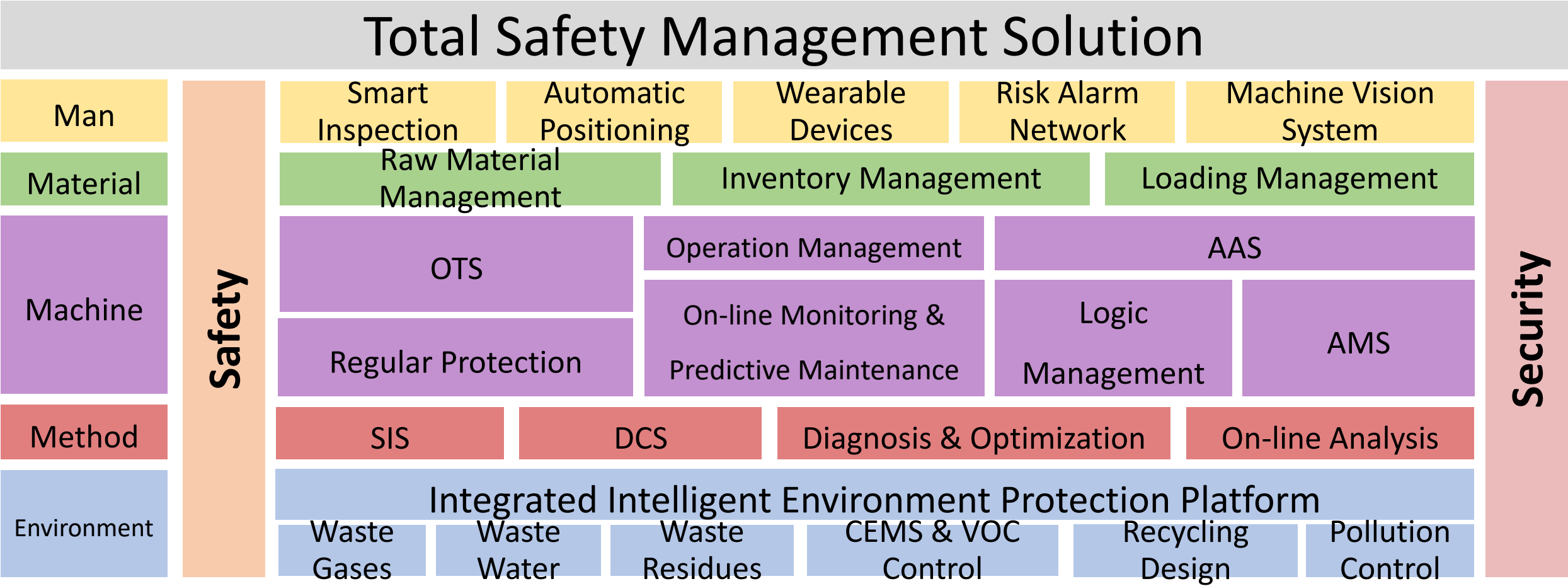
CEMS - Continuous Emission Monitoring System



Total Quality Management – 4M1E



SUPCON Total Safety Management Solution



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Thank you!

Dr. Zhong Weitao

Director, Strategy Development

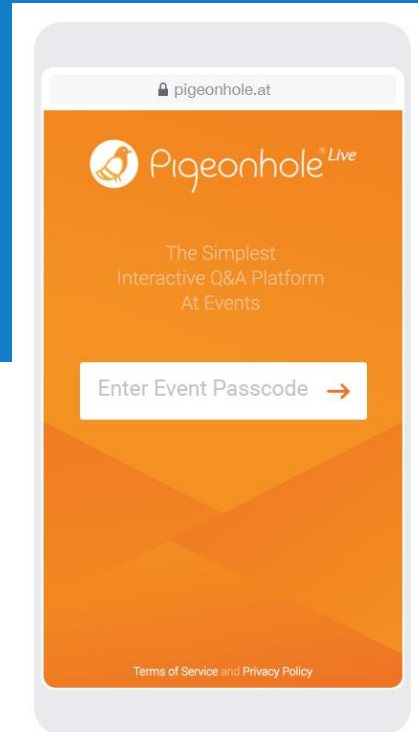


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Q&A



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Technologies, Methodologies and Regulations