



**37TH INTERNATIONAL
NO - DIG
FLORENCE 2019**

Fortezza da Basso • FLORENCE (Italy)

30th September • 2nd October 2019

POLYMERIC ALLOY PIPE WITH RESTRAINT JOINT SYSTEM FOR HDD APPLICATIONS

Ing. Gianfranco Battaglin
Mr. Nicola Melotti

PVC-A TECHNOLOGICAL PLATFORM

PVC-U
Unplasticized PolyVinyl Chloride

CPE
Chlorinated PolyEthylene

PVC-A



Fitt Bluforce

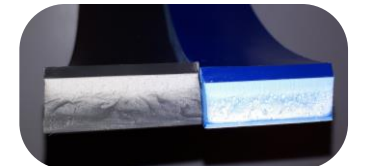
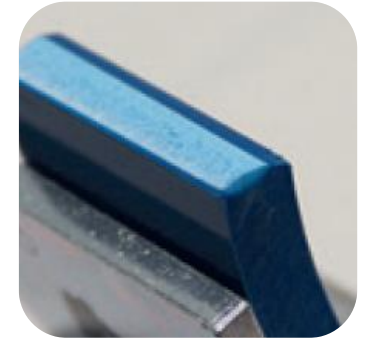
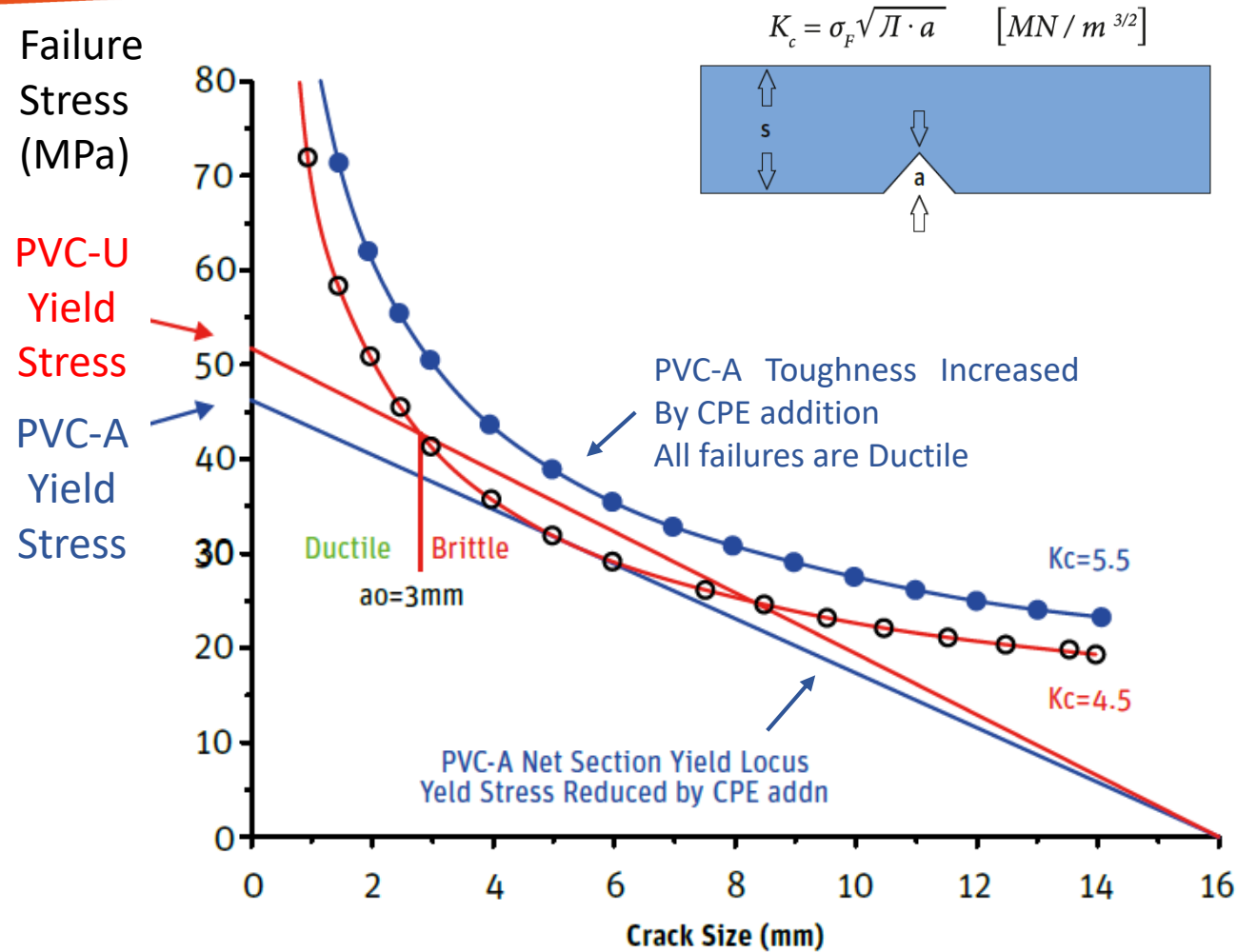


Fitt Bluforce RJ

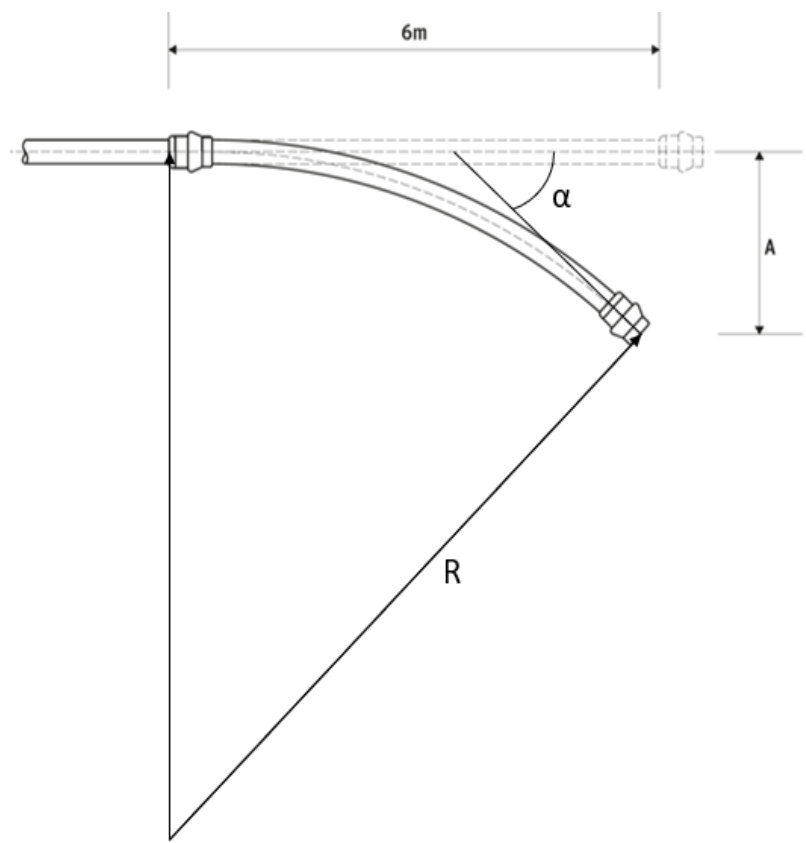
PVC-A DUCTILITY



37TH INTERNATIONAL
NO-DIG
FLORENCE 2019



FITT BLUFORCE FLEXIBILITY



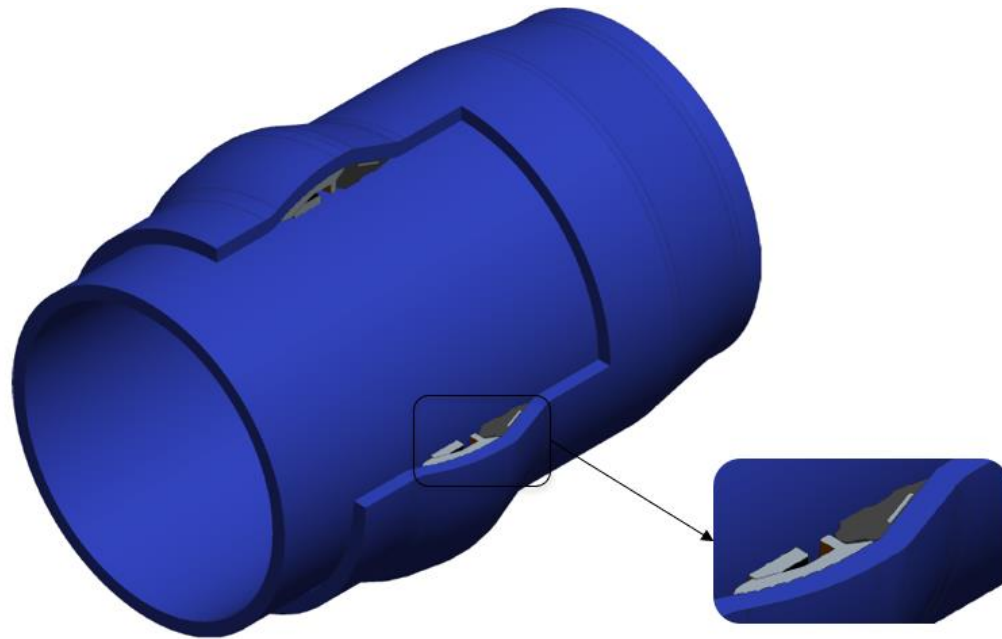
DN [mm]	A [m]	L [m]	α [°]	R [m]
90	1,30	6,0	18,6	9,2
110	1,10	6,0	15,8	10,9
160	0,75	6,0	10,7	16,0
200	0,60	6,0	8,6	20,0
225	0,50	6,0	7,2	24,0
250	0,45	6,0	6,4	26,7



RESTRAINT JOINT SYSTEM



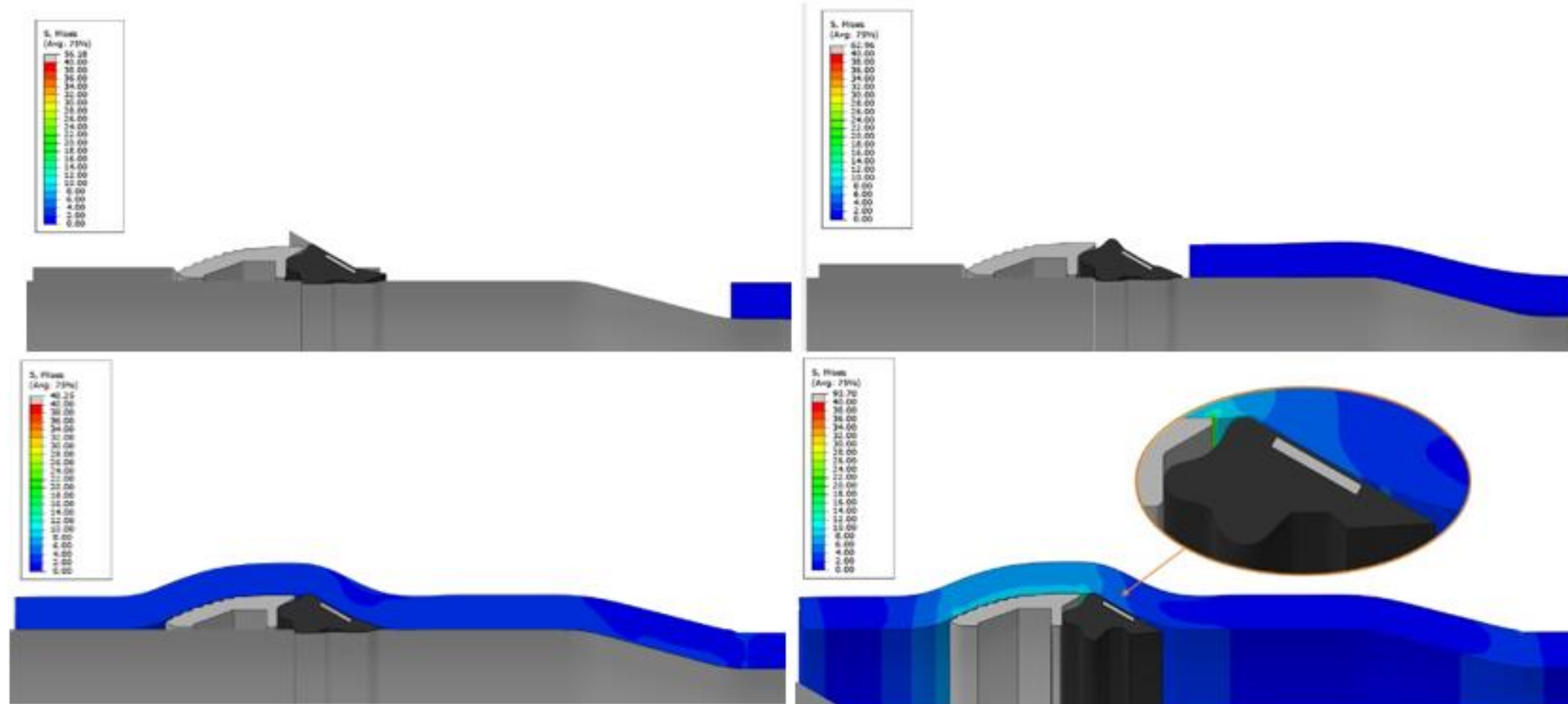
37TH INTERNATIONAL
NO - DIG
FLORENCE 2019



FITT BLUFORCE RJ: PROCESS SIMULATION



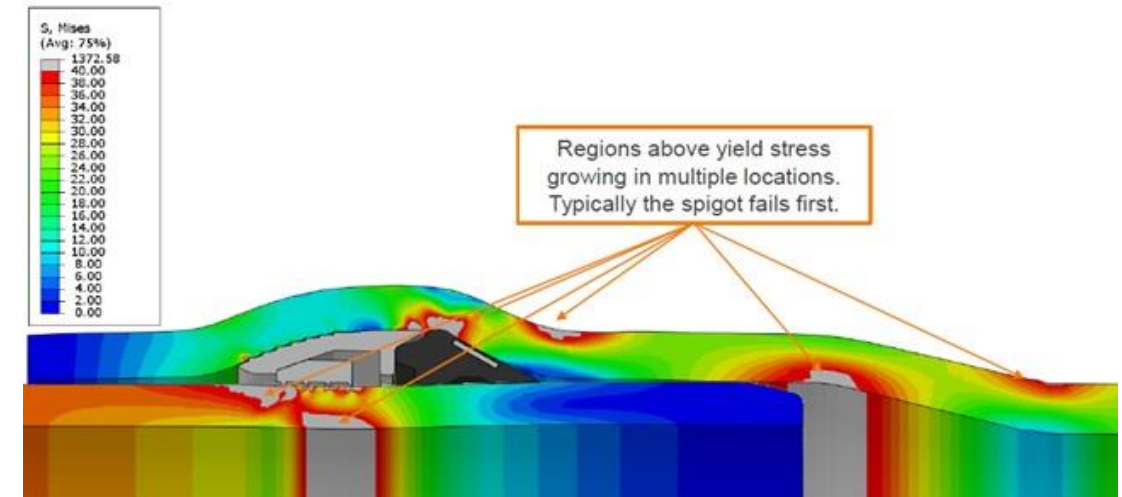
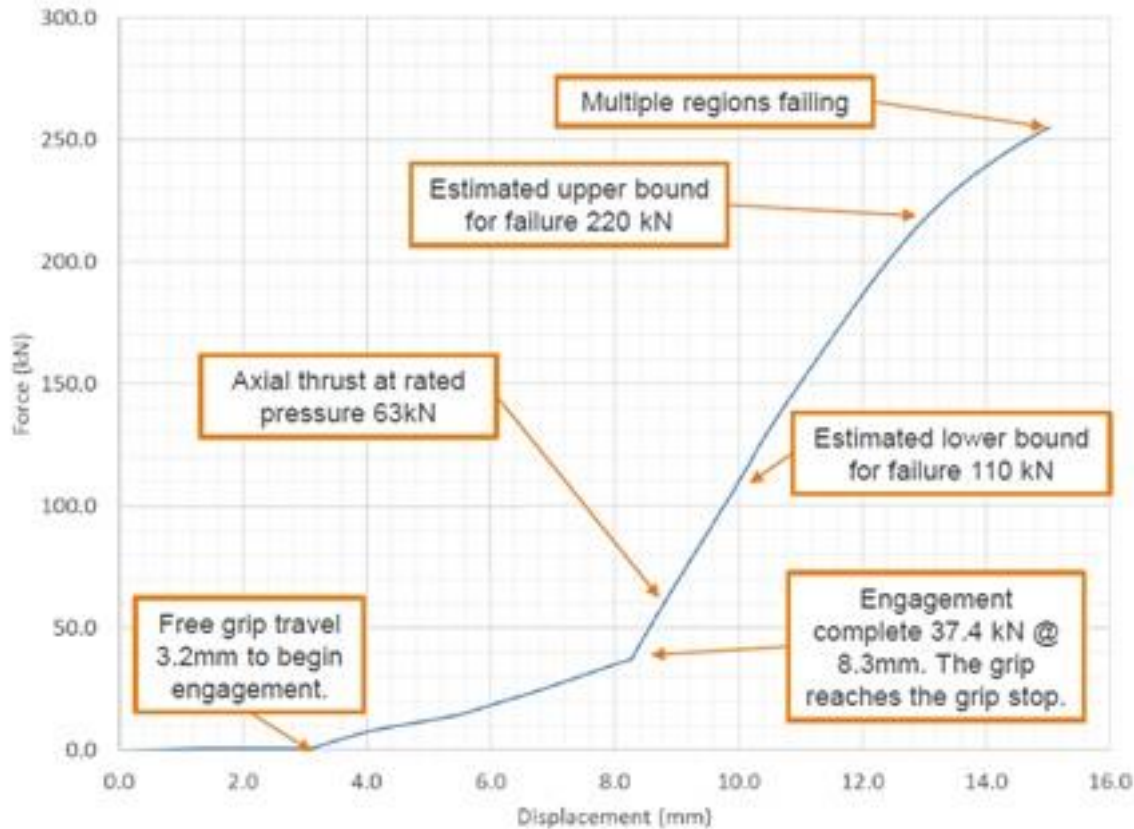
37TH INTERNATIONAL
NO-DIG
FLORENCE 2019



FITT BLUFORCE RJ: STRUCTURAL OPTIMIZATION



37TH INTERNATIONAL
NO-DIG
FLORENCE 2019



FITT BLUFORCE RJ: PHYSICAL TESTING



EN 12842: 2012; ASTM F1674



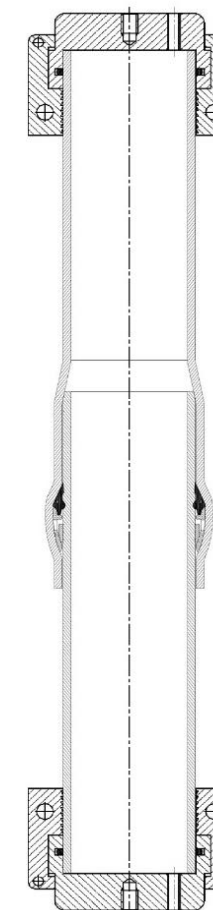
EN ISO 13844 - 13845: 2015

FITT BLUFORCE RJ: AXIAL THRUST



37TH INTERNATIONAL
NO-DIG
FLORENCE 2019

	PN 10		PN 16		PN 20	
DN	P int	Axial thrust	P int	Axial thrust	P int	Axial thrust
[mm]	[bar]	[kN]	[bar]	[kN]	[bar]	[kN]
90	-	-	28,1	18,2	34,8	22,6
110	17,5	17,0	28,2	27,3	34,8	33,8
160	17,5	35,8	27,6	56,6	34,7	71,2
200	17,4	55,7	27,8	89,0	34,8	111,5
225	17,4	70,5	27,8	112,7	34,6	140,3
250	17,4	87,1	27,8	139,1	34,7	173,9
315	17,4	137,9	27,7	219,8	34,7	275,4
400	17,4	222,9	27,4	354,0	34,6	443,8



FITT BLUFORCE RJ: TENSILE STRENGTH

DN [mm]	PN [bar]	Tensile Load at break [kN]
90	16	40
	20	45
110	16	50
	20	60
160	16	110
	20	130
200	16	150
	20	170
225	16	180 (*)
	20	200 (*)
250	16	190 (*)
	20	220 (*)
315	16	240 (*)
	20	290 (*)
400	16	360 (*)
	20	450 (*)
(*): preliminary results		



FITT BLUFORCE RJ: COMPARISON



37TH INTERNATIONAL
NO-DIG
FLORENCE 2019

		PVC-A DN200 PN16	PE 100 RC DN200 PN16	ductile iron DN200	steel DN200
product price	€/m	60	57	120	72
unit length	m	6,0	12,0	6,0	6,0
weight	kg/m	8,2	10,5	40,1	29,5
handling	-	manual	mechanical	mechanical	mechanical
pre-pulling assembly	-	spigot insertion in the socket	certified welding	spigot insertion in the socket +gasket + bell cover mounting	certified welding
	min	< 0,5'/joint	52'/joint	8'/joint	15'/joint
string assembly during pulling phase	-	yes manual	no	yes mechanical	no
job site minimum required size	-	pipe pallet + rimmer	string length + rimmer	pipe pallet + rimmer + handling machines	string length + rimmer

FITT BLUFORCE RJ: HDD APPLICATIONS



Pipe: FITT Bluforce RJ DN 200 PN 16

Length and depth: 140 mt x 10 mt

Machine: Vermeer Navigator D 33x44

Pulling load: 125 kN.

String assembly and pulling: 80'

FITT BLUFORCE RJ: HDD APPLICATIONS



37TH INTERNATIONAL
NO - DIG
FLORENCE 2019



Challenge:

Non-cohesive soil

Salty water table

Insertion depth ≥ 10 m.

FITT BLUFORCE RJ: HDD APPLICATIONS



Pipe: FITT Bluforce RJ DN 200 PN 20

Length and depth: 1.200 mt x 8 mt

Machine: Ditch Witch JT3020 Mach 1

Pulling load: 55 kN.

String assembly and pulling: n°6 pulls from 185 m to 287 m in 6 days (one pull per day)



FITT BLUFORCE RJ: HDD APPLICATIONS



Challenge:

No space to create the pulling string

Buried subservices

Hi traffic street

6 pulls with different length and depth

THANKS FOR YOUR ATTENTION



Via Piave, 8
36066 Sandrigo, VI (Italy)
Tel. +39 0444 46 10 00
Fax +39 0444 46 10 99

All Rights Reserved of FITT® S.p.A.
©Copyright by FITT® S.p.A.