



GROUP

Coking Safety & Reliability Seminar 2012

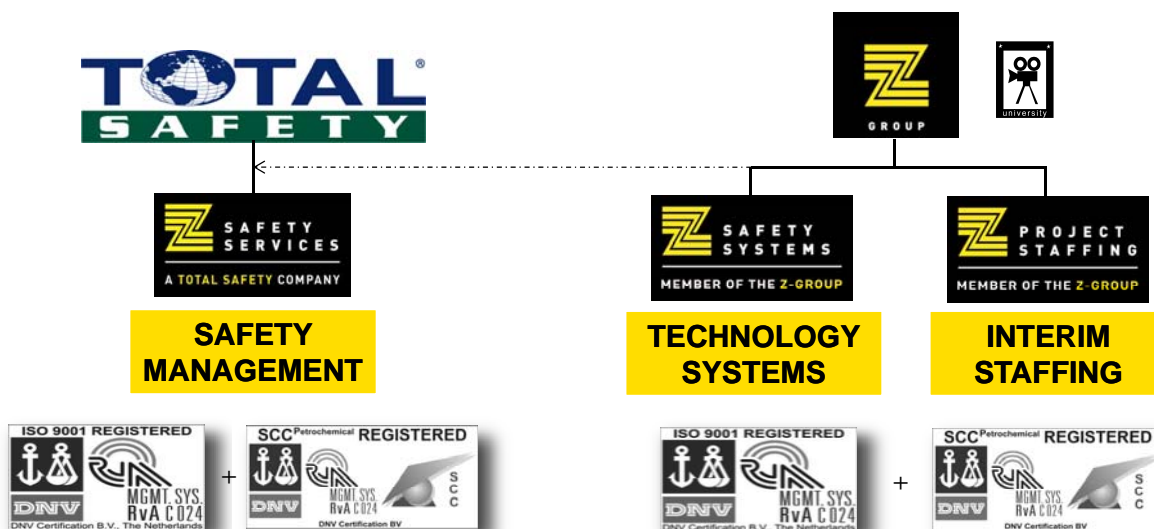
April 30 – May 4 Galveston

Matty Zadnikar | Z-GROUP | matty.zadnikar@z-group.org



TOTAL SAFETY & Z-GROUP

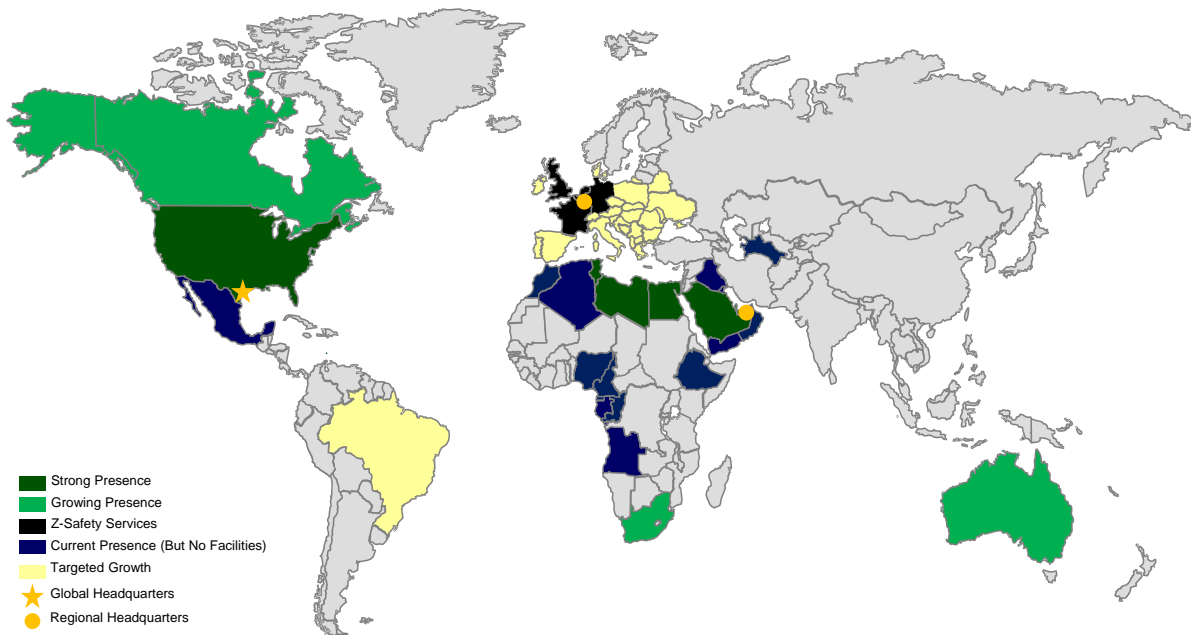
Global Integrated Safety Service providers





Total Safety & Z-Safety Systems Global Partnership

134 Facilities in 18 Countries; Presence in Another 14



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West-European References Z-Safety Services | Z-Safety Systems



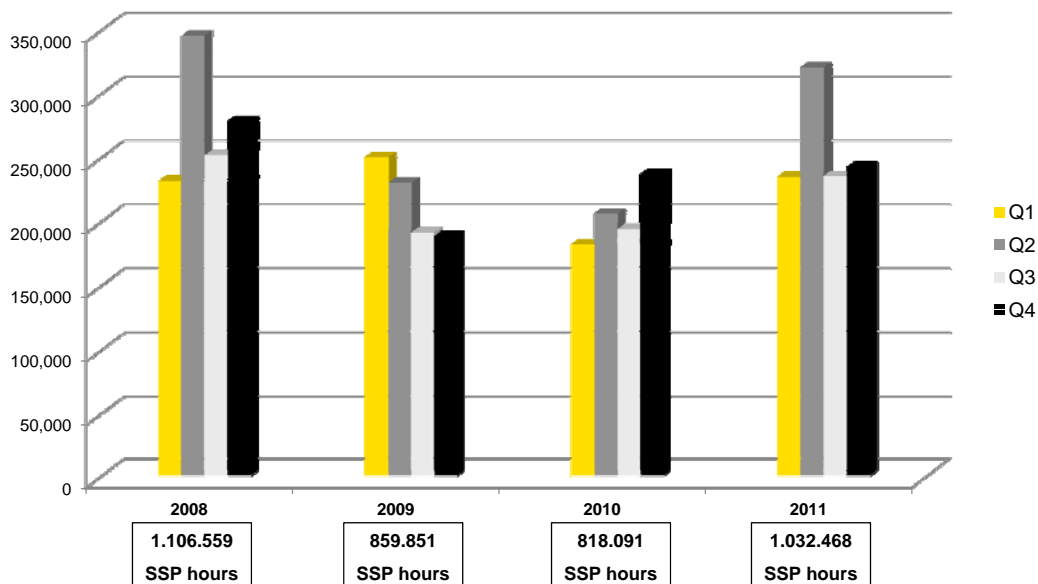
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Safety supervision in confined spaces: ...a challenge?

- TA & project trends in Europe
- Solutions in technology
- Added value in safety output & cost effectiveness

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Specialized Safety Personal (SSP) Period 2008 - 2011

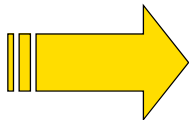


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Trends in safety supervision

Daily maintenance, TARs & projects

- ↑ workload & ↓ working time
- ↑ job requirements concerning safety
- ↓ job appreciation & valuation
- Experience (13 years) & lessons learned



...TECHNOLOGY as support

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Z-Monitoring Technology as support

**OLD
SITUATION**

SAFETY GUARDS



MONITORING SUPPORT



**NEW
SITUATION**

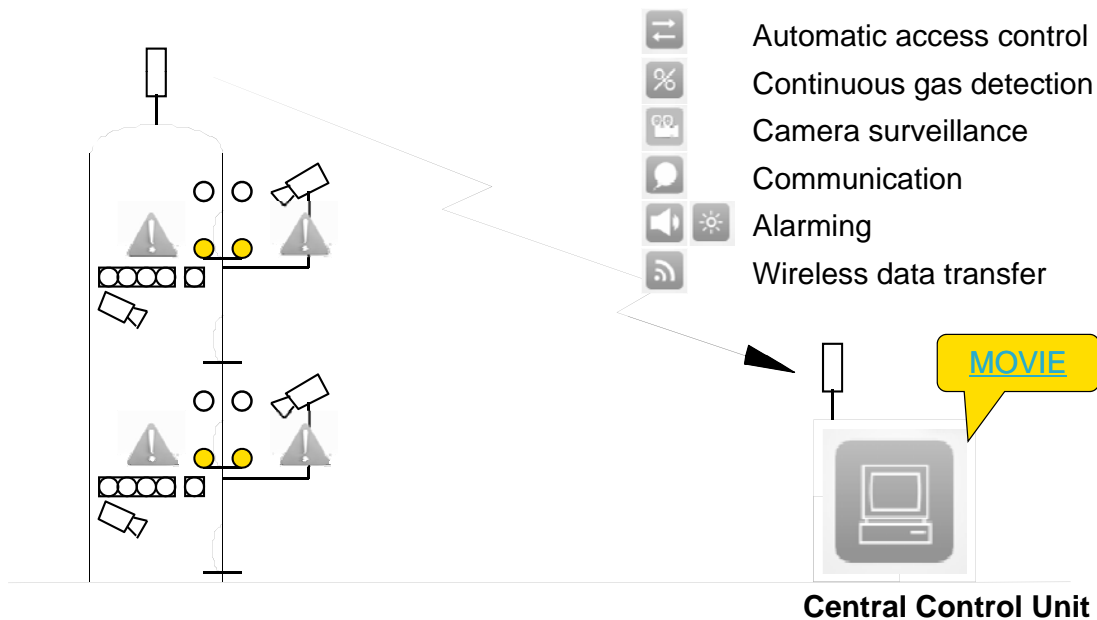
**RIGHT “BALANCE” BETWEEN MAN & TECHNOLOGY
HIGHER SAFETY LEVEL - MORE CONTROL**

Improved safety supervision through technology

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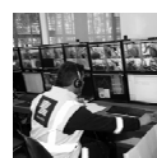
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PER WORK SPOT	Standard
2x access control	1x outside manhole 1x inside manhole
4 + 1 gas detection	O ₂ , LEL, H ₂ S, CO + 1 optional (PID, ...)
2x camera monitoring	1x outside manhole 1x on the work spot
2x antennas	Dependent on the location/plant
2x communication & alarming	2 intercom boxes 2 alarms + flashlights
1x Central Control Unit	Configuration & setting per 12 work spots



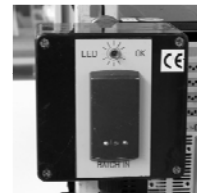
BALANCE BETWEEN MAN & TECHNOLOGY

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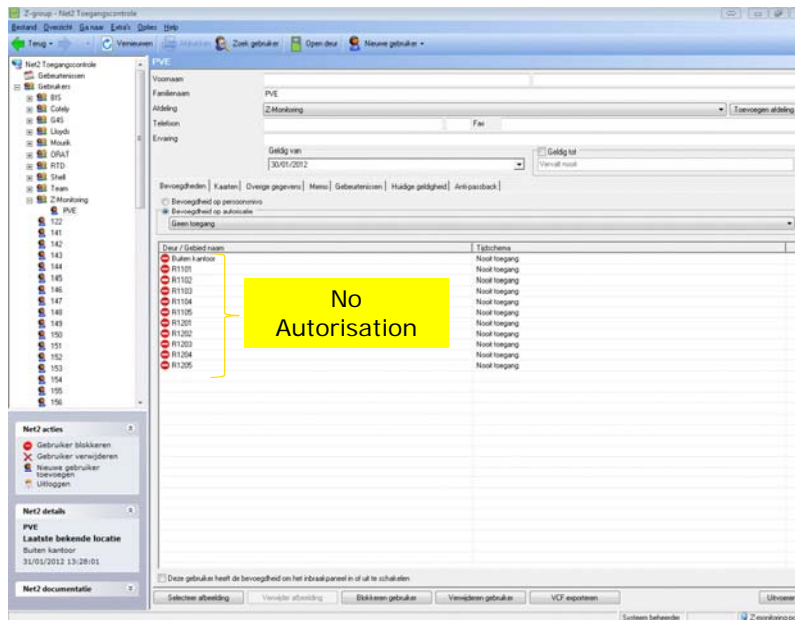


- 1 badge reader INSIDE the manhole
- 1 badge reader OUTSIDE the manhole

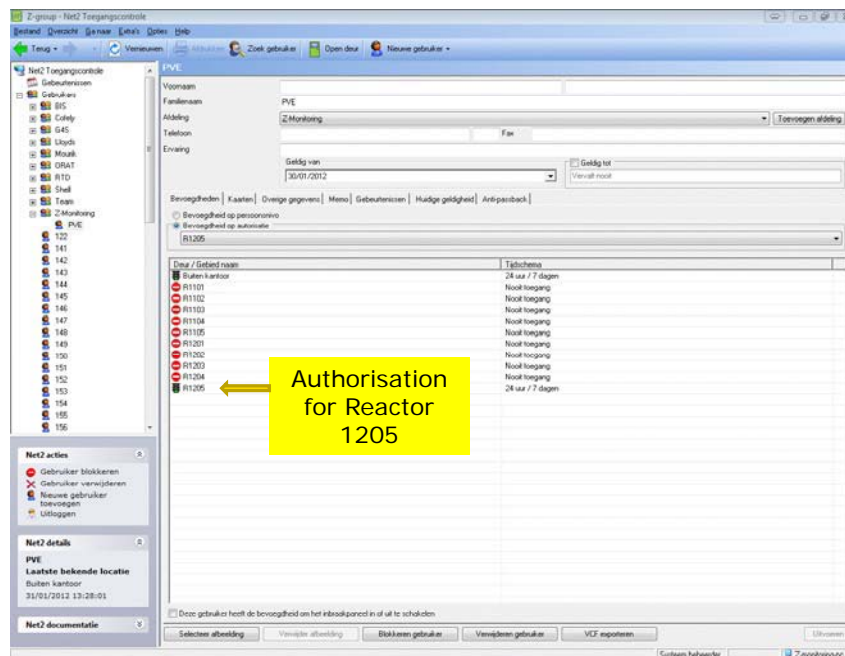
- Personalized active RFID tokens
- Max reader/tag distance:
 - standard: 1m
 - long range: up to 5m (upon request)
- Data transmission between badge readers on different levels is ensured by RS485/ETH network
- Possibility to create different zones, access levels and user profiles up to 10.000 users
- Roll call and head count information within a mouse click in case of emergency



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Automatic access control Accessrights per reactor

Every IN event is visible to the Operator. **GREEN** = Authorised acces

RED = Unauthorised acces -> Operator intervention required

RED = Unauthorised access for R1204

GREEN: Access allowed for R 1205

Event Time	Peripheral Name	First Na...	Surname	Department Name	Event Type Descor
31-01 12:53	R1101 Set 27* (In)	231	R.Rojer	Cofely	Toegang verlee
31-01 12:53	R1101 Set 27* (In)	223	N.Santos	Cofely	Toegang verlee
31-01 12:52	R1101 Set 27* (In)	250	A.Silva	Cofely	Toegang verlee
31-01 12:52	R1101 Set 27* (In)	231	R.Rojer	Cofely	Toegang verlee
31-01 12:51	R1101 Set 27* (In)	248	A.Pereira	Cofely	Toegang verlee
31-01 12:51	R1104 Set 5* (In)	5	Harms	Mourik	Toegang verlee
31-01 12:50	R1101 Set 27* (In)	231	R.Rojer	Cofely	Toegang verlee
31-01 12:50	R1104 Set 5* (In)	5	Harms	Mourik	Toegang verlee
31-01 12:48	R1104 Set 5* (In)	5	Harms	Mourik	Toegang verlee
31-01 12:47	R1104 Set 5* (In)	5	Harms	Mourik	Toegang verlee
31-01 12:47	R1104 Set 5* (In)	5	Harms	Mourik	Toegang verlee
31-01 12:44	R1102 Set 9* (In)	66	F.Koch	Cofely	Toegang verlee
31-01 12:39	R1102 Set 9* (In)	66	F.Koch	Cofely	Toegang verlee
31-01 12:39	R1104 Set 5* (In)	58	A.Sallarii	BIS	Toegang verlee
31-01 12:39	R1101 Set 27* (In)	231	R.Rojer	Cofely	Toegang verlee
31-01 12:38	R1101 Set 27* (In)	231	R.Rojer	Cofely	Toegang verlee
31-01 12:36	R1102 Set 9* (In)	66	F.Koch	Cofely	Toegang verlee
31-01 12:31	R1204 Set 2* (In)		PVE	Z-Monitoring	Toegang gewe
31-01 12:31	R1205 Set 3* (In)		PVE	Z-Monitoring	Toegang verlee
31-01 12:30	R1105 Set 8* (In)	88	M.Ruth	Cofely	Toegang verlee
31-01 12:30	R1105 Set 8* (In)		PVE	Z-Monitoring	Toegang gewe
31-01 12:30	R1104 Set 5* (In)	63	H.Koch	Cofely	Toegang verlee
31-01 12:30	R1101 Set 27* (In)	231	R.Rojer	Cofely	Toegang verlee
31-01 12:30	R1104 Set 5* (In)		PVE	Z-Monitoring	Toegang gewe
31-01 12:29	R1205 Set 3* (In)		PVE	Z-Monitoring	Toegang verlee
31-01 12:27	R1202 Set 10* (In)	45	G.Wollhem	Cofely	Toegang verlee
31-01 12:26	R1202 Set 10* (In)	91	R.Aust	Cofely	Toegang verlee
31-01 12:24	R1101 Set 27* (In)	138	Freita Semcto	Cofely	Toegang verlee
31-01 12:20	R1101 Set 27* (In)	138	Freita Semcto	Cofely	Toegang verlee
31-01 12:17	R1101 Set 27* (In)	138	Freita Semcto	Cofely	Toegang verlee

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Automatic access control real time visualisation of number of people

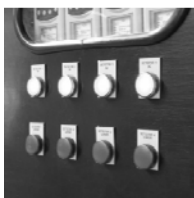
Reactor numbers

Reactor	Number of people
R1101	1
R1102	0
R1103	2
R1104	0
R1105	0
R1201	0
R1202	0
R1203	2
R1204	2
R1205	0
Totaal:	7

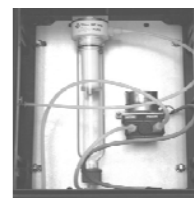
Number of people per reactor

Total number of people per area

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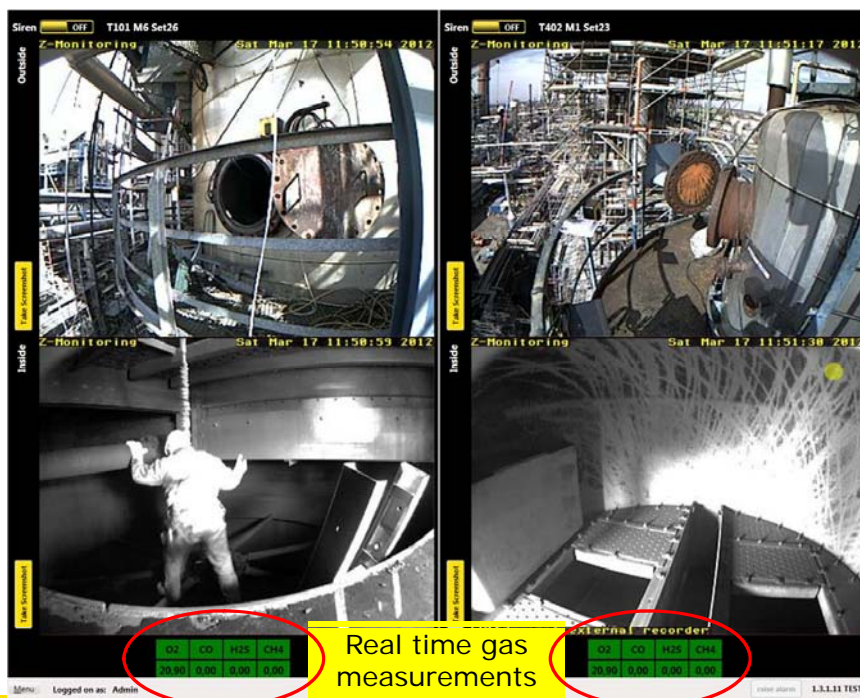
- **STANDARD** configuration: O₂ - LEL - H₂S – CO (up to 40 different gasses possible – upon request)
- 1 **OPTIONAL** sensor possible: PID - dust - temperature - humidity
- Gas detection through a sampling system, minimizing the disturbance of sensors in the confined space



- Continuous flow control in the sampling system (2 l/min)
- Continuous monitoring of sensor condition through “heartbeat”
- Full event logging (calibration-bump test-gas out-breaks-temperature...)
- Sampled gas is conditioned and filtered (dust & watering filter)
- Stand-alone alarming (no operator action or communication with CCR needed to alarm)
- CE and UL approved (from 07/2012)



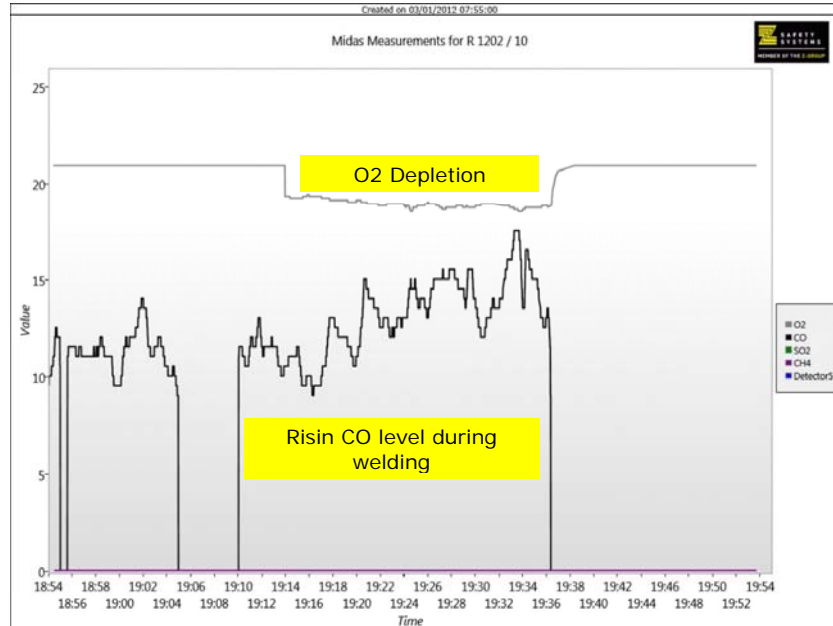
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Gas detection trend

(measurement in
reactor 1202 dd 3
januari 2012 om
07.55)



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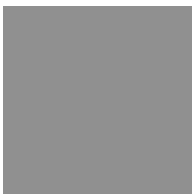
Technical features Camera monitoring



- 1 camera INSIDE the manhole on the work spot
- 1 camera OUTSIDE the manhole to control the entrance and the environment of the access to the manhole



- Dual lens HiRes cameras (up to 3 MP)
- Day & night vision by IR backlight
- Full event and data logging in camera
- PoE (Power over Ethernet) – no extra power cables needed
- Storage interval fully configurable to customer wish



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Technical features CCTV

Registration when motion detected. Images can be reviewed

The operator can take screenshots when dangerous situations occur.



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Technical features Antennas



- Wireless data transmission PTO (point-to-point) or PTMP (point-to-multi-point)
- Fully secured and 128 bit encrypted data transmission



- In accordance with RFI standards & therefore immune for in plant data/control system
 - Uses 5,4 ~ 5,8 GHz band (16 channels)
 - Max distance:
 - line of sight: up to 10 km
 - no line of sight: site visit /plan
- Required to determine the number of APs (Access Points)



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- Communication system integrated in the cameras: activation by push-to-talk button
- 2 intercom boxes: 1 INSIDE / 1 OUTSIDE the manhole
- 2 alarms with flashlights (visual & acoustic): 1 INSIDE / 1 OUTSIDE the manhole



- Full duplex communication
- Activation locally & automatically by the gas detection system or remotely by the operator
- First alarm level = flash light
Second alarm level = siren



1. Manual activation of the alarms by operator in CCR

2. Automatic activation of the alarm by the gasdetection system



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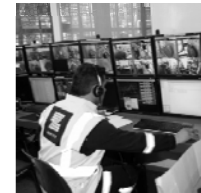
Technical features Central Control Unit



- Visualization software platform to centralize, analyse and report all incoming data
 - Continuous supervision of the work spots/ confined spaces by trained professionals



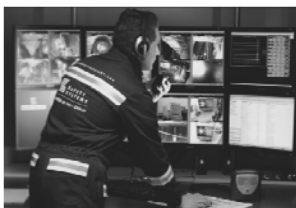
- Tick boxes to check/indicate the work permits, required PPE and atmosphere
- Clear visualization of alarm conditions and status (green/orange/red + sound)
- Visual & acoustic pop-ups in case of incoming call
- Continuous check of network condition and status
- Logging of operator by check-in each change (alternately active in control room and in the field – rotation every 2 hours)



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	Monitoring Operators Safety & Rescue Supervisors	Monitoring Operators Safety & Rescue Supervisors
Number of work spots	<u>INSIDE</u> in the CCU	<u>OUTSIDE</u> in the field
1 – 12	1	1
12-24	2	2
24-36	3	3
36-48	4	4
48-60	5	5



“RIGHT” BALANCE BETWEEN MAN & TECHNOLOGY

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↑ SAFETY ↑ EFFICIENCY

Continuous gas detection

- Measurement directly on the work spot/in the confined space
- Reliable reporting & trending of all gas measurements

Automatic access control

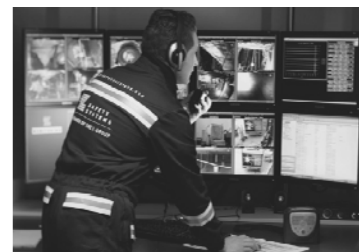
- Complete & detailed data of all entrances of the confined spaces
- Support towards on-site rescue team
- Reliable registration of all entrances

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↑ SAFETY ↑ EFFICIENCY

Camera monitoring

- Faster response time
- Direct communication in case of emergency
- Support of the on-site rescue team with direct images from the confined spaces
- Reliable live-stream reporting



Communication & alarming

- Intercom, visual & acoustic alarm on the work spot

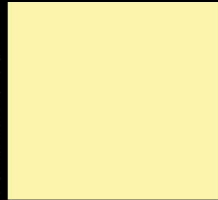
Central Control Unit (CCR)

- Central follow-up & control room

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A TOTAL SAFETY COMPANY



ONE
TOTAL
INDUSTRIAL
SERVICE
PROVIDER



MEMBER OF THE Z-GROUP