

Dredging pipelines contributing to the NetZero objective

PROFIT FROM DISCHARGING PIPELINES SYSTEMS

WEDA

28 JUNE 2023

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Kiasma® Group

“when passion meets
talent
and experience meets
innovation
progress come to life”



TODAY'S MENU IS PROFIT FROM DISCHARGING PIPELINE SYSTEMS



THE CASE OF HD-PE MULTI-LAYERS





**WE ARE IN A WORLD WHERE EVERYTHING IS GETTING
SMARTER AND MORE INTELLIGENT**

EXCEPT THE....

PIPE FOR DREDGING





PIPES (no matter steel, rubber, HD-PE) ARE PART OF THE DREDGING AND CAUSE HEADACHES



WEAR OUT



BLOW OUT



BREAK UP

HD-PE Compounds and Productions techniques offer

**FAR BETTER RESISTANCE TO WEAR AND TEAR
MORE CONTROLLABLE BLOW OUT CONDITIONS
PREDICTABLE BREAK UP**



PIPES ARE PART OF THE DREDGING SOLUTIONS



WEAR OUT



BLOW OUT



BREAK UP

SOLUTION: products, specifically designed for dredging to address:

- ✓ *Higher resistance to abrasion and wear*
- ✓ *Higher resistance to impacts and mechanical stress*
- ✓ *Lower maintenance*
- ✓ *Lower environmental impact*
- ✓ *Better projects margin*

FROM GENERIC TO SPECIALIZED
jump in performance because specialization



TODAY MAIN TAKEAWAYS

1. DISCHARGING PIPELINE IS A FACTOR FOR PROFIT
2. PROFIT COMES FROM SPECIALIZED SOLUTIONS
3. PROFIT AND SUSTAINABILITY GO TOGETHER





CRASH COURSE ON DISCHARGING TECHNOLOGY AND ECONOMICS

WHAT IS A DISCHARGING PIPELINE SYSTEM

WHAT IS IN THE PIPELINE SYSTEM

WHAT MAKES A PIPELINE A SYSTEM

WHERE TO INNOVATE IN A PIPELINE

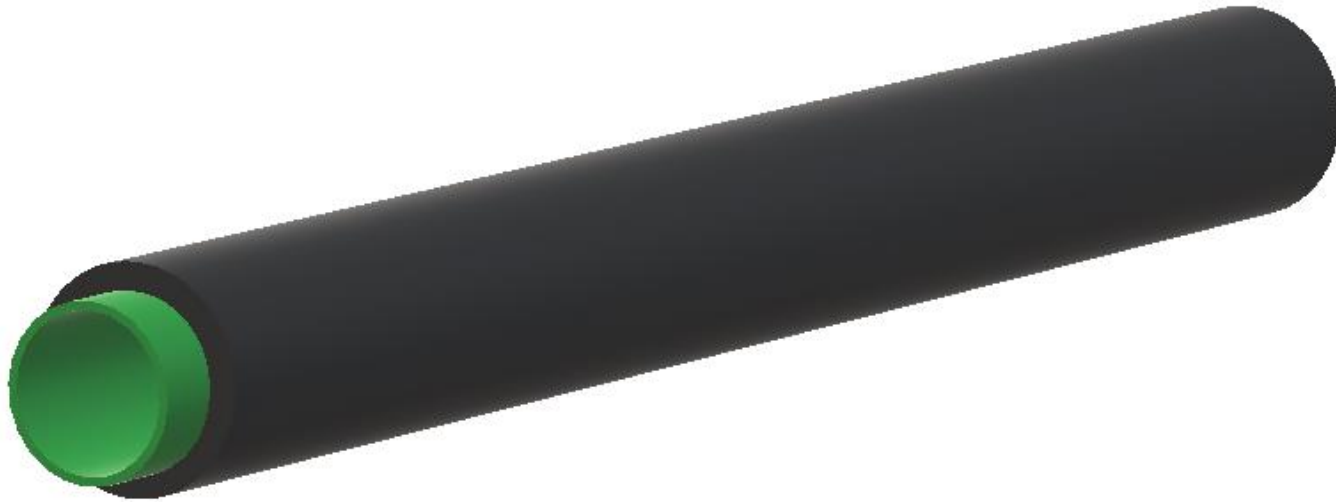
WHAT IS A SPECIALIZED PIPELINE

WHERE THE PIPELINE CONTRIBUTES TO PROFIT



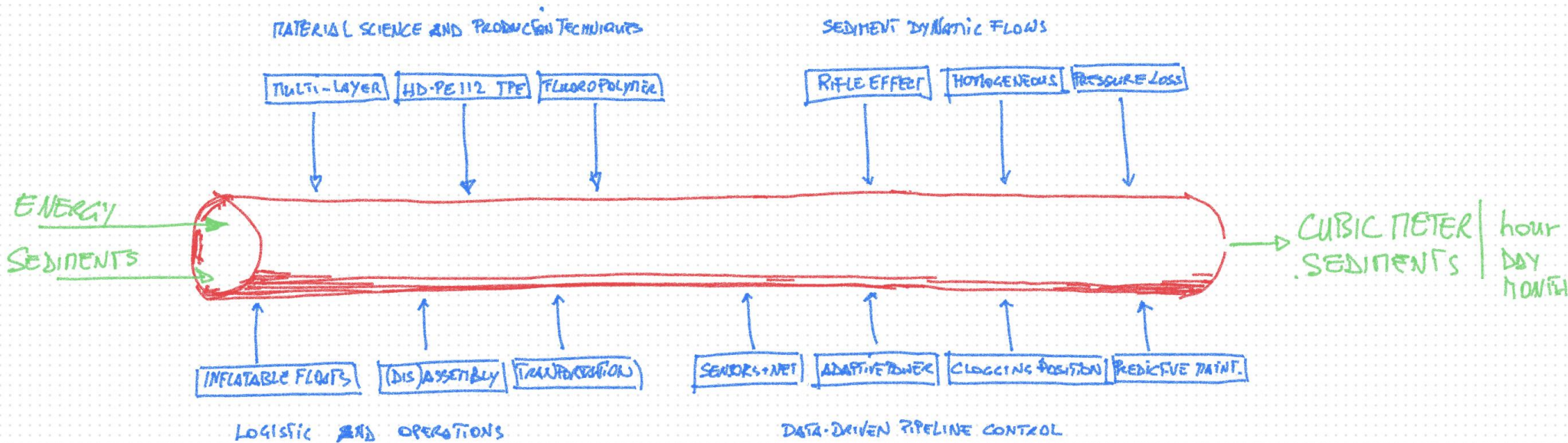


A PIPE IS A PIPE





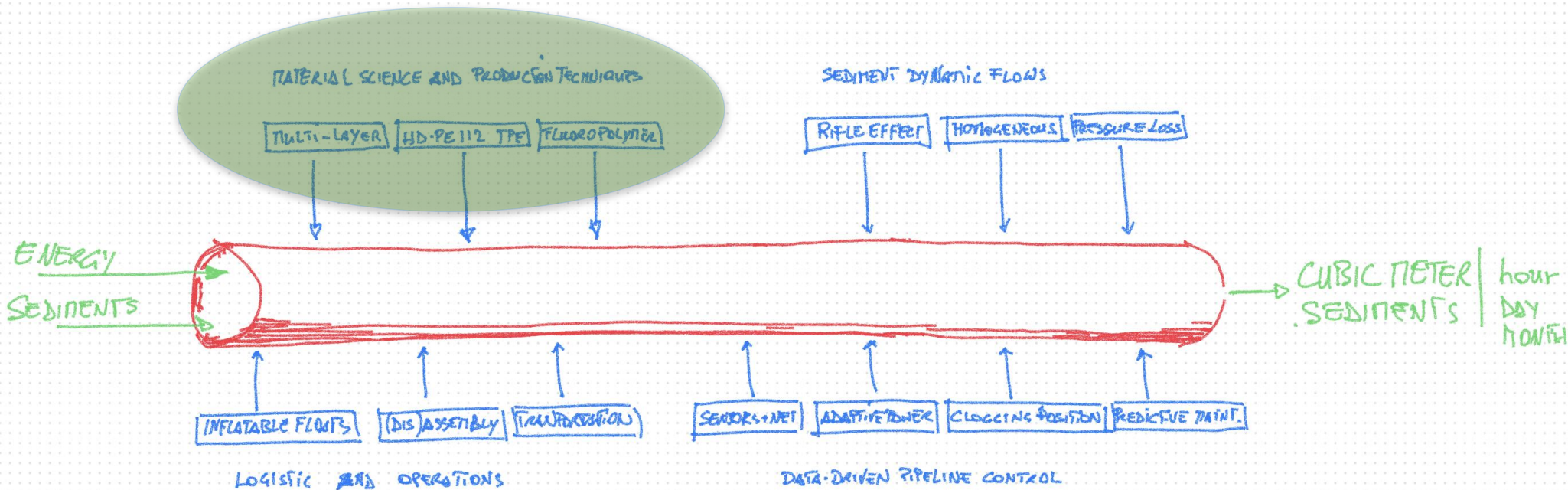
WERE YOU SEE A PIPE WE SEE A SYSTEM



and its
DYNAMICS - MECHANICS - ECONOMICS



MATERIAL SCIENCE and PRODUCTION TECHNIQUES





Next-generation polymers anti-abrasive HD-PE 112 BASED (code name KNN33_4.0[®] type 3AR)



STRUCTURAL + ANTI-ABRASIVE



WHAT IS IN THE PIPE: MULTILAYER!

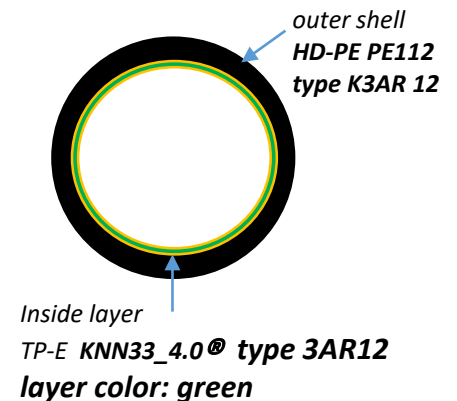
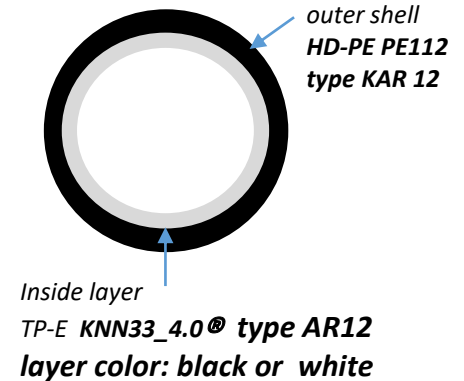
OUTER LAYER made of thermoplastic compound HD-PE PE112.

The HD-PE 112 is made of a bimodal PE resin, having specified stress cracking resistance & impact strength. The HD-PE 112 compound is produced from a compound with higher physical and mechanical properties than HDPE PE100 because it has a higher resistance to circumferential stresses (**MRS 11,2 at 100 years**). HD-PE 112 is derived from an advanced production process in which the molecular structures have stronger and more efficient bonds even under high stresses, although with smaller pipe thicknesses, while still maintaining the operating pressure intact.

INNER LAYER KNN[®] (TP-E compound) specially designed for the dredging and mining sector.

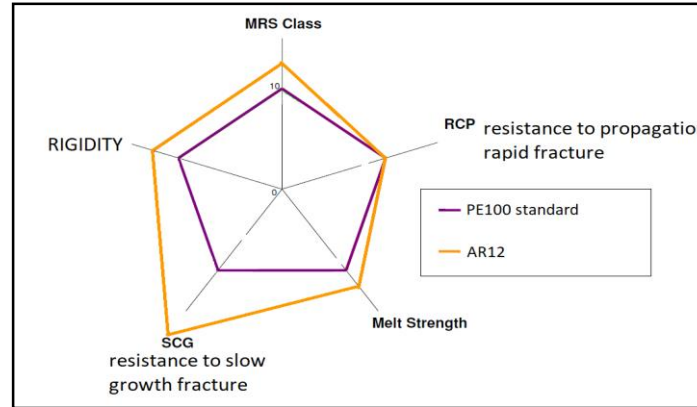
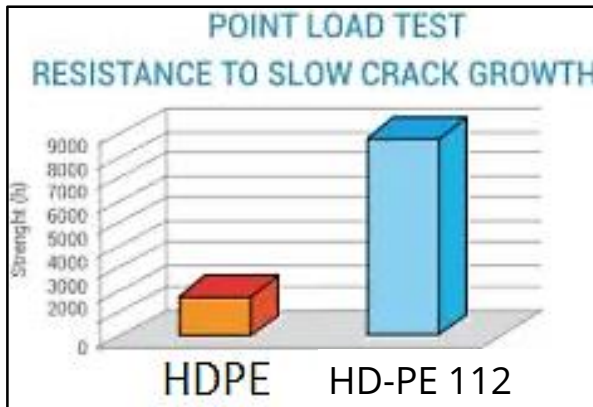
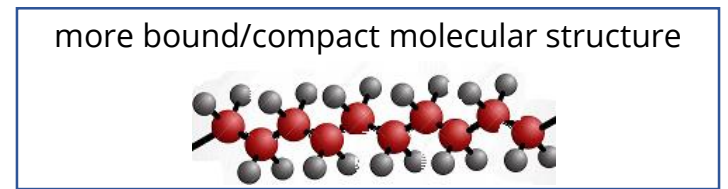
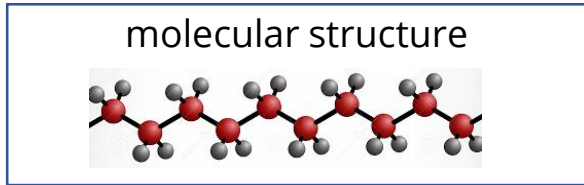
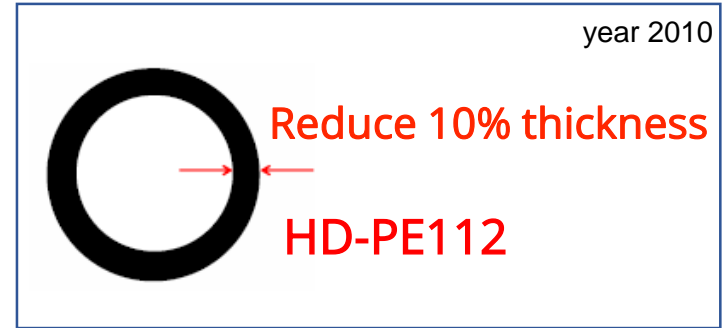
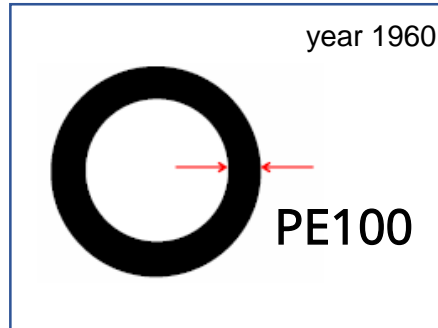
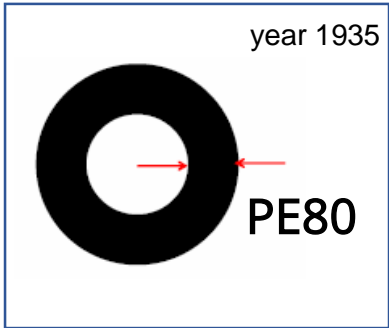
The pipes are specifically developed to increase their durability according to a much higher resistance to abrasion and, higher resilience and improved mechanical properties.

(code name KNN33_4.0[®] pipes)





OUTER LAYER MATERIAL EVOLUTION



INCREASE BLOW OUT RESISTANCE

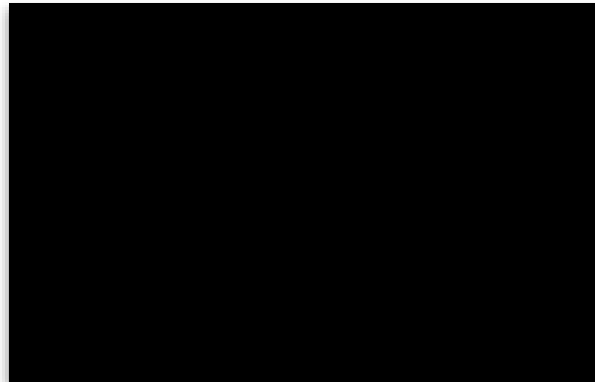


ANTI-ABRASIVE INNER LAYER MATERIAL EVOLUTION

PARAMETER	Test method	Test results				
		STEEL pipes	Thermoplastic HDPE PE100	type AR12	type 1AR12	type 2AR12
Yield strength	ISO 527		20,8 MPa	6,2 Mpa (semi-elastic)	No yield (Elastic behaviour)	No yield (Elastic behaviour)
Abrasion loss	ISO 4649	376 mm ³	152 mm ³	85 mm ³	70-72 mm ³	48 mm ³
Resilience	ISO 180		29,6 kJ/m ²	No breakage	No breakage (Elastic behaviour)	No breakage (Elastic behaviour)



ELASTICITY LAYER



RESISTANCE TO LACERATION

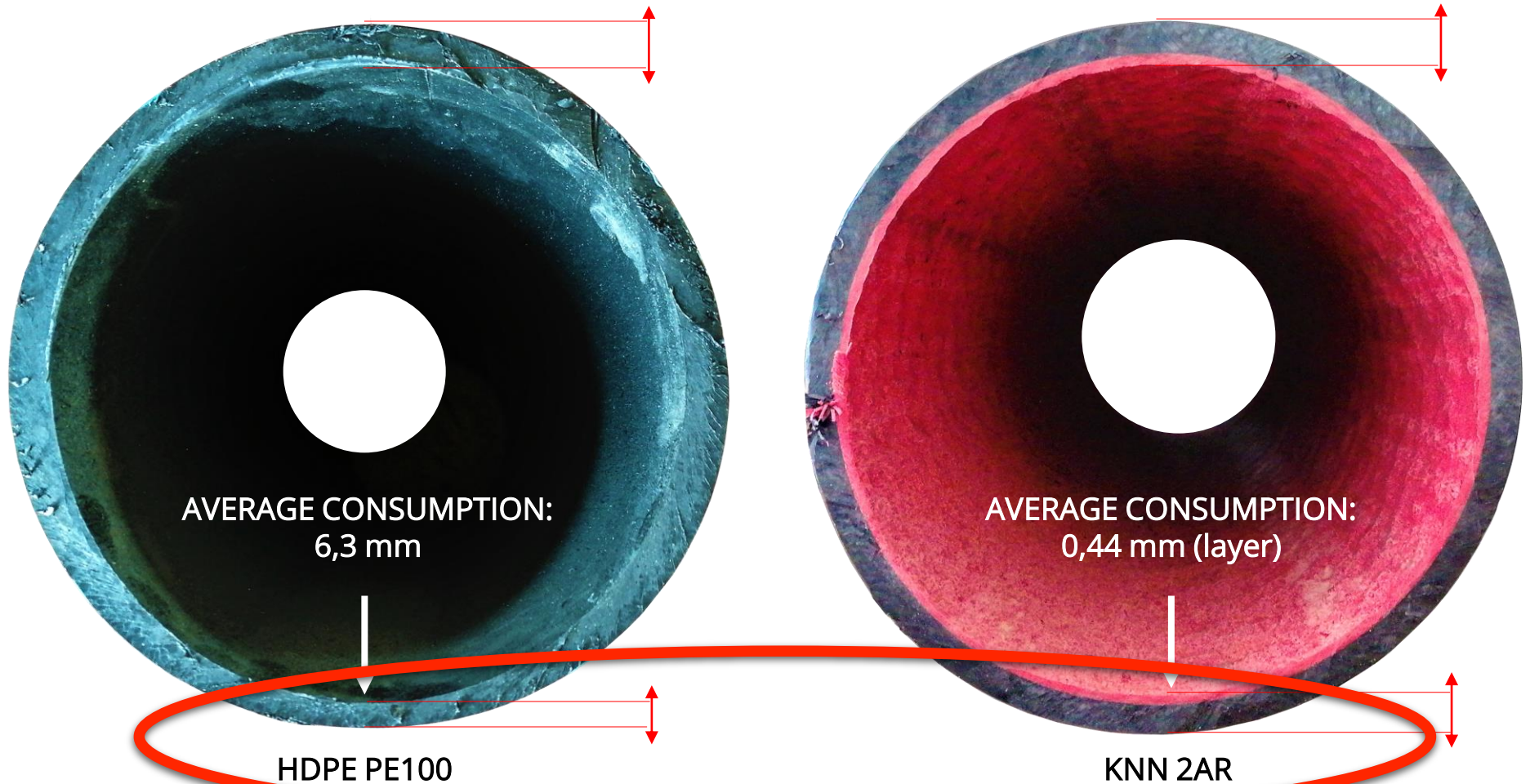


RESISTANCE TO ABRASION



ON-SITE QUARRY TEST: RESULTS (Abrasion)

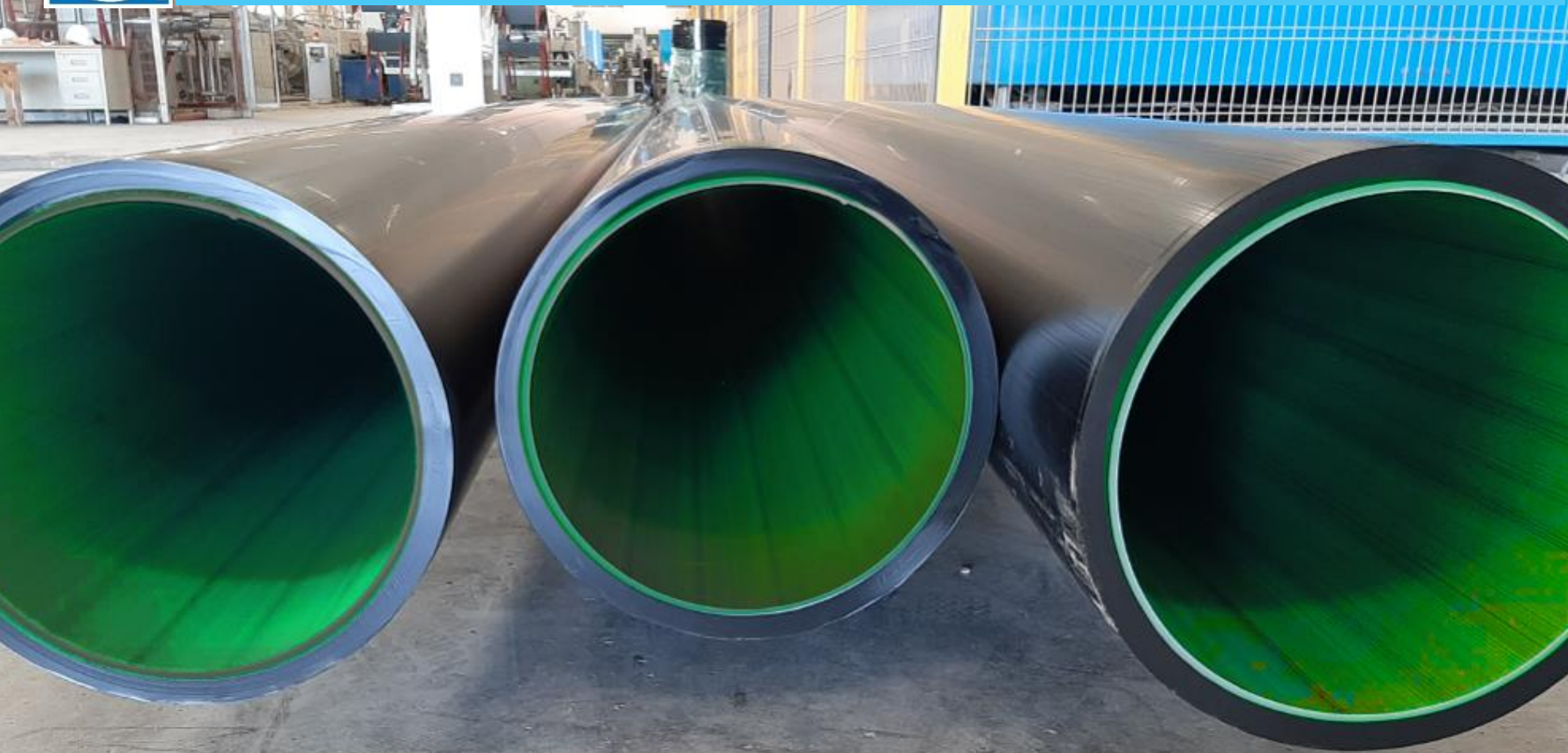
Comparison HDPE PE100 - KNN type 2AR 112



ANTI-ABRASION



ANTI-ABRASION PIPE FRESHLY BAKED FROM PRODUCTION

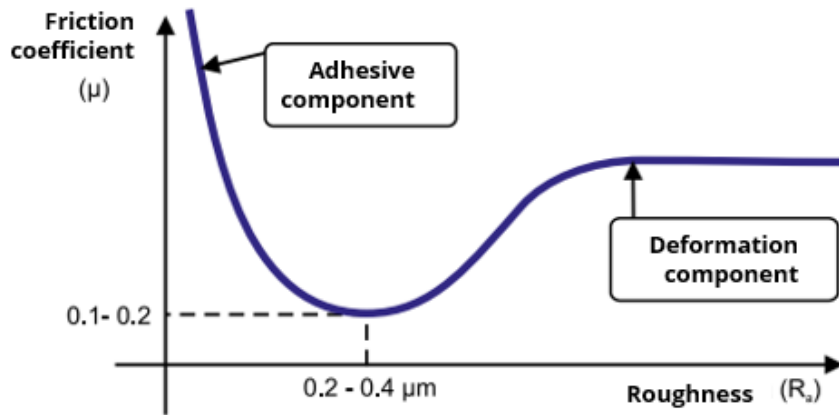


AND FRICTION REDUCING - KNN 3AR[®] PIPES



MORE! FRICTION REDUCER INNER LAYER MATERIAL

FRICTION REDUCE ENERGY EFFICIENCY (type of sediments + roughness of inner pipe surface)



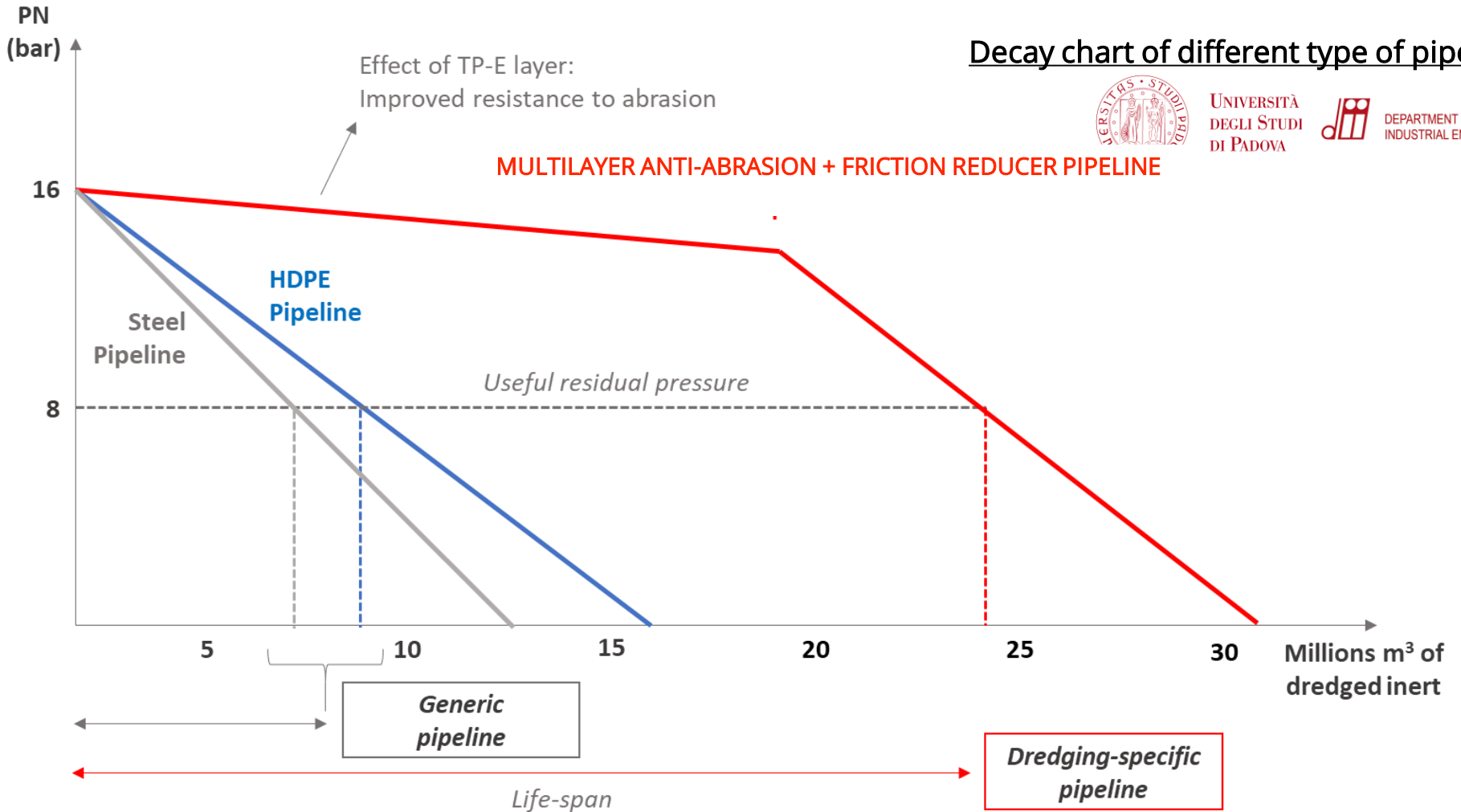
Effect of surface roughness on friction coefficient

Part of TP-E compound is anti-wear technopolymer compound with LUBRICANT properties allows lower energy demand (10 to 15 %).

ANTI-ABRASION + FRICTION REDUCER



MULTI-LAYER PIPE RESULTS



UNIVERSITÀ
DEGLI STUDI
DI PADOVA



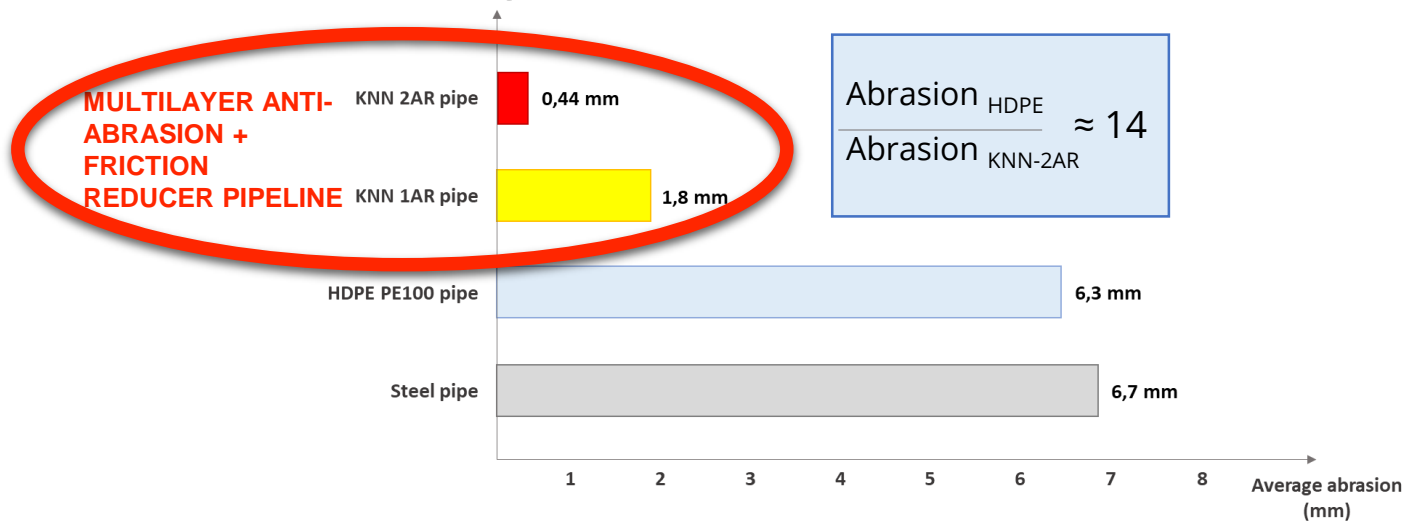
DEPARTMENT OF
INDUSTRIAL ENGINEERING

WORKING LIFE EXTENDED 2-4 TIMES

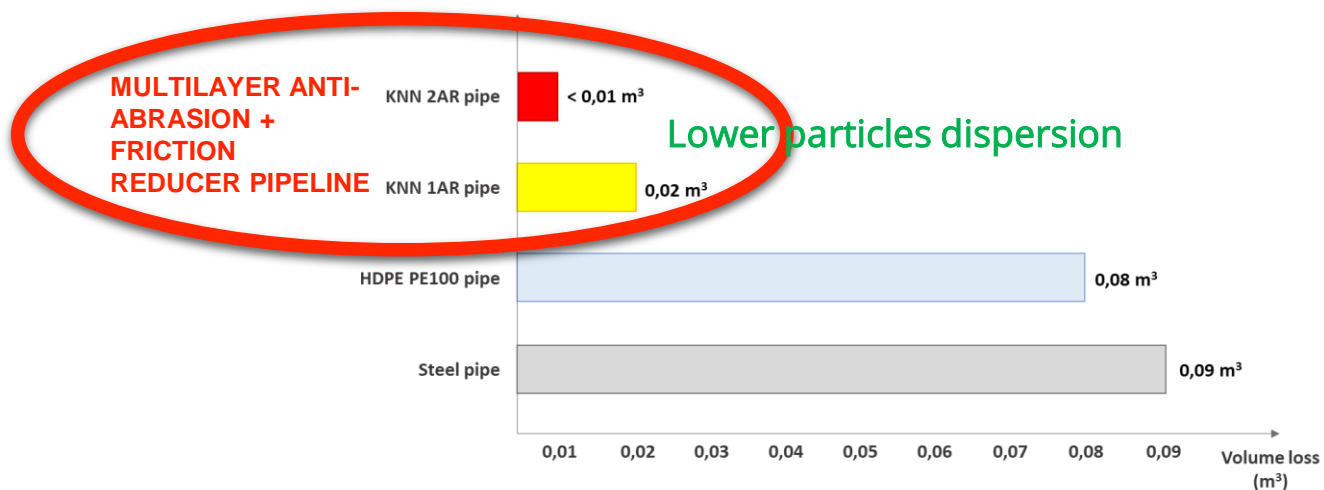


ON-SITE QUARRY TEST: RESULTS (abrasion)

Average Thickness Abrasion

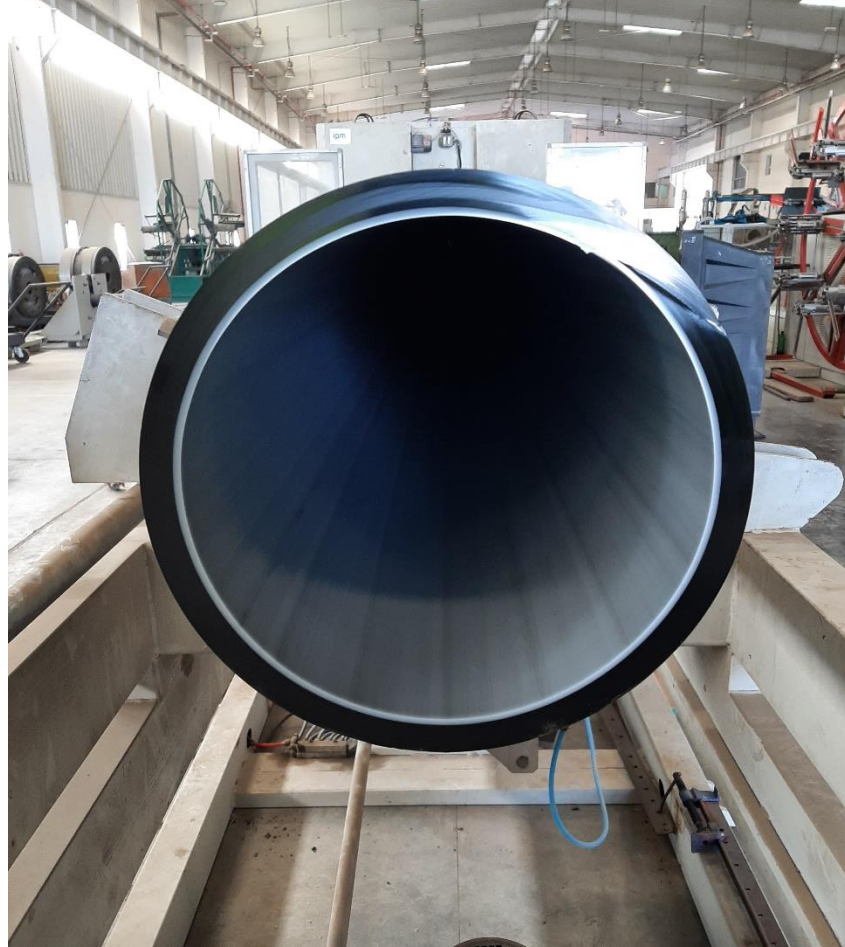


Average Volume Loss Evaluated for a pipe with Length=12 m.





CO-EXTRUSION PRODUCTION TECHNIQUES



**CO-
EXTRUSION
(no glue)**

**HIGHLY ENGINEERED PIPE = SPECIALIZED
(the 'tire' of dredging)**



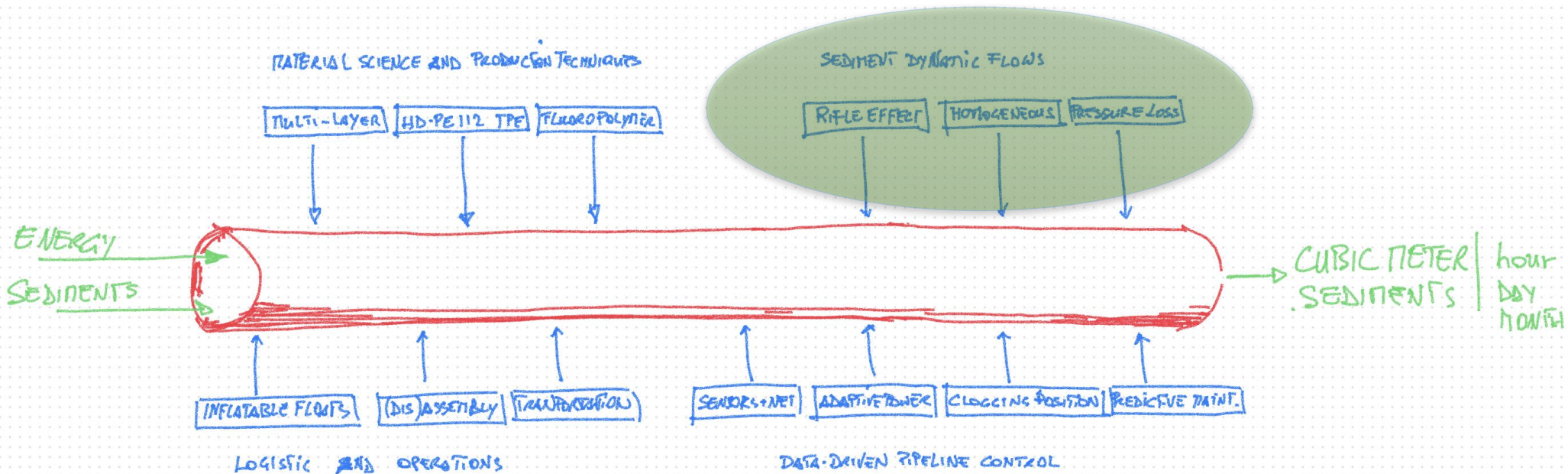
TAKEAWAYS FROM HD-PE AND TPE

- A. REAL INCREASE OF THE RESISTANCE TO BLOW UP
- B. ANTI-ABRASION EXTENDS THE PIPE LIFE 2-4 TIME
- C. ENERGY SAVINGS 10-15%



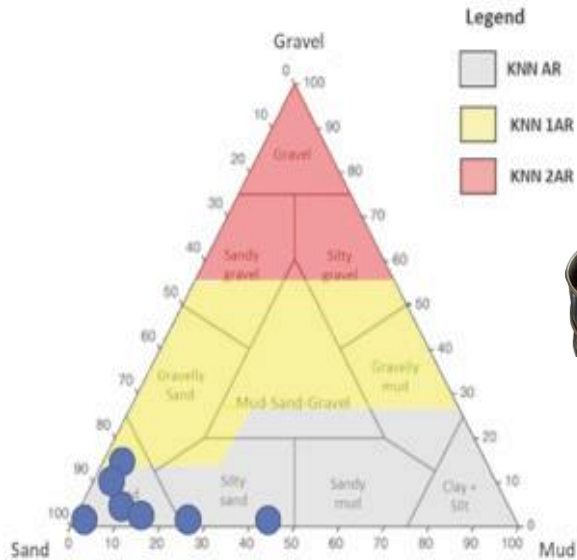


SEDIMENT FLOW DYNAMICS





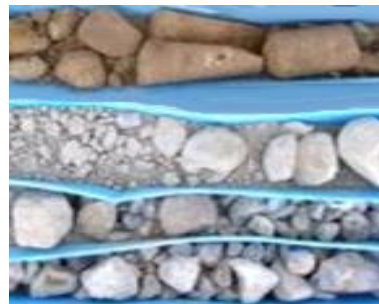
SEDIMENT: ALL STARTS FROM THE SOIL



ENGINEERING PROJECT STUDY - LINE DESIGN



SEDIMENT ANALYSIS ASSESSMENT TYPE OF PIPE

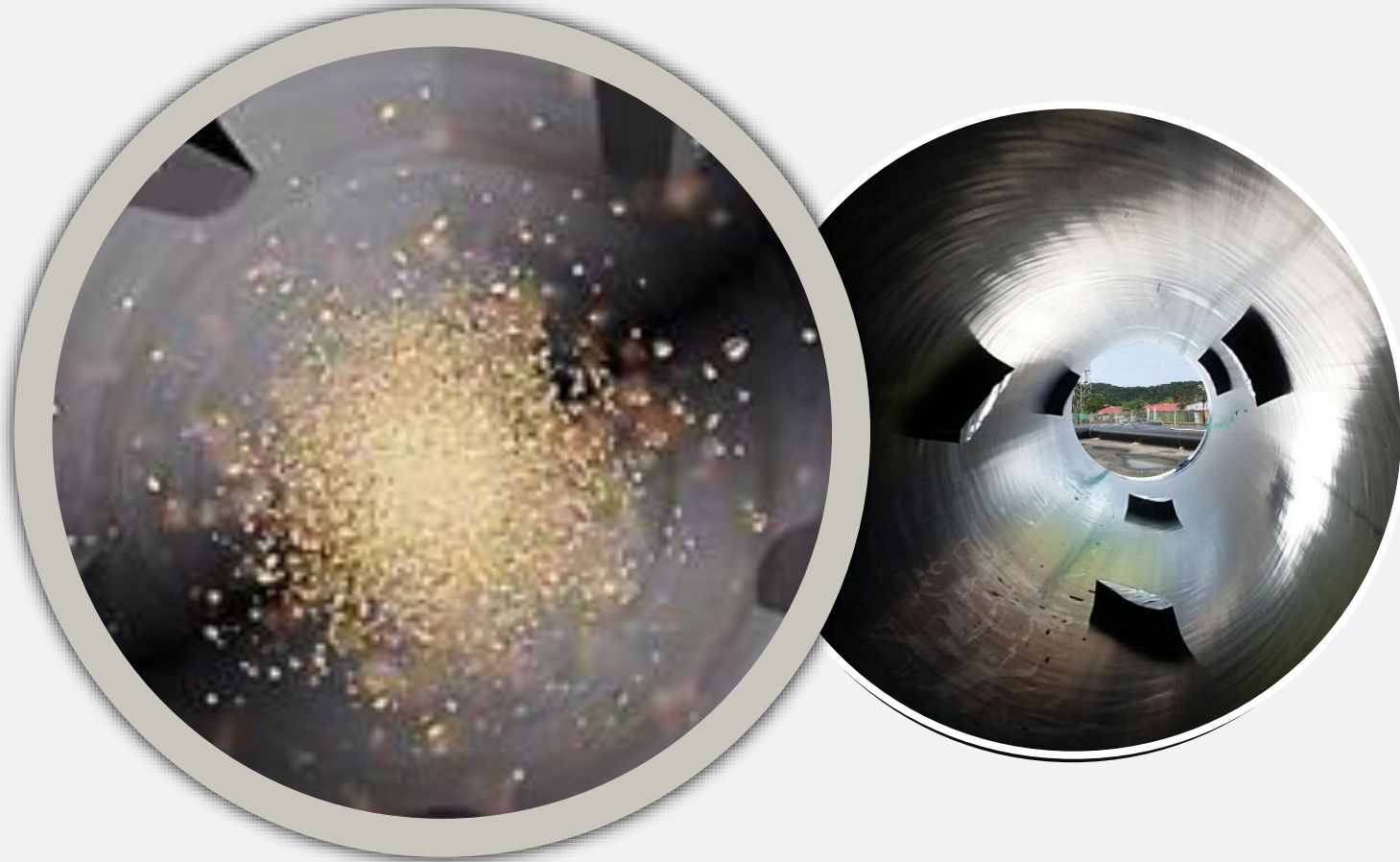


COURSES AND TRAINING TO EXPLAIN THE APPLICABLE SOLUTIONS





WHAT IS A SPECIALIZED PIPE: MAKE SEDIMENTS 'DANCING'

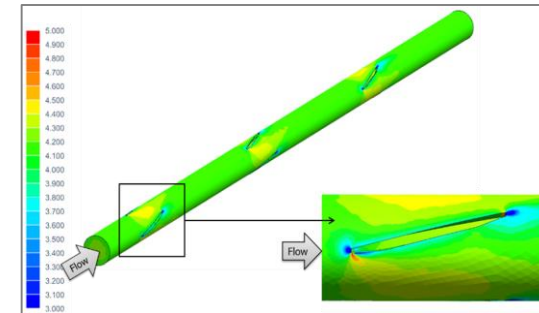
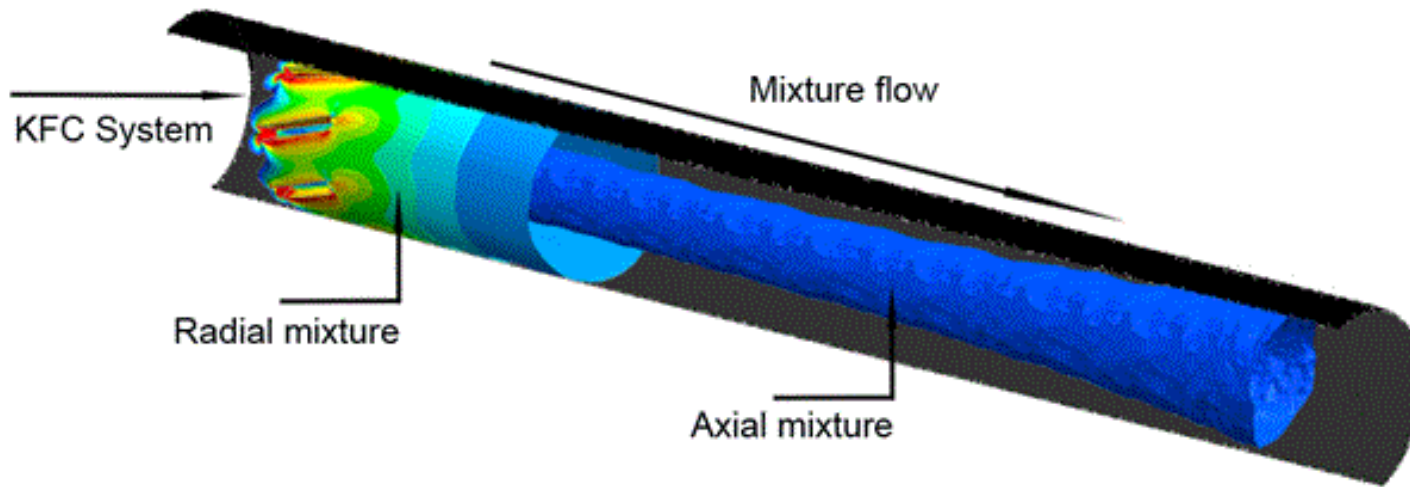


ENERGY REDUCTION 7-10%



SYSTEM INSIDE THE PIPES (CODE NAME KFC®)

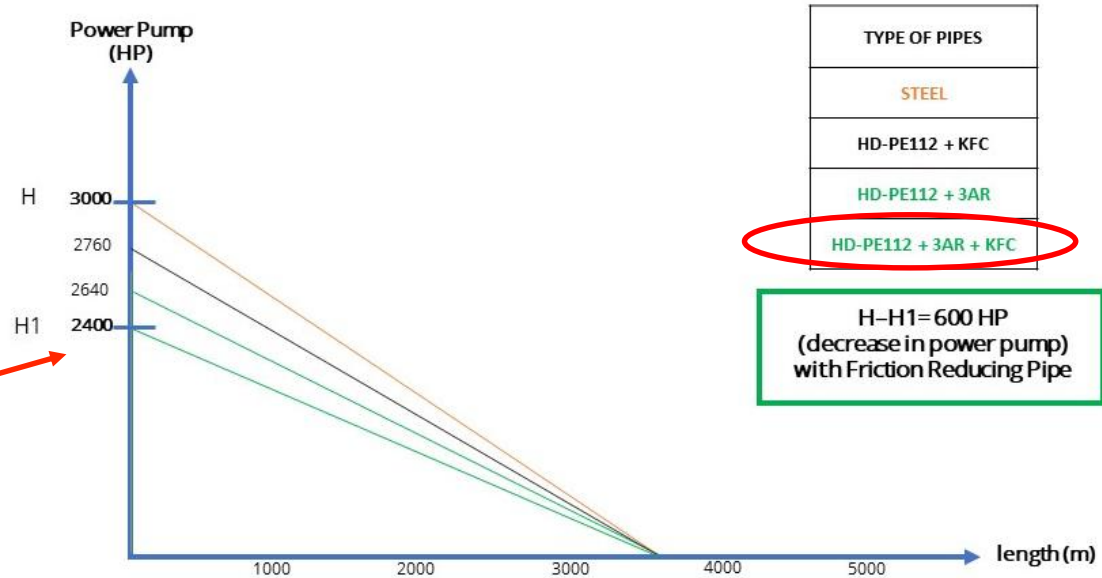
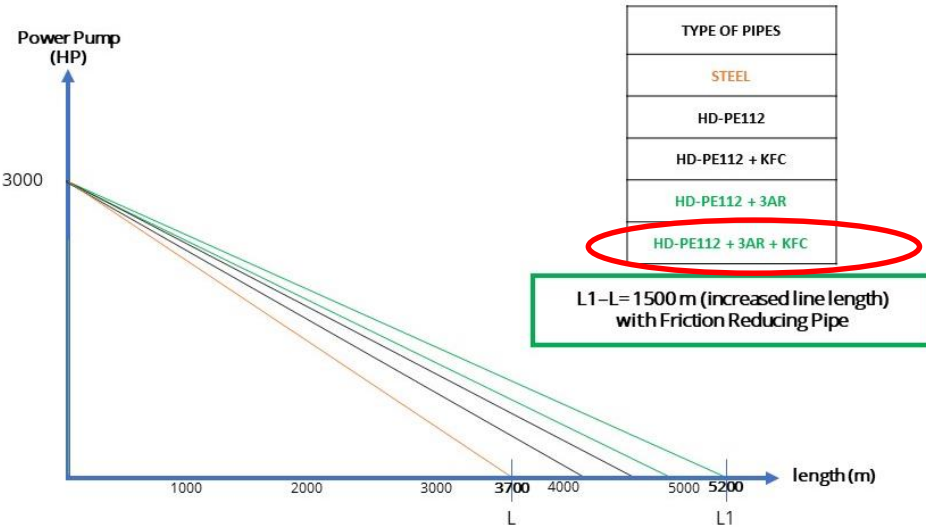
MAKING THE FLOW HOMOGENEOUS



KEY: n. OF FINS/WINGLET + SPACING



LINE LENGTH COMPARISON: STEEL / HD-PE112 3AR® with or without THE RFLE EFFECT (code name KFC®)

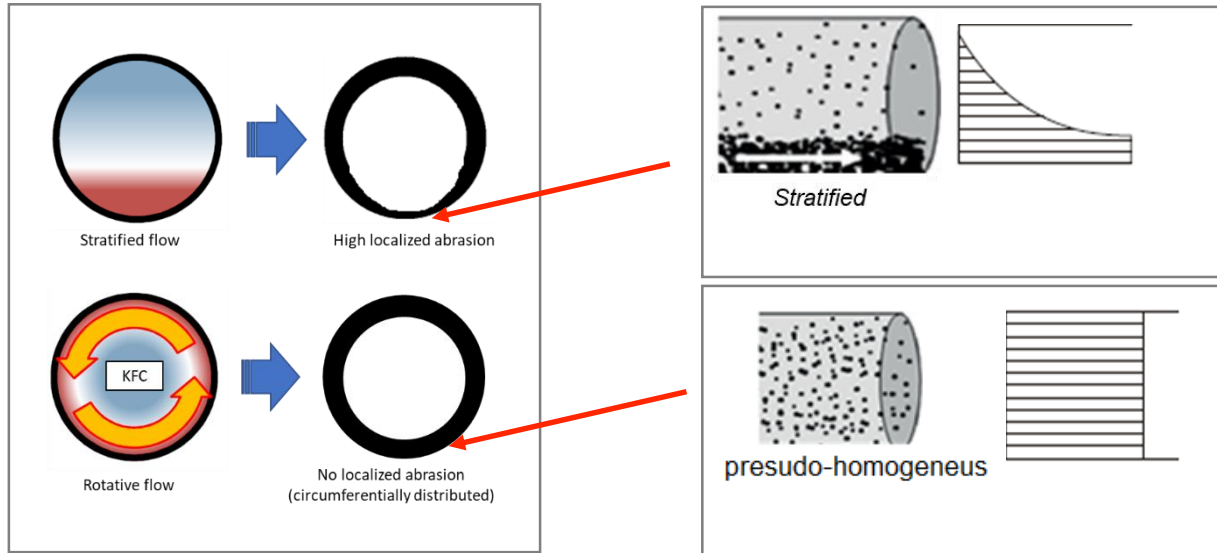


RIFLE 'DANCING' EFFECTS ON LENGTH AND POWER

Test site: DREDGE DN 650 - power pump 3000HP - working pressure 12 bar (175 PSI) - 25% solid



WHAT IS A SPECIALIZED PIPE - MAKE SEDIMENTS DANCING



KFC[®] SYSTEM KIASMA FLOW CHANGE

❖ REDUCTION OF PIPE ABRASION	About 30 %
❖ PRESSURE LOSS REDUCTION	About 15 %
❖ INCREASED PRODUCTIVITY	About 15 %
❖ REDUCTION OF THE DREDGE PUMP'S NEED FOR FUEL	About 7 %
❖ REDUCTION IN CO2 EMISSIONS INTO THE ATMOSPHERE	About 12-14 %
❖ REDUCTION OF MICROPLASTICS IN THE MARINE ECOSYSTEM	About 30-40 %



TAKE AWAY : INDUCED SEDIMENT DYNAMIC 'DANCING' BOOSTS PERFORMANCE UP TO 3 TIMES

CFD Comparison KNN[®] + KFC[®] and Steel PRESSURE LOSS

PIPE OD 400	Loss Pressure (Pa)
Steel pipe with 30% solid (Rough. 0.4 mm)	20894
KNN [®] Pipe with KFC [®] System	7534

PIPE OD 560	Loss Pressure (Pa)
Steel pipe with 30% solid (Rough.0,4 mm)	14446
KNN [®] Pipe with KFC [®] System	5002

PIPE OD 900	Loss Pressure (Pa)
Steel pipe with 20% solid (Roug.0,4 mm)	6313
KNN [®] Pipe with KFC [®] System	3619

KFC[®] SYSTEM
KIASMA FLOW CHANGE

Calculation of pressure loss reduction on 1Km of line

'DANCING'= 1/3 PRESSURE LOSS



TAKE AWAY

DYNAMIC + MATERIAL SCIENCE BOOST PERFORMANCE UP TO 4 TIMES

KFC® SYSTEM
KIASMA FLOW CHANGE

Using the KFC® system inside the pipes, abrasion is reduced:

Parameter	Test method	Test results				
		STEEL pipes	Thermoplastic HDPE PE100	KNN33_4.0® IARIZ	KNN33_4.0® IARIZ TP-E	KNN33_4.0® IARIZ TP-E
Abrasion loss	ISO 4649	376 mm ³	152 mm ³	85 mm ³	70-72 mm ³	48 mm ³
Abrasion loss	ISO 4649			70 mm ³	60 mm ³	40 mm ³

WITH KFC® and friction reducer

WITH 'DANCING'

'DANCING'=20% LESS ABRASION LOSS



TAKEAWAYS (material + dynamics)

A. NO NEED OF ROTATION

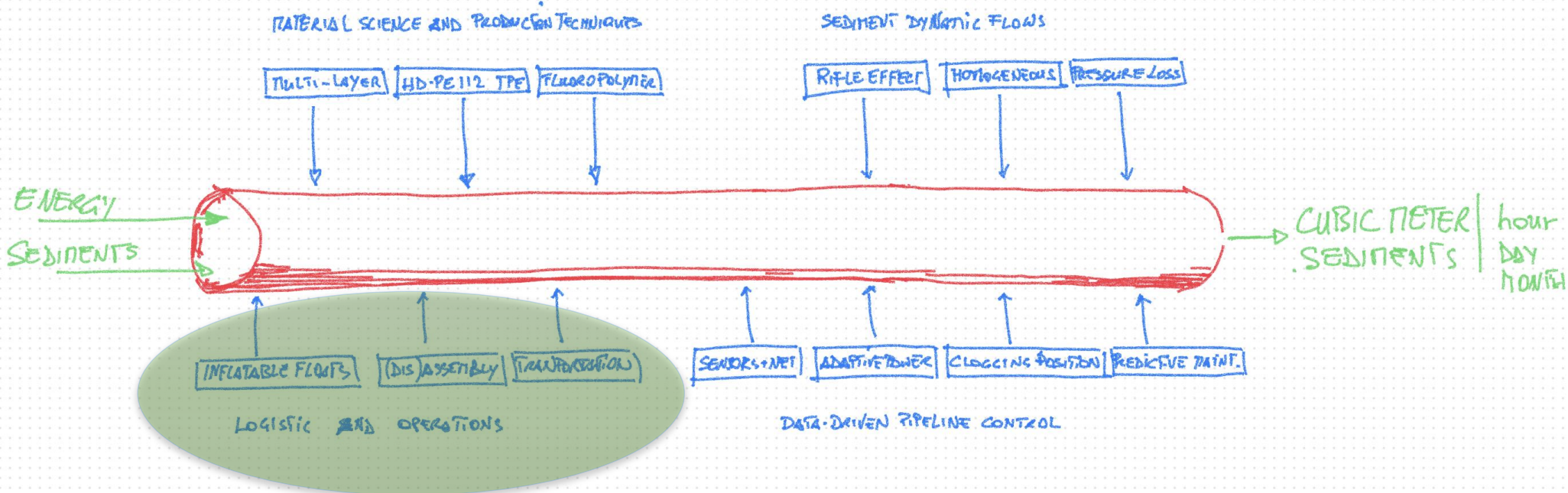
B. LESS ENERGY = REDUCE BOOSTS



TRADE OFF: ELIMINATE 3 STOPS ROTATIONS - COST 5-10% MORE



LOGISTIC AND OPERATIONS





FLOATS: TRADITIONAL SYSTEMS

for THERMOPLASTIC & STEEL PIPES - RANGE DN 200 (8") TO DN 1200 (48")

RIGID

THERMOPLASTIC

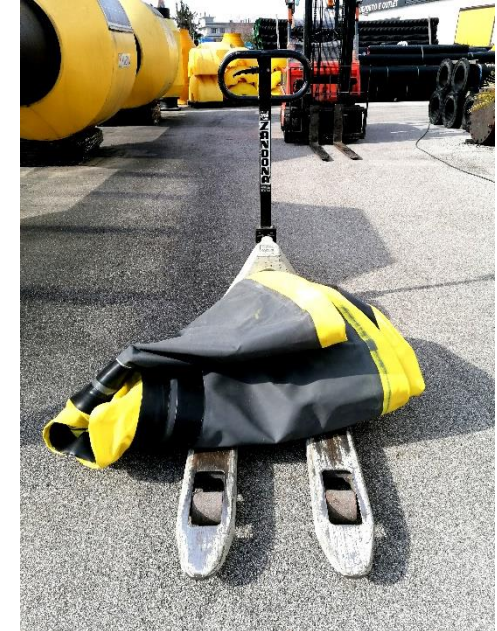
floats - full or empty





INFLATABLE FLOATS: SMART SYSTEMS

KIFLO® floats (POLYVINYL ELASTIC) - to inflate: n° 1 worker - time 5 minutes



Floats made of High Strength Polyester with constant wall thickness, excellent impact resistance and high durability. Designed and manufactured in Italy by KIASMA, KIFLO® floats are inflated on site.

BENEFITS:

- Less bulk when deflated
- Lighter
- Reduced costs for transport
- Reduced storage, handling and installation costs



TAKE AWAY

INNOVATION ON FLOATS BOOSTS OPERATION EFFICIENCY

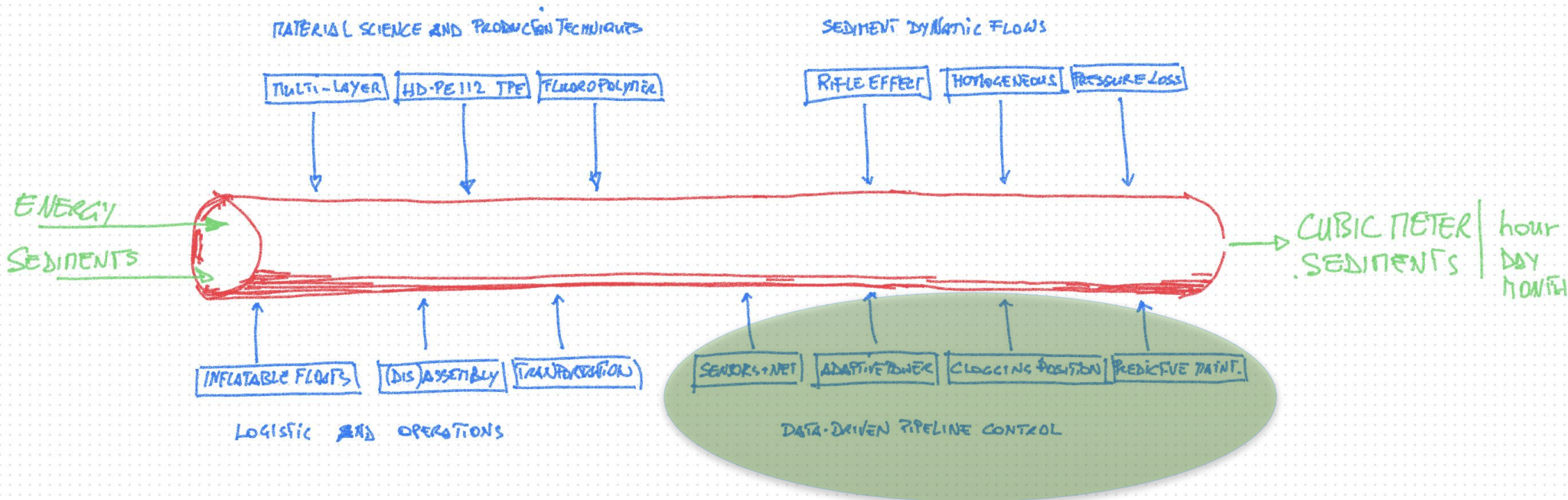


300 KIFLOs IN A 40'HC CONTAINER (FOR PIPE OD1000)

KIFLO[®] SYSTEM

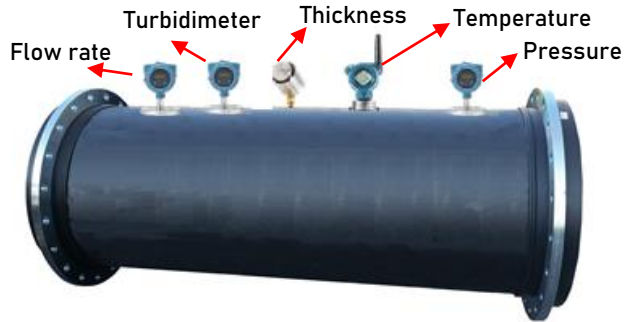


DATA-DRIVEN OPERATIONS





DYNAMIC DATA FROM THE PIPELINE



Smartphone (Wi-Fi)
Process data to be used (Wi-Fi)



**CONTROL OF LINE
PARAMETERS FROM THE
OFFICE**



PRESSURE



THICKNESS



TEMPERATURE



WEIGHT & M³



TURBIDIMETER

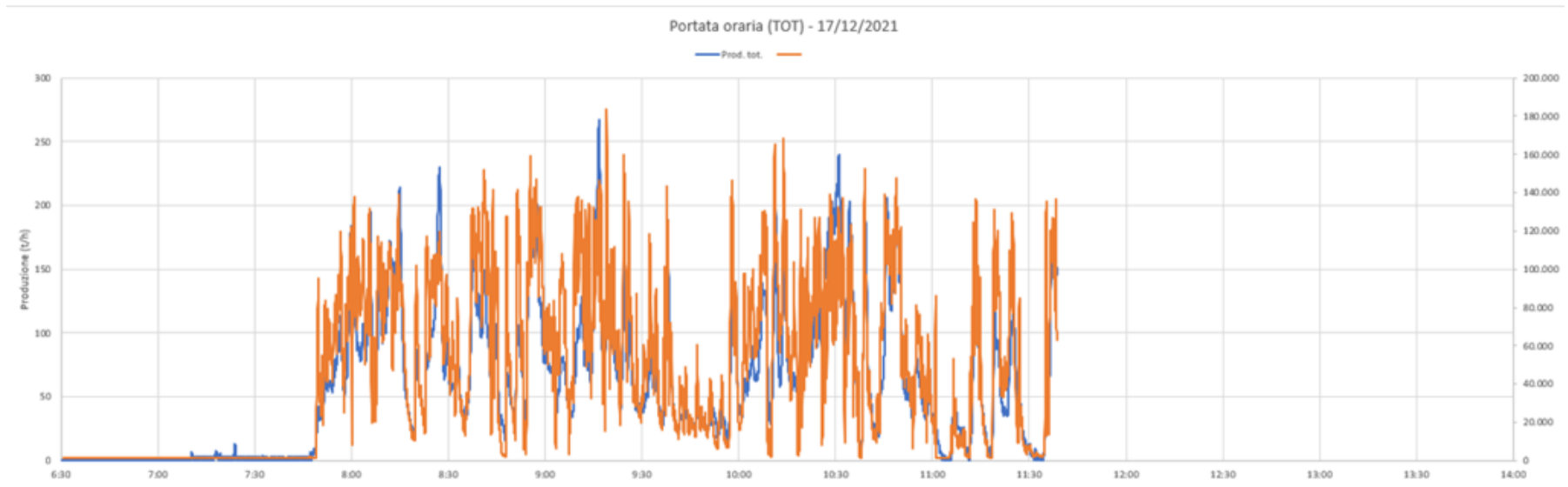


DYNAMIC DATA FROM THE PIPELINE



KIASMA - WEIGHT SENSOR TEST RESULTS

COMPARISON OF TOTAL WEIGHED PRODUCTION AT THE GATTI QUARRY (BS-ITALY) IN THE VARIOUS TYPES OF SOLIDS WITH DIFFERENT GRAIN SIZES, AND DATA COLLECTED BY THE KIASMA WEIGHT SENSOR, IN THE SAME TIME FRAME



Result: between the real weight (from the Cava balances) and the weight measured by the Kiasma sensor, the margin of error is minimal
Below are specification diagrams on the types of sediment dredged and weighed by the quarry scales.



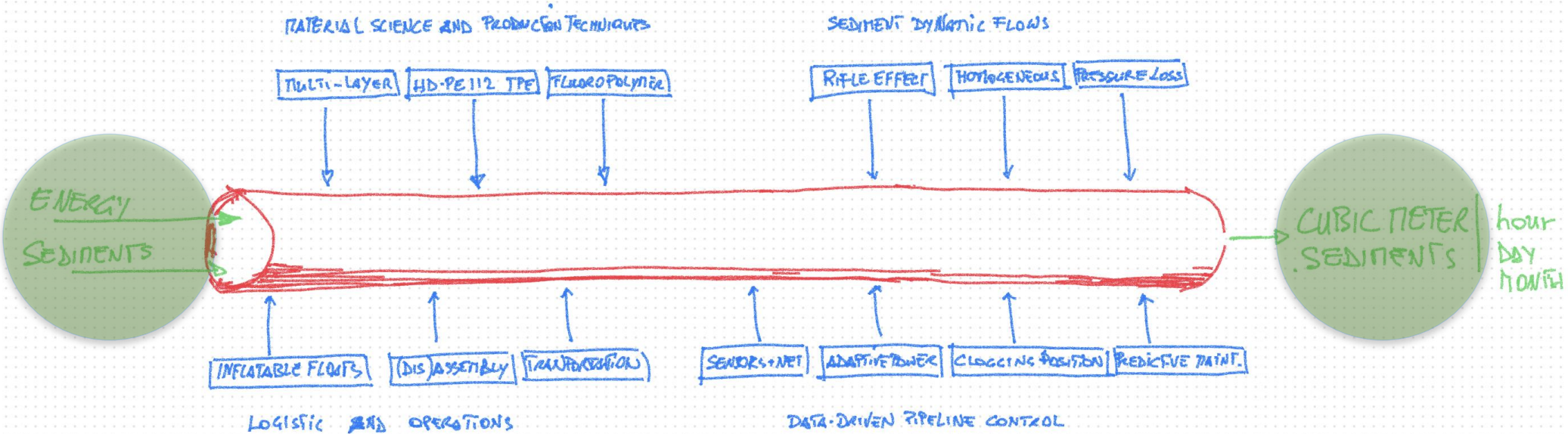
TAKEAWAYS

- A. SAVINGS ON ENERGY AND FUEL (PUMP)
- B. IMMEDIATE IDENTIFICATION OF CLOGGING POSITION
- C. MAINTENANCE PLANNED





ENERGY AND PROFIT





FUEL SAVINGS

PIPELINE WITH
ANTI-ABRASIVE + FRICTION REDUCTION + KFC®(dancing)

APPROXIMATELY 17% LESS FUEL FOR DREDGING OPERATIONS

(OD 560 PSI10)



SLURRY DISCHARGE PIPELINE COMPARISON OVER A 30 MLN m³

Type of pipe	N°	Floaters	Plates + Flanges	Pipe	Assembly	Usable thick.	abrasion mm / mln m ³	Pipe TOT. capacity (*)	COST
Steel DN30" Thickness 25 mm (n.8 floaters)	1	19.200 \$	4.600 \$	6.500 \$	2.000 \$	15 mm	1,5/1,8	10 mln m ³	32.300 \$
	2	-	600 \$	6.500 \$	3.500 \$	15 mm	1,5/1,8	10 mln m ³	10.600 \$
	3	-	600 \$	6.500 \$	3.500 \$	15 mm	1,5/1,8	10 mln m ³	10.600 \$
								30 mln m³	53.500 \$

Type of pipe	N°	Floaters	Plates + Flanges	Pipe	Assembly	Usable thick.	abrasion mm / mln m ³	Pipe TOT. capacity (*)	COST
Self Rubber - DN30" self floating	1	-	-	40.000 \$	-	38 mm	Sed. type?	15 mln m ³	40.000 \$
	2	-	-	40.000 \$	-	38 mm	Sed. type?	15 mln m ³	40.000 \$
								30 mln m³	80.000 \$

Type of pipe	N°	Floaters	Plates + Flanges	Pipe (*)	Assembly	Usable thick.	abrasion mm / mln m ³	Pipe TOT. capacity (**)	COST
KNN33_4.0® 3AR12 OD 900mm - PN 12,5 (n.3 floaters)	1	7.200 \$	-	12.500	600 \$	11-12mm	0,6/0,5	20 mln m ³	20.300 \$
	2	-	-	12.500	600 \$	11-12mm	0,6/0,5	20 mln m ³	13.100 \$
								40 mln m³	33.400 \$

Residual capacity = 10 mln m³



MAIN TAKEAWAYS -FINAL

1. YES! DISCHARGING PIPELINE IS A FACTOR FOR PROFIT
2. YES! PROFIT COMES FROM SPECIALIZED SOLUTIONS
3. YES! PROFIT AND SUSTAINABILITY GO TOGETHER



HOW MUCH FOR ALL OF THIS ????



CLOSING REMARK

HOW MUCH FOR ALL OF THIS ???

CHANGE HABITS, PROCEDURES: TEAMWORK

costing/planning - purchasing - operations

From an economic angle
INCREASE: 10-20% PURCHASE ASSET VALUE
REDUCE: COST DUE TO AMORTIZATION















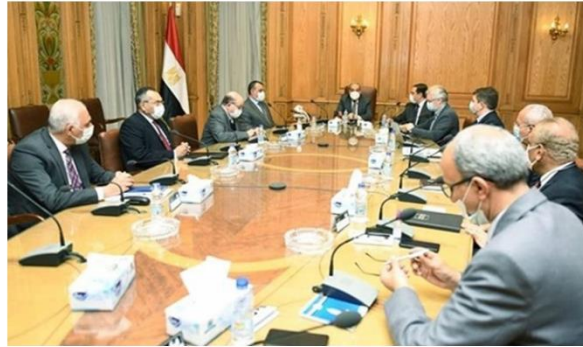
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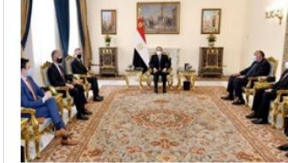
Military production min. discusses with representatives of Italian company aspects of cooperation

Thursday, 18 March 2021 - 02:44 PM



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Wednesday, 12 May 2021 02:17 PM



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Text Size

Minister of Military Production Mohamed Ahmed Morsi received a delegation of Kiasma Italian company to discuss aspects of boosting cooperation.

Morsi said that the meeting tackled the possibility of the cooperation in the field of joint production of multi-use pipes.

Both sides discussed transferring expertise and localizing developed technology in this field.

Morsi pointed out that this meeting is part of resuming hat was discussed during a meeting he held on the sidelines of IDEX 2021 that was held in Abu Dhabi in February.

Morsi welcomed the visit of the delegation to the companies and units of the military production to get acquainted with its technological, technical and manufacturing potentials.

The meeting comes in light of deepening cooperation between both sides, he said, pointing out that Egypt is a promising market for the Italian investments.

Saturday, 08 May 2021 10:59 AM

Sisi: Egypt not to accept touching its water security

Sunday, 09 May 2021 01:25 PM



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Currency Exchange

Prayer Times

WORLD, // PORT NEWS ([HTTPS://DREDGEWIRE.COM/CATEGORY/PORT-NEWS/](https://dredgewire.com/category/port-news/))

Dredging pipeline company Kiasma joins MOU between Italy and People's Republic of Bangladesh



([https://dredgewire.com/dredging-](https://dredgewire.com/dredging-pipeline-company-kiasma-joins-mou-between-italy-and-peoples-republic-of-bangladesh/)

[pipeline-company-kiasma-joins-mou-between-italy-and-peoples-republic-of-bangladesh/](https://dredgewire.com/dredging-pipeline-company-kiasma-joins-mou-between-italy-and-peoples-republic-of-bangladesh/))

Mr. Kabir Bin Anwar, Dr. Mattia Ventura, Prof. Malik Fida A Khan, Prof. Motaleb Sarker, Prof. Atish Dabholkar, Prof. Filippo Giorgi, Prof. Marco Marani, Prof. Luca Carniello, Prof. Andrea D'Alpaos, Prof. Stefano Lanzoni, Dr. Martina Crotti, MB Enrico Crotti, Dr. Eng. Renzo Taffarello.

Posted on December 16, 2021

Three-year collaboration for environmental sustainability of waterways in Bangladesh.

Bangladesh07 December 2021- At the Center for Environmental and Geographic Information Services (CEGIS), a research centre of excellence established by the Government of Bangladesh under the Ministry of Water Resources (MoWR), whose work embraces different sectors of water resources planning and management, climate change, for development projects in Bangladesh; a Memorandum of Understanding has been signed with the support of the Italian Embassy in Dhaka in the person of the *Honourable Ambassador Dr. Enrico Nunziata and Dr. Mattia Ventura – Honourable Chargé d'affaires a.i.;*

*A bilateral cooperation between Italy and Bangladesh is therefore seen as a synergy:

Privacy - Termini



Ecosystem

ZEDhub enables Zero Emission Dredging together with important stakeholders

Greenhouse has emissions need to be reduced. This challenge and the Paris-agreement has formed the basis of our common ambition: Enable Zero Emission Dredging ASAP. To achieve our ambitious goal, we choose for a collaborative approach, initiated by the founding partners of ZEDhub, executed in collaboration with the full value chain and triple helix.

Technology and System Providers



**BEST PRACTICES IN
DIFFERENT PROJECTS**

**RESULTS FROM IP AND
PATENTS**

**+30 YEARS OF
EXPERIENCE**

**CUSTOMERS ALL OVER
THE WORLD**

THANK YOU

Renzo Taffarello and the Kiasma Team



KIASMA IS HAPPY TO SHARE WITH YOU
Tech department massimocusato@kiasmasrl.it