



TRAITEMENT DES BOUES (SÉPARATION DE L'EAU), AVANTAGES ÉCONOMIQUES ET ENVIRONNEMENTAUX DANS LA CONSTRUCTION DE TUNNELS ET SANS TRANCHÉE.

IAN RAMSAY, IRR TRENCHLESS



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An Introduction to Spray in Place Rehabilitation

Ian Ramsay irr trenchless, board member
and fellow of ISTT



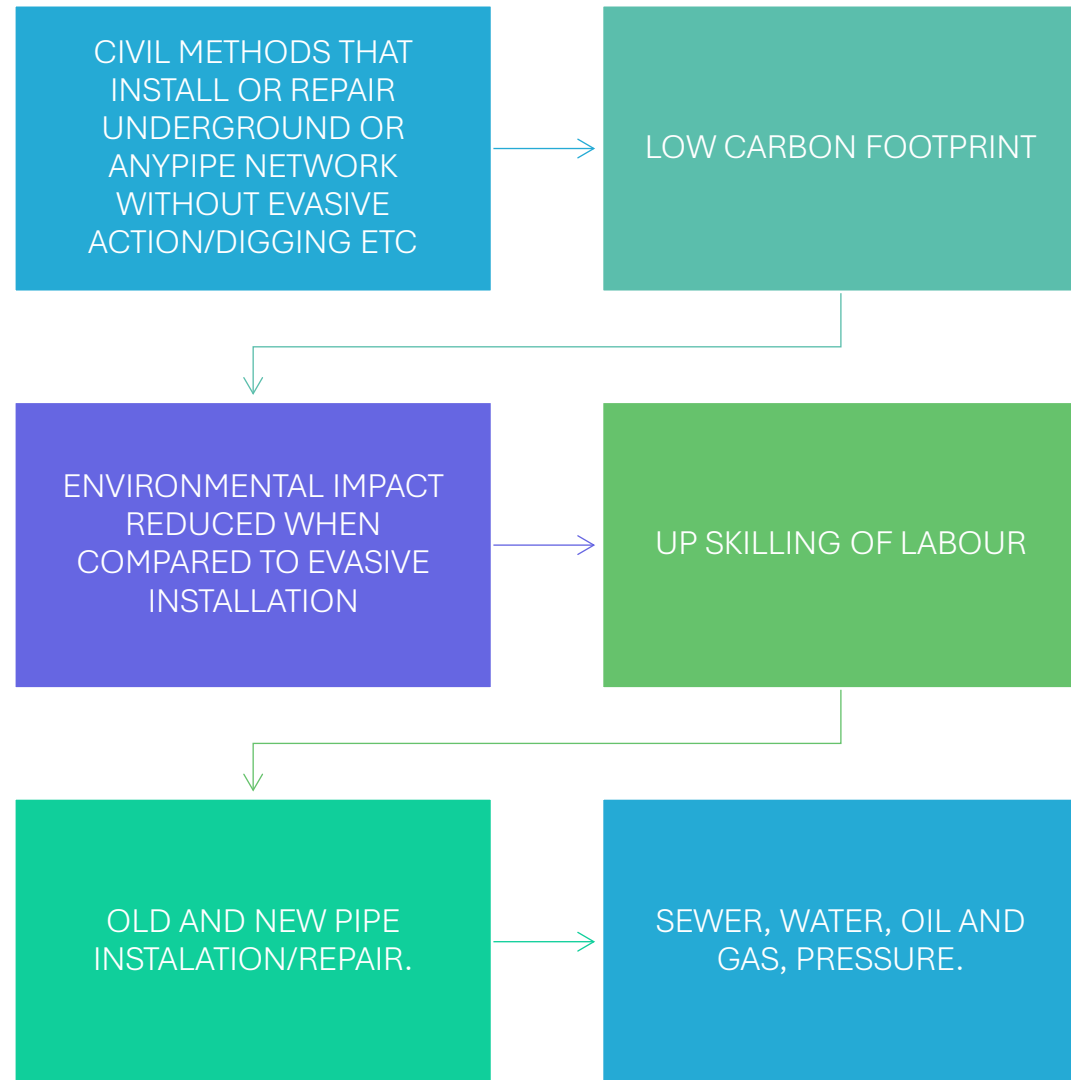
TRENCHLESS
MOROCCO

Trenchless GLOBALY

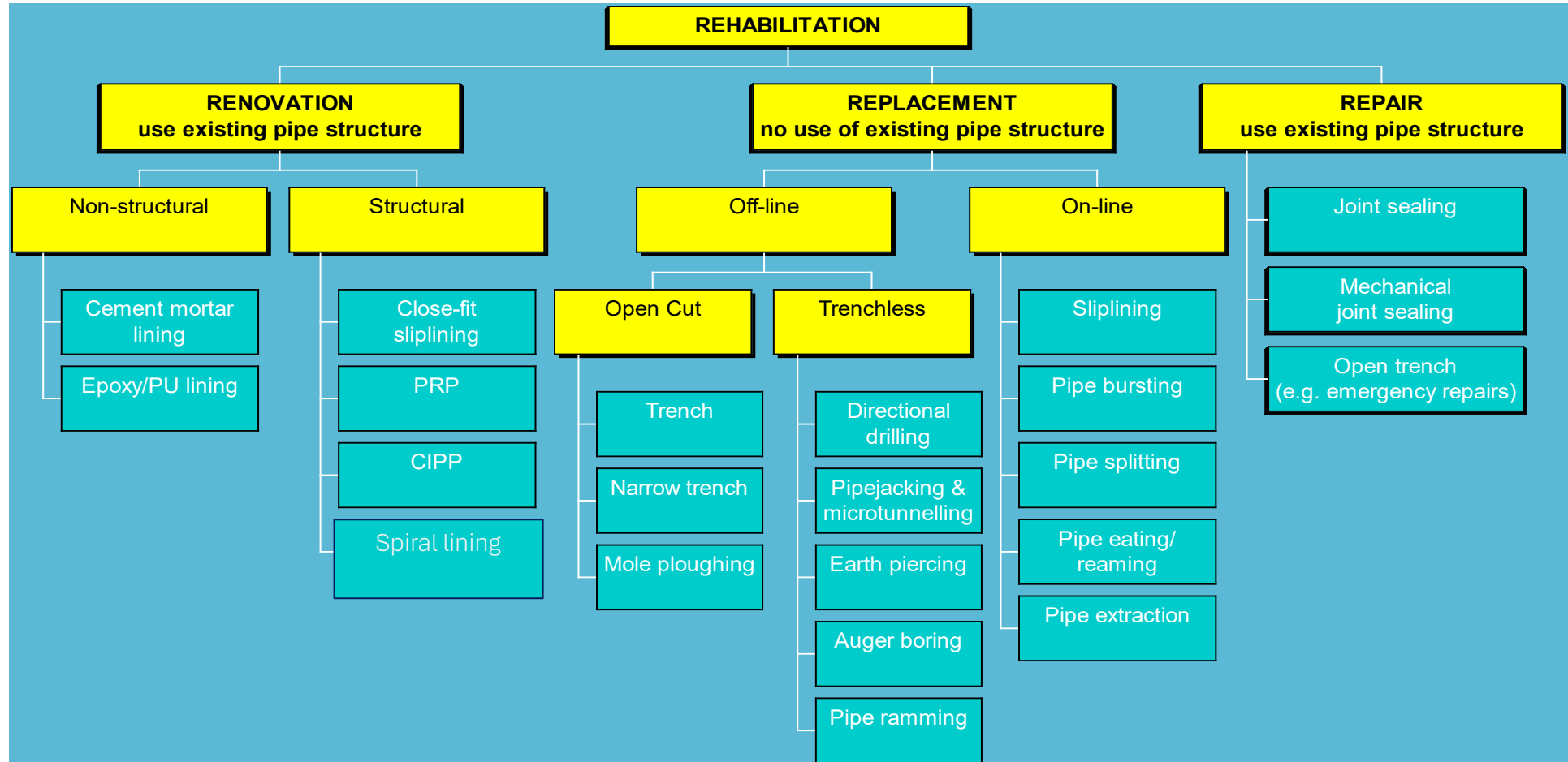
- SINCE THE 1970'S TRENCHLESS TECHNOLOGY HAS GROWN INTO A MULTI BILLION MARKET GLOBALLY
- COUNTRIES AROUND THE WORLD HAVE RECOGNISED THE NEED AS ISSUES WITH LOCAL ASSETS AND NETWORKS INCREASE.
- INNOVATION AND A BETTER UNDERSTANDING OF THE PROBLEMS AND CAUSES HAS ENABLED TECHNOLOGIES TO DEVELOP
- TESTING AND PRODUCT STANDARDS MAINTAIN A SUSTAINABLE AND A LONGTERM SOLUTION

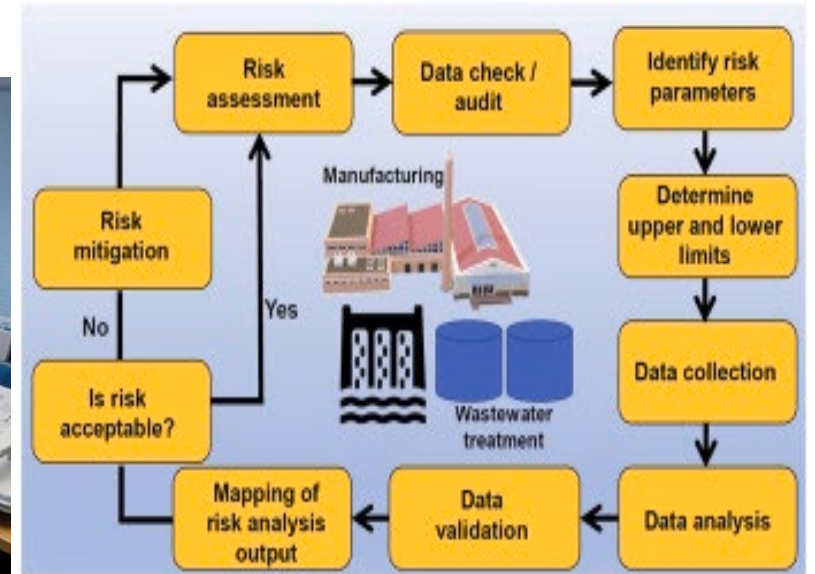
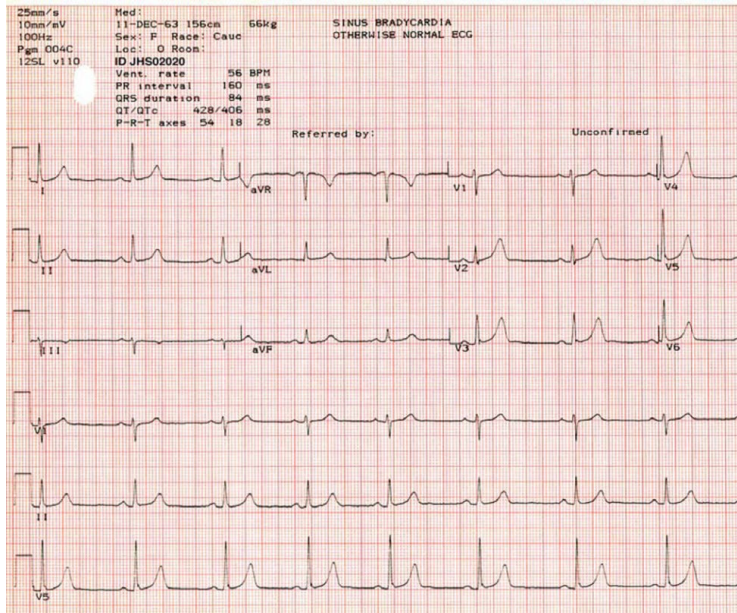


Trenchless technology



WHAT IS TRENCHLESS

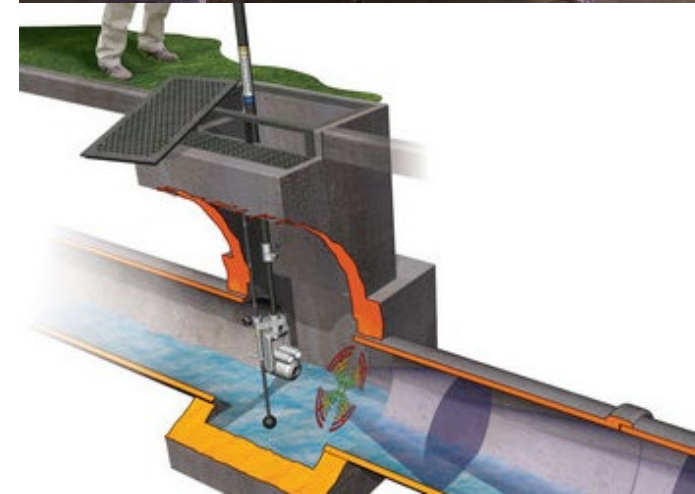




INSPECTION, CONDITION ASSESSMENT

Visual Options with cameras

- ADDITIONAL SURVEY METHODS
 - LIDAR
 - LASER SURVEY
 - EMC DIAGNOSITICS
 - AIR AND PRESSURE TESTING
 - AI OPTIONS



International Aramoon Corp. IAC شركة أرامون الدولية للمقاولات والبناء والتشييد
 No-Dig Test & Repair for Water & Sewer Network فحص وإصلاح شبكات المياه والصرف الصحي بدون حفر

CCTV survey dated: 21/12/02

Operator: Radie S. Fabian Report nr.: 34/Dahran/600
 City: Al Khobar Sector: Sewer Line Pressure Section
 Street: W3S Al Jazzer St.
 Plan nr.: KS-1012 Line ID: D3/P-LineR00
 Line nr.:
 from manhole: AVC 5 to manhole: STA 3414
 Line type: Foul Weather: Dry
 Survey direction: Survey downstream Water protection zone: Water protection zone 1
 Nom. diameter: 600 Material: Glass fiber reinforced plastic
 Line length: 0.00 Pipe length: 12.00

Video tape nr.: Inspection
 Reason of survey: Assessment of complete remedial or renovation works
 Position in traffic: Main road - suburban/rural (all other roads with h
 Comments:

M 1:3600	Path	Shortcut	Anomalia description	Pos.	Video	Photo
	2.50	LS	Line start		000921	
	13.70	II	Joint inspection		000215	
	97.10	II	Joint inspection		000920	
	191.90	II	Joint inspection		001718	
	242.30	MP-3	Damaged Pipe (Hole) 5:00		002143	1
	242.30	MP-	Pipe Damaged (Hole) 7:00 o'clock		002159	2
	288.50	MP-	Pipe damaged Circumferencial, 3:00 to 9:00 o'clock position		002508	3
	269.60	PO-	Protruding Cable from 3:00 to 9:00 O Clock		003101	
	270.20	PO-	Protruding Cable, pipe wall, 4:00 to 8:00 o'clock		002638	4
	270.40	SA	Survey abandoned		003033	
	270.60	PC-	Protruding Cable		002747	5
	270.60	PC-	Protruding Cable Number 2 4:00 to 9:00 o'clock		002843	6
	270.60	PC-	Protruding Cable Number 2 at 3:00 at 9:00 o'clock		002850	

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Defect photo **Number : 3, 4**

Line-nr.: 03/P-Line/600 Report nr.: 34/Dahran/600
 Start manhole: AVC 5 End manhole: STA 3414

Photo: 3
 Position: 288.50
 State: MP-

Description:
 Pipe damaged Circumferencial, 3:00 to 9:00 o'clock position


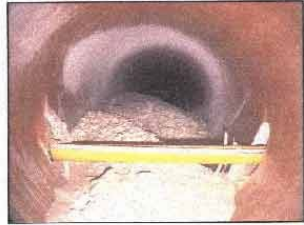


Photo: 4
 Position: 270.20
 State: PO-

Description:
 Protruding Cable, pipe wall, 4:00 to 8:00 o'clock



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CCTV SURVEYS



Spray lining





SPRAY LINING SIPP

- Resin is sprayed on to the surface of the pipe. Mixed at spray head.
- Thickness based on design can be monitored. Structural or semi structural
- Gas, pressure pipes, drinking water pipes.
- Diameters 12mm to 2.4m
- A TOOL IN THE TRENCHLESS BOX OF TOOLS. Some projects require several trenchless systems, CIPP, spray etc working together.

CLEANING OF THE PIPE



- **Water Jet High Pressure**

Ideal for light to very heavy corrosion
Removal of Cement & Bitumen linings

- **Water Jet Low Pressure**

Ideal for light corrosion & Pipe Flushing
Ideal for cleaning asbestos cement pipes

- **Vortex Blowing & Tomahawk vacuum Systems**

75mm to 200mm - ideal for light to medium corrosion
Clean up to 400m between access points

- **Rackfeed Boring Machines**

75mm to 250mm - ideal for light to very heavy corrosion

Clean up to 170m between access points

- **Pipe Scrapers**

32mm to 1200mm - ideal for light to heavy corrosion

Clean up to 200m between access points



CLEANING PIGS

Emt



Cleaning





1
LOCATE THE PIPE



2
SMALL EXCAVATIONS X 2



3
ISOLATE & CUT INTO THE PIPE



4
SURVEY TO ASSESS PIPE
CONDITION &
ABNORMALITIES



5
CLEAN THE PIPE



6
SURVEY TO CONFIRM
PIPE IS CLEAN



7
LINE THE PIPE



8
SURVEY TO CONFIRM
LINING INTEGRITY



9
DISINFECT THE PIPE



10
PIPE BACK TO SERVICE

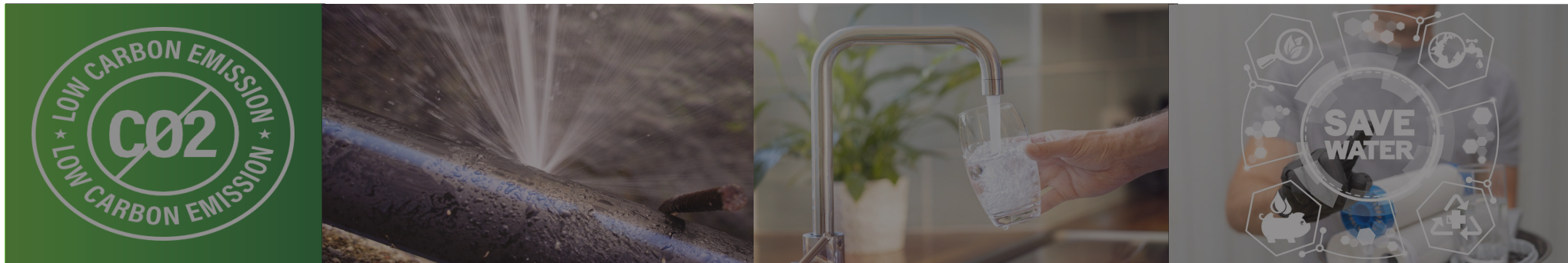


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FILL EXCAVATION

“ITS EASILY POSSIBLE TO CLEAN AND COAT 150m PIPE LENGTHS
AND RETURN TO SERVICE IN 8 HOURS”

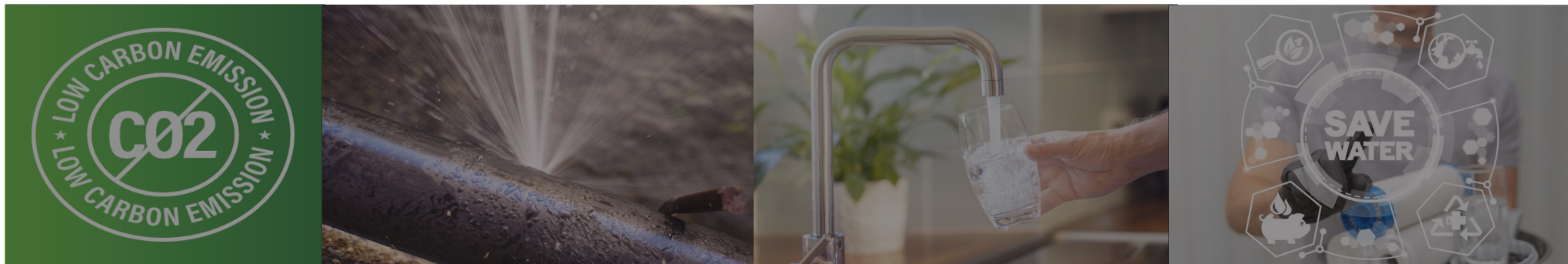
SIPP BENEFITS

- Line up to 1000m of pipe per week
- **Low cost option for pipeline rehabilitation**
- Minimal disruption with a small footprint, Ideal for built up urbanised areas
- **Zero ground disturbance protects existing underground utilities**
- Does not usually block services
- **40% carbon reduction compared to other systems**
- Pipe enhancement reduces pipe failures
- **Leakage reduction**
- Fixes “Brown water” issues
- **For pipes from 75mm to 2500mm diameter**



For pipes from 75mm to 2500mm diameter

- Reduced pressure loss throughout the network
- **Minimal diameter reduction in host pipe**
- Pipe can be returned to service 1 hour after coating
- **Possible to line up to 900m between access points (SR3000)**
- Fast – Efficient – Proven system
- **Lining Steel / Cast Iron / PVC / Asbestos Cement and cement lined pipelines**
- 50 year design life
- **Cleaner and fresher drinking water**
- Does not disturb existing utilities



- **POTABLE WATER LINING MATERIAL**

Approved for use under NSF & UK Reg DWI 31(4)(a)

Designed specially for SIPP - 3mm thick per pass up to 14mm total thickness. the applied thickness is designed using an innovative design calculator to apply a lining that meets design specifications

- **UNIQUE CARBON FIBRE BASED LINING MATERIAL**

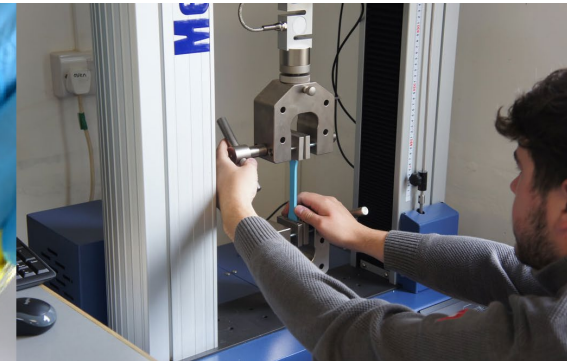
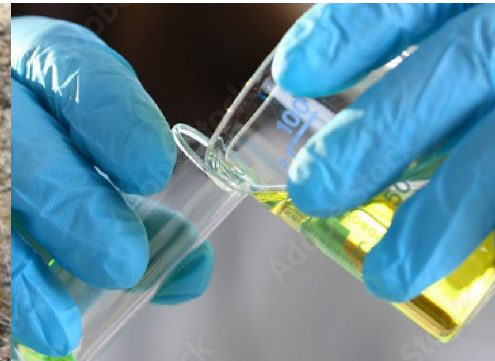
For Sewers & Access Chambers

- **SPECIALISED EPOXIES**

For Sewers / Tanks / Access Chambers / Bunds

- **OIL & GAS LINING MATERIAL**

Work in cooperation with the best Lining material suppliers in the world to develop long term and safe solutions. The development of these lining involves many research and implementation studies, as well as numerous evaluations and tests.



SIPP LINING EQUIPMENT

Various SIPP Pipe Lining Rigs depending on pipe diameter and pipe length

RIG MODEL	IDEAL DIAMETER RANGE	COATING TANK CAPACITY	MAXIMUM LINING LENGTH (m)	NOTES
BSR100	12 to 50mm	60 L	25	BILT SYSTEM
MSR60	60mm TO 200mm	80 L	60	ULTRA PORTABLE
SR200	75mm to 200mm	200 L	100	FULLY ELECTRIC
SR500	75mm to 300mm	500 L	150	
SR1000	75mm to 600mm	1000 L	175	
SR2000	150mm to 1200mm	2000 L	175	
SR3000	200mm to 2500mm	3000 L	430	



THESE WORLD 1st & GLOBALLY RECOGNISED INNOVATIONS ARE FITTED AS STANDARD TO ALL NEW RIGS



DIAL A FLOW
Automatic Lining thickness & flow rate
The 1st Fully Autonomous SIPP



A.V.O.S
Removes operatives from excavations whilst SIPP lining



S.T.M
Smart Coating tank level monitoring in real time with Radar



ONLINE
Online at all times with full remote access and interrogation, c/w software updates



N.H.S
Programmable heating system, warm your rig automatically overnight



NON CONTACT FLOW METERS
Removes all the usual issues with mechanical meters



SMOOTH-COAT UMBILICAL HOSE
Mk1 version developed over 12 years ago, now on Mk2



A.R.O
Always on, built in rig operation assistant



EXHAUST HEAT RECOVERY
Carbon reduction & fuel saving system



AUDIT FORMS
Unique online paperless lining



SMART CHECK
World 1st Patent protected Un-cheatable weight checking system for SIPP rigs



SOLVENT REDUCTION
We have pioneered the use of disposable parts to reduce cleaning



GLOBAL TRAINING



SR1000
Fitted to a Truck

Over 80 SR1000s
sold to date



s sold to date

PIPE LINING RIG MAXIMUM COATING LENGTH BETWEEN ACCESS POINTS

SIPP LINING RIG CAPACITIES

PIPE DIA MM	PIPE DIA INCHES	COATING THICKNESS	POSSIBLE DISTANCE IN METRES				
			SR200E	SR500	SR1000	SR2000	SR3000
100	4	3mm / 0.125"	100	100	180	180	N/A
150	6	3mm / 0.125"	100	100	180	180	N/A
200	8	3mm / 0.125"	90	100	180	180	420
250	10	3mm / 0.125"	75	100	180	180	420
300	12	3mm / 0.125"	60	100	180	180	420
360	14	3mm / 0.125"	50	100	180	180	420
410	16	3mm / 0.125"	40	100	180	180	420
460	18	3mm / 0.125"	N/A	100	180	180	420
500	20	3mm / 0.125"	N/A	90	180	180	420
560	22	3mm / 0.125"	N/A	85	180	180	420
610	24	3mm / 0.125"	N/A	80	165	180	420
700	28	3mm / 0.125"	N/A	70	144	180	420
800	31	3mm / 0.125"	N/A	60	125	180	385
900	35	3mm / 0.125"	N/A	50	110	180	340
1000	39	3mm / 0.125"	N/A	40	100	180	310
1100	43	3mm / 0.125"	N/A	N/A	90	180	280

TOTAL TANK CAPACITY

TANK CAPACITY	200	LITRES		53	GAL
TANK CAPACITY	500	LITRES		132	GAL
TANK CAPACITY	1000	LITRES		264	GAL
TANK CAPACITY	2000	LITRES		528	GAL
TANK CAPACITY	3000	LITRES		793	GAL

PIPE LINING RIG WEIGHTS & DIMENSIONS

MODEL	WEIGHT TANKS EMPTY	WEIGHT TANKS FULL			LENGTH	WIDTH	HEIGHT
METRIC	2950	3250			3000	2000	2000
IMP	6,505	7,166			9.84	6.56	6.56
METRIC	3500	4200			3500	2100	2200
IMP	7,718	9,261			11.48	6.89	7.21
METRIC	4,500	6000			4000	2230	2700
IMP	9,923	13,230			13.11	7.31	8.85
METRIC	7,000	9500			5000	2230	2700
IMP	15,435	20,948			16.39	7.31	8.85
METRIC	10,000	14500			6000	2230	2700
IMP	22,050	31,973			19.67	7.31	8.85

Est 1992

SIPP LINING RIG MONITORING



W.E.R.M.S - The most popular SIPP Rig Monitoring System in the world Fitted to all our Lining Rigs

- WRc / DWI approved for use on potable water pipelines
- High level monitoring of Ratio / Pressure / Temperature etc
- Online & globally connected at all times
- **AUDIT FORMS (world 1st)** enabled for paperless record keeping
- Developed & updated over 24 years by Schur-BPH
- Precise computer controlled lining application
- Continually updated with many innovations
- Full remote access & control using any web enabled device (**world 1st**)
- GPS & email (**world 1st**)
- Sun readable screens



All Rigs come fitted with W.E.R.M.S as standard

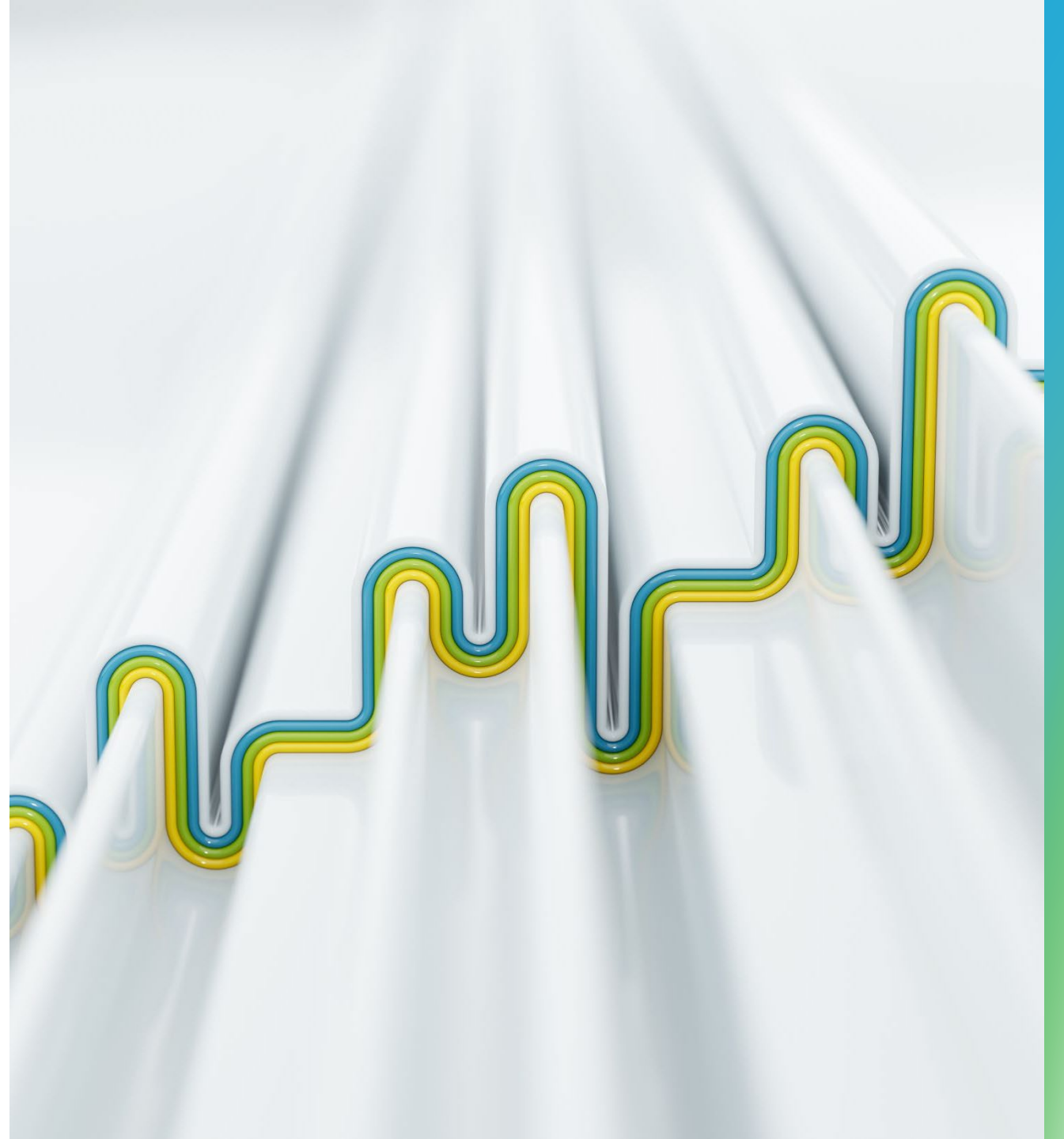
CASE STUDIES

- 2022 CROATIA 420M DN 200MM WATER PIPE
- 2021 UK YORKSHIRE WATER 600MM
- 2020 IRISH WATER 350MM
- 2019 CHILE 350MM
- 2017 BELGIUM DN 1100MM
- 2013 ITALY DN 150MM
- 2012 MOSCOW DN 900MM
- 2012 BRAZIL 250MM
- 2012 USA 900MM
- GLOBALLY OVER 2800 KM SPRAY LINED



SUMMARY SPRAY IN PLACE

- Compact system
- No compressor required, ultra quiet allowing 24/7 working
- Highly developed software to control installation and ensure positive result.
- Fast efficient
- Resins applied based on requirements of project, long term, chemical resistant, abrasive resistant
- Design and planning
- 50 year plus life
- Environmental /trenchless solution for all types of pipes, pressure , non pressure, drinking water and waste water.



Conclusions, WHY TRENCHLESS



- Ageing Infrastructure
- Global growth in population and demand on services
- Impact of climate change on networks
- Technologies and testing regimes exist to improve networks and assets and offer sustainable solutions
- Education, better understanding, working together for the best use of resources