SUB SECTION 6

REPORT 6

Performance Of Offshore Pipelines (POP) Project
UCB MTMG Tasks

Performance of Offshore Pipelines (POP) Project

UCB MTMG Tasks

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MTMG Tasks

1) Assist in pipeline selection
2) Review pipeline design & service information
3) Review results from in-line surveys
4) Develop corrosion prediction for pipelines without in-line surveys

MTMG Tasks

5) Develop burst pressure predictions

6) Review results from hydrotests

7) Review results from lab material tests

9) Revise prediction models

10) Document & present results

MTMG Schedule

Task	1stQ	2ndQ	3rdQ	4thQ	5thQ	6thQ
1	-------					
2		-------				
3			-------			
4		-------				
5			-------			
6				-------		
7				-------		
8					-------	
9		-----X		-----X	-------	-----X

MTMG Budget

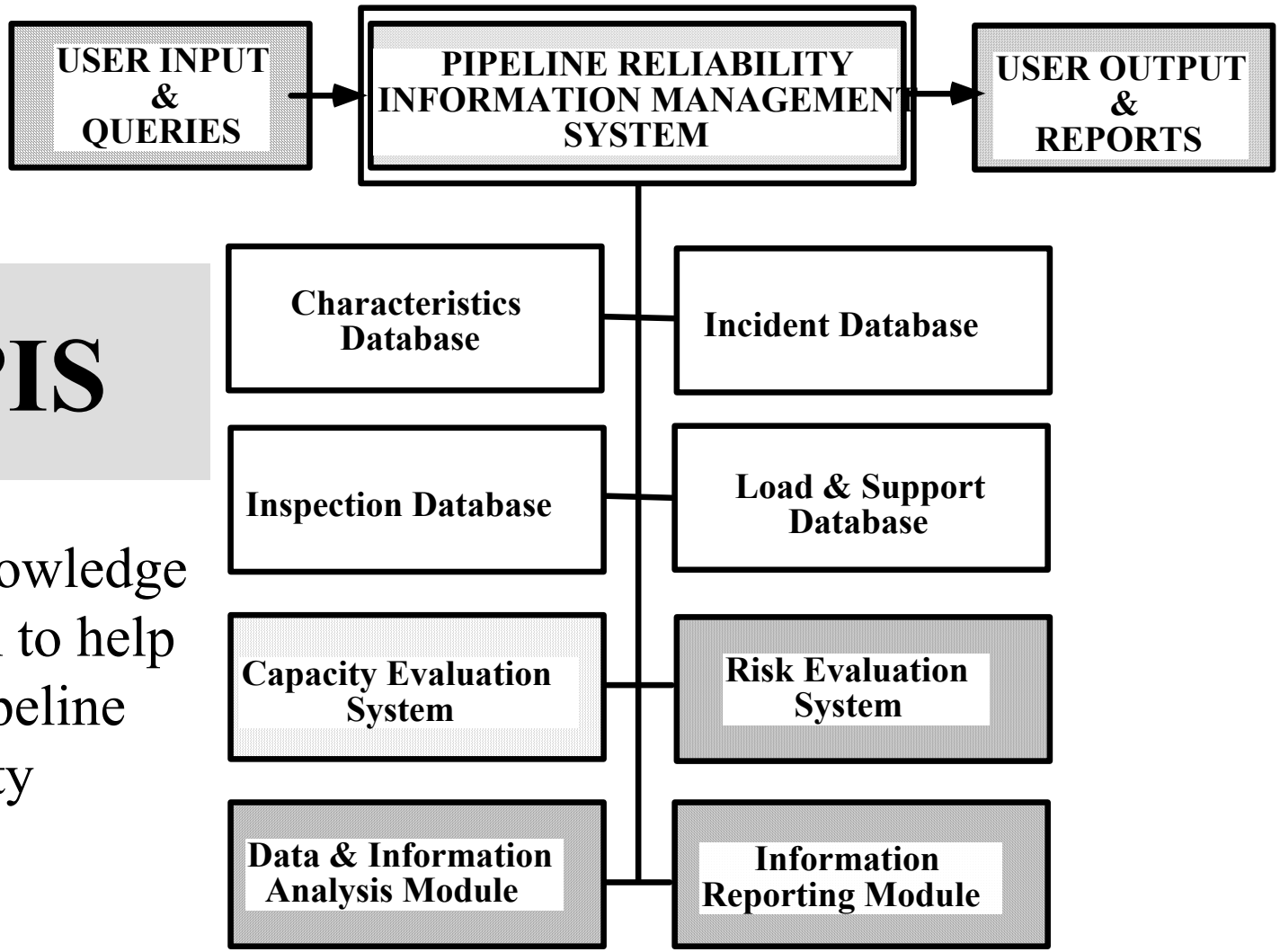
Category	1st Half	2nd Half	3rd Half	Total
PI	13,000	13,000	13,000	39,000
GSR	13,000	13,000	13,000	39,000
Benefits	3,000	3,000	3,000	9,000
Computing	2,500	500	500	3,500
Repro	500	500	1000	2,000
Travel	2,000	2,000	1,500	5,500
Totals	34,000	32,000	32,000	98,000

MTMG POP Background

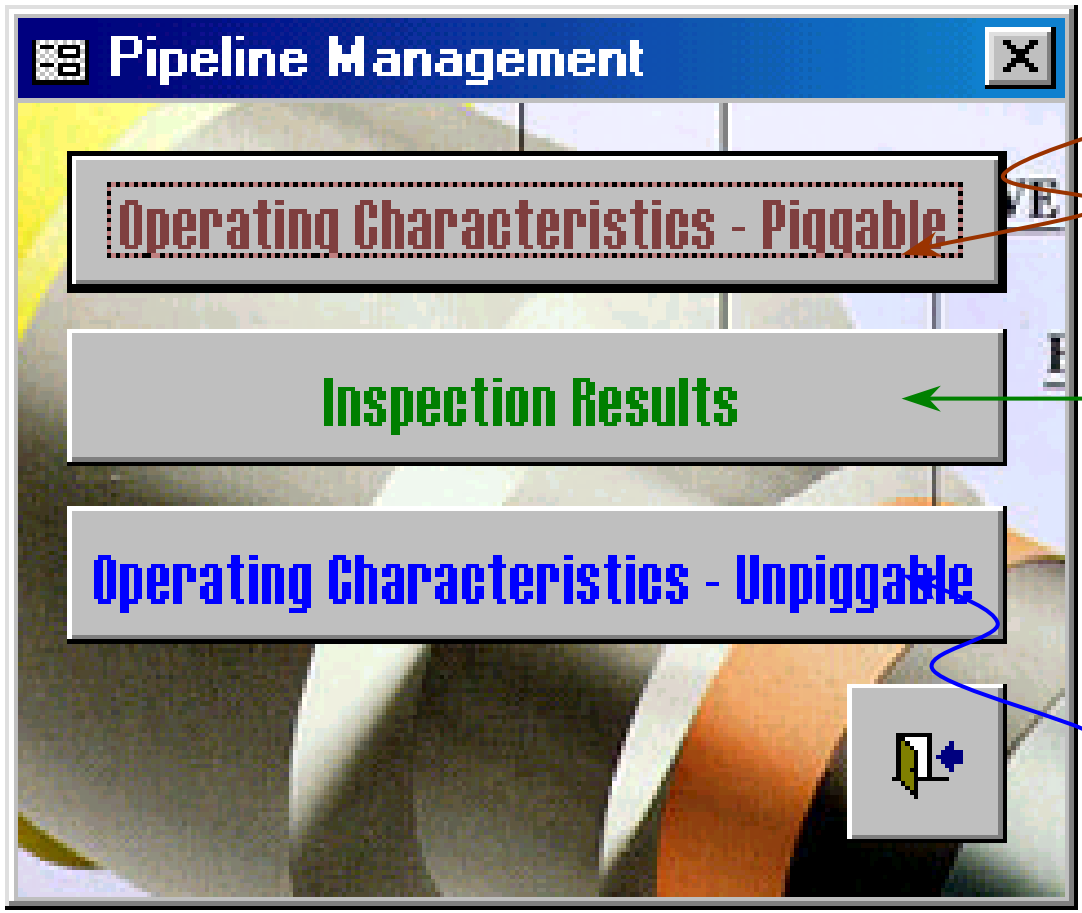
- **Pipeline Integrity and Performance Information System - PIMPIS**
- **RAM based criteria for design and requalification of PEMEX pipelines**
- **RAM PIPE REQUAL**
- **Trinidad pipelines**
- **Northwest shelf 2nd trunkline**

PIMPIS

Develop a knowledge based system to help manage pipeline integrity



Development of database/knowledge based system that assesses the risk associated with corrosion loss for a pipeline

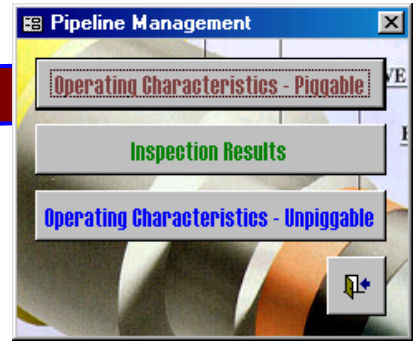


Operating characteristics data entry module for piggable pipelines

Inspection results entry module

Data entry and analysis module for unpiggable pipelines

Operating Characteristics Piggable



Operating Characteristics

Pipe ID	Diameter (inches)	Thickness (inches)	Type of Material Transported	Length (miles)	Date Constructed
1001	6	0.35	Oil	30	9/25/65

Design Pressure (psi)	Operating Pressure (psi)	High Temp (F)	High pH	High Oxyg (ppb)	High Water Content %	High Velocity (fps)
1750	1200	100	7.5	40	3	0
Std Dev DesignP (psi)	**Std Dev OperP (psi)**	**Low Temp (F)**	**Low pH**	**Low Oxyg (ppb)**	**Low Water Content %**	**Low Velocity (fps)**
110	300	90	6	20	1	0

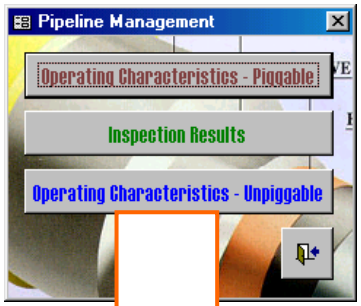
Strain Hardening Index:	Ultimate Strength (psi)
0.15	100000

Inspection Table 2

		1/4" ~ 1"		1" ~ 3"		3" ~ 6"		6" ~ 12"		
Record Number	Pipe ID	No. of Flaws	Depth of Flaws	No. of Flaws	Depth of Flaws	No. of Flaws	Depth of Flaws	Number of Flaws	Depth of Flaws	Inspected Date
14063	1001	3	0.023	3	0.023	3	0.023	500	0.023	9/25/65
14064	1001	5	0.054	5	0.054	5	0.054	1000	0.054	12/12/72
14065	1001	13	0.085	13	0.085	13	0.085	1500	0.085	2/29/80
14066	1001	17	0.116	17	0.116	17	0.116	2300	0.116	5/18/87
(toNumber)	1001	0	0	0	0	0	0	0	0	

Record: 1 of 98

Operating Characteristics - Unpiggable

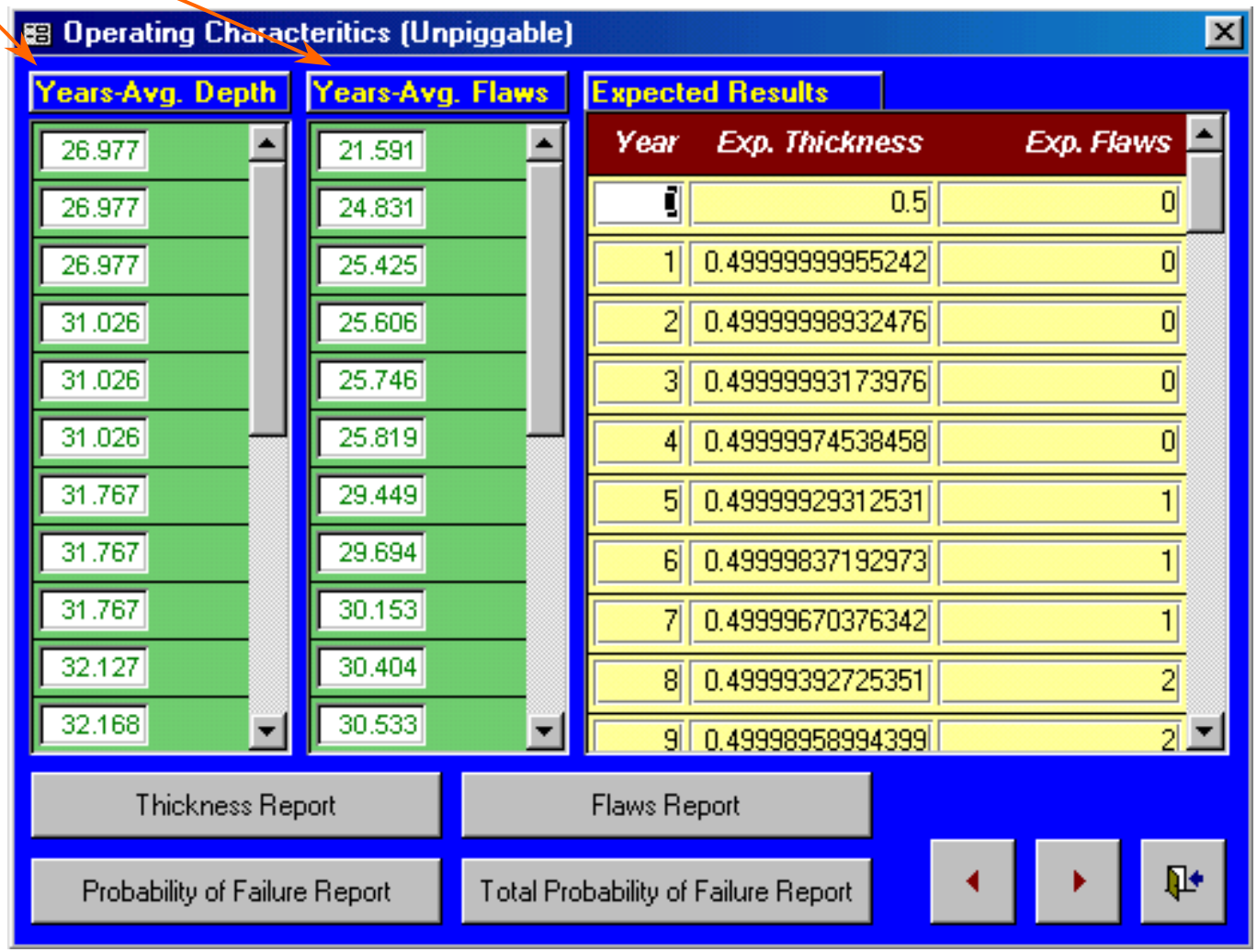


Operating Characteritics (Unpiggable)

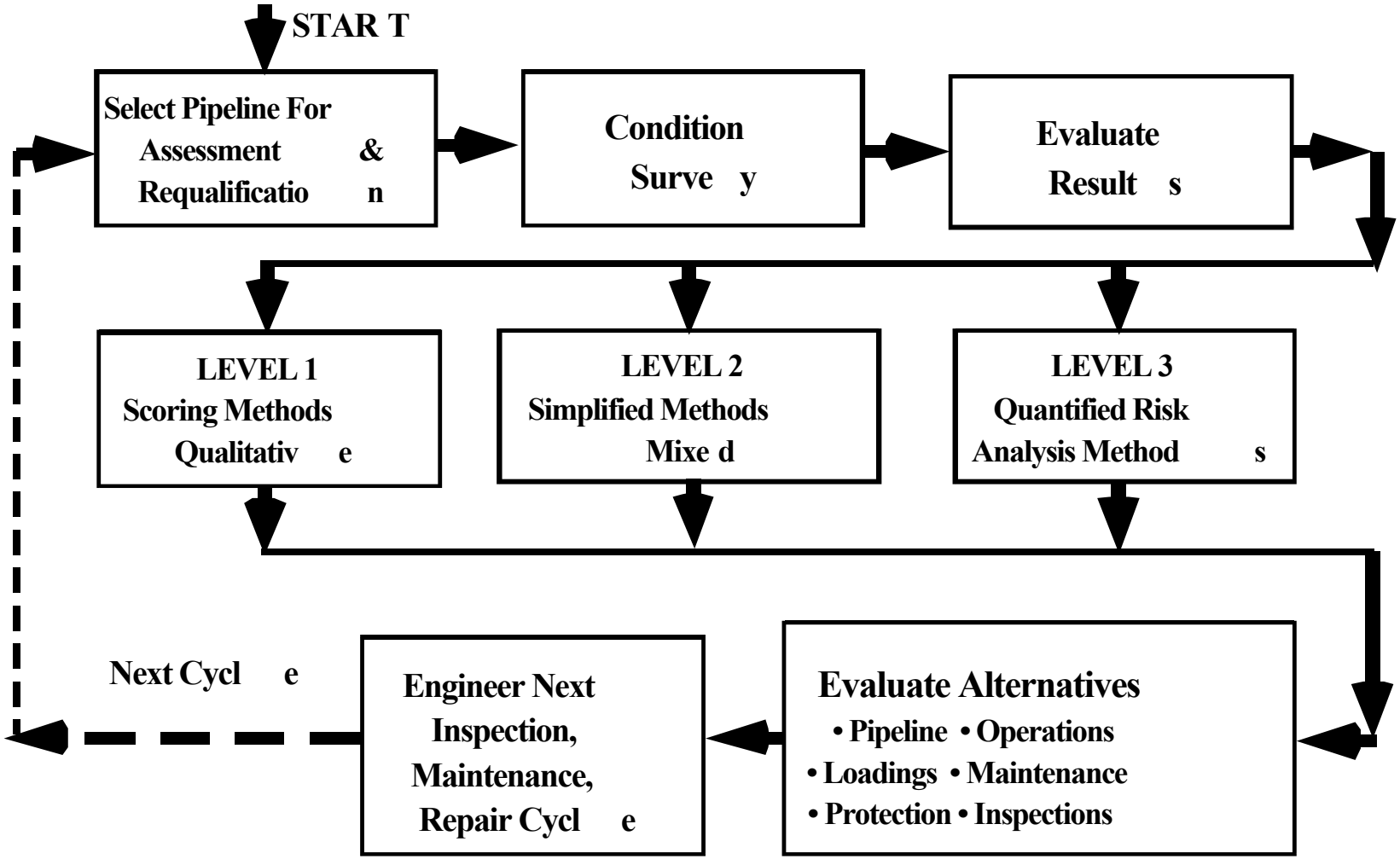
uPIPID	u1001	High Temp (F)	110
Diameter (inches)	6.25	Low Temp (F)	92
Thickness (inches)	0.375	High Oxyg (ppb)	43
Ultimate Strength (psi)	100000	Low Oxyg (ppb)	26
Design Pressure (psi)	1650	High pH	5
Std Dev DesignP (psi)	175	Low pH	2
Operating Pressure (psi)	1050	High Water Content %	5
Std Dev OperP (psi)	275	Low Water Content %	2.25
Date Constructed	3/7/65	High Velocity (fps)	0
Length (miles)	21	Low Velocity (fps)	0
Material Transported	Oil		
Strain Hardening Index:	0.15		

Probabilistic Analysis

Years to develop average depth and average flaws in selected piggable pipelines

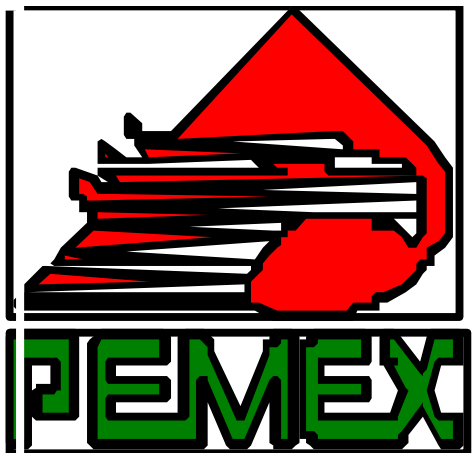


RAM PIPE REQUAL



RAM PIPE REQUAL

Develop strategies for requalifications of marine pipelines

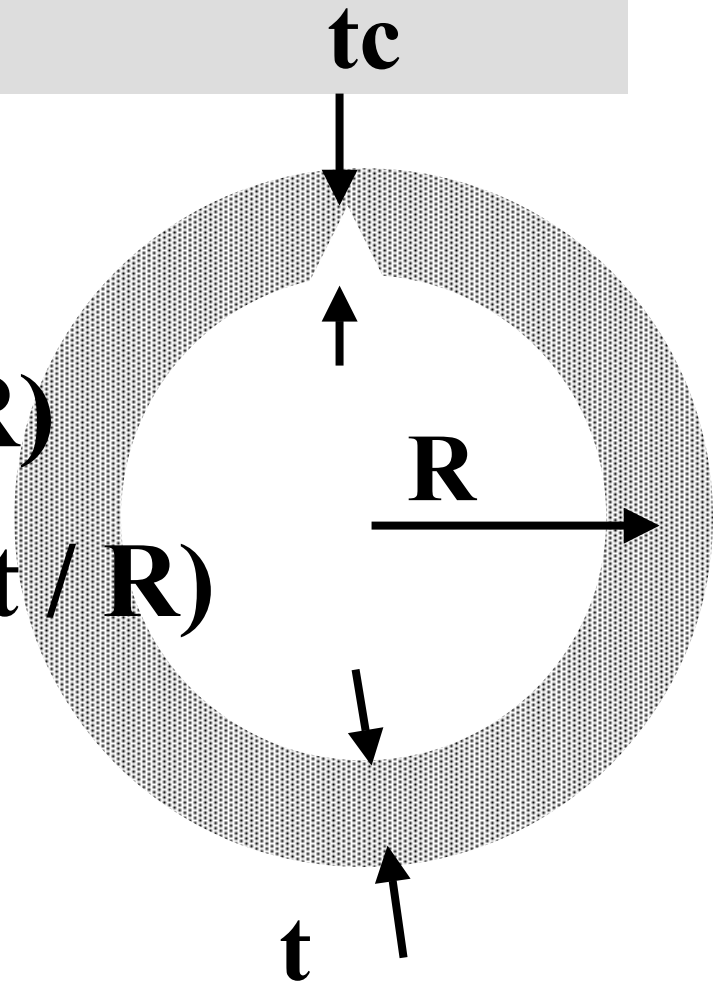


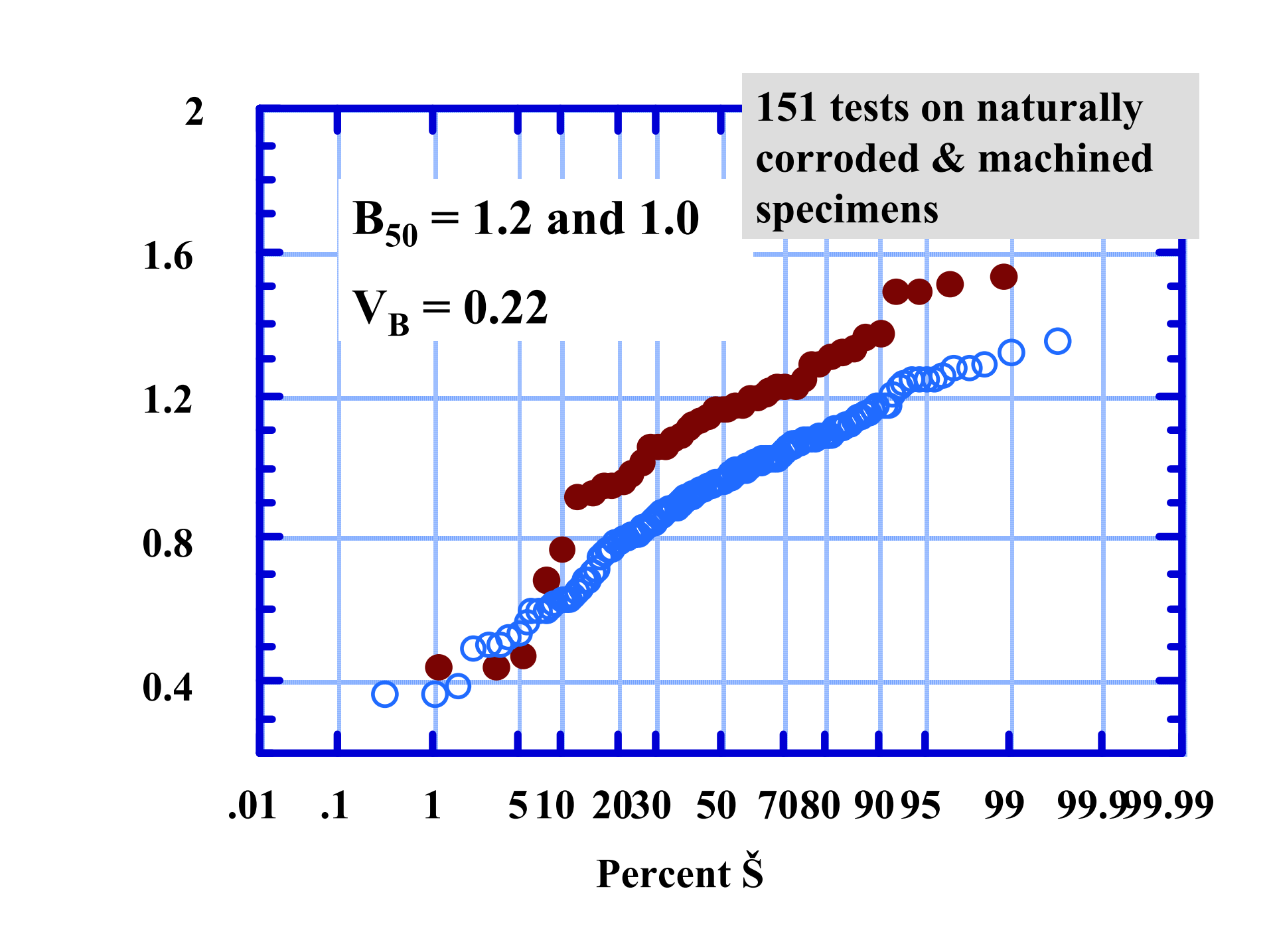
RAM PIPE REQUAL formulations

$$p_B = (SMTS / SCF)(t / R)$$

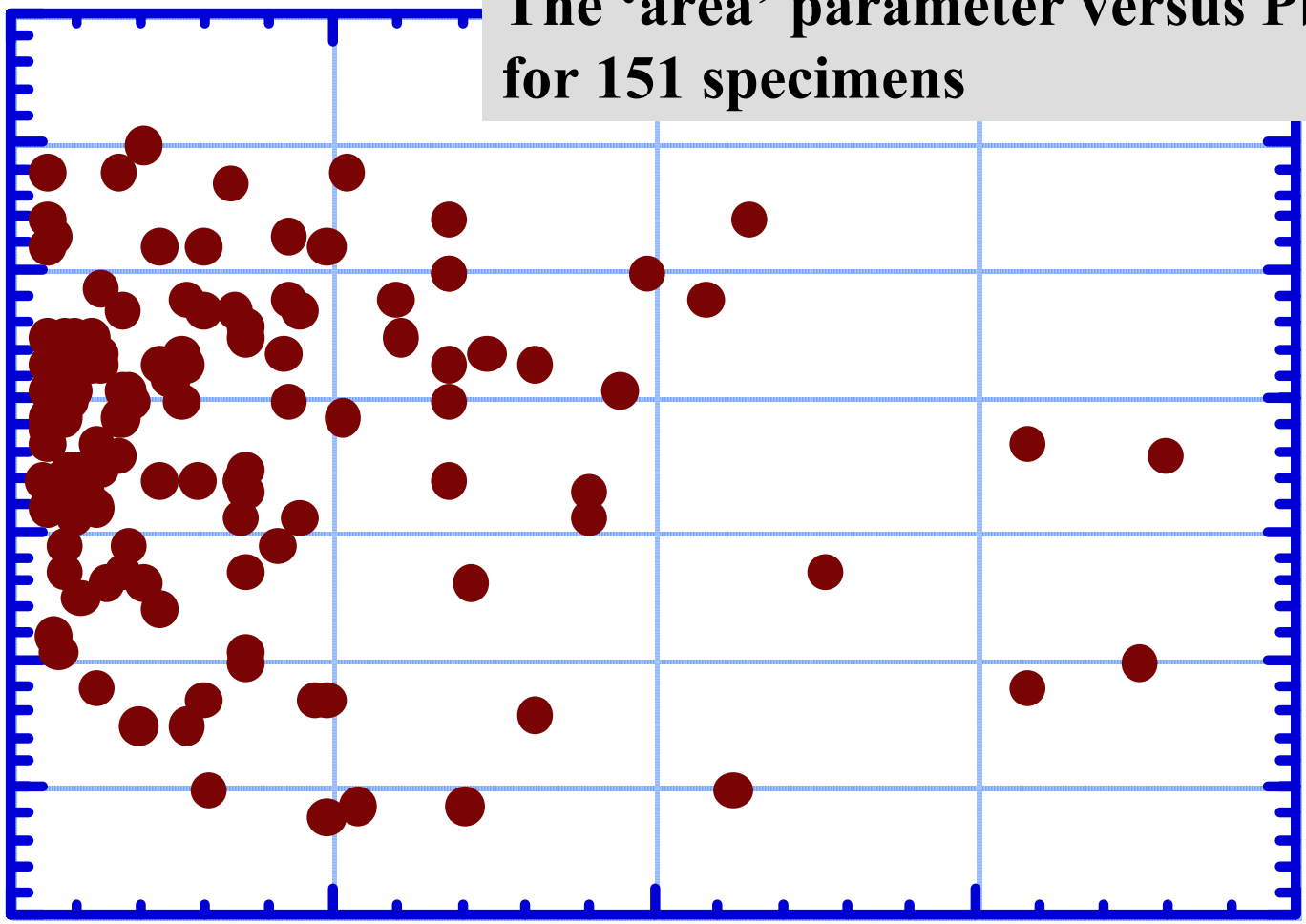
$$p_B = (1.2\ SMTS / SCF)(t / R)$$

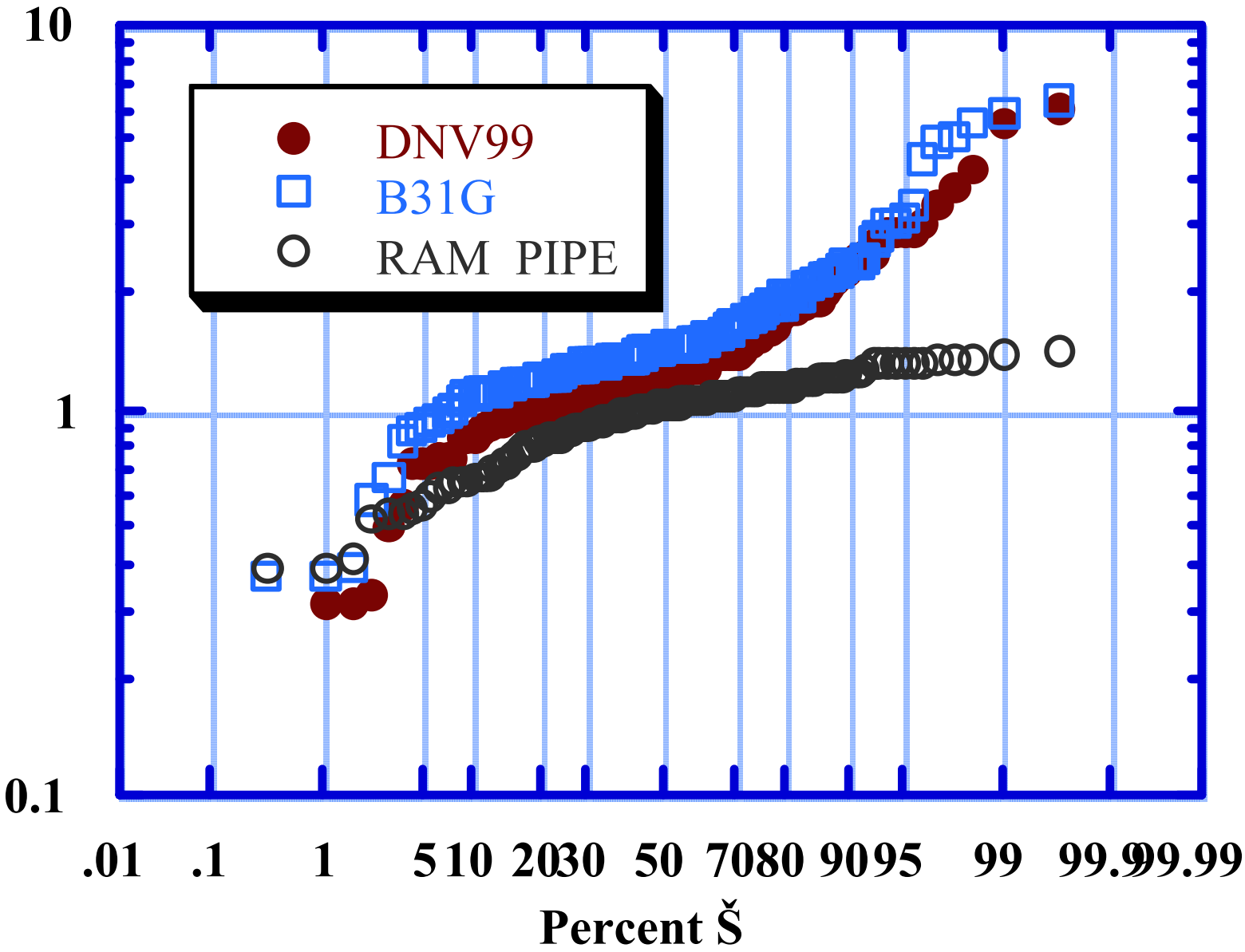
$$SCF = 1+2(tc/R)^{0.5}$$



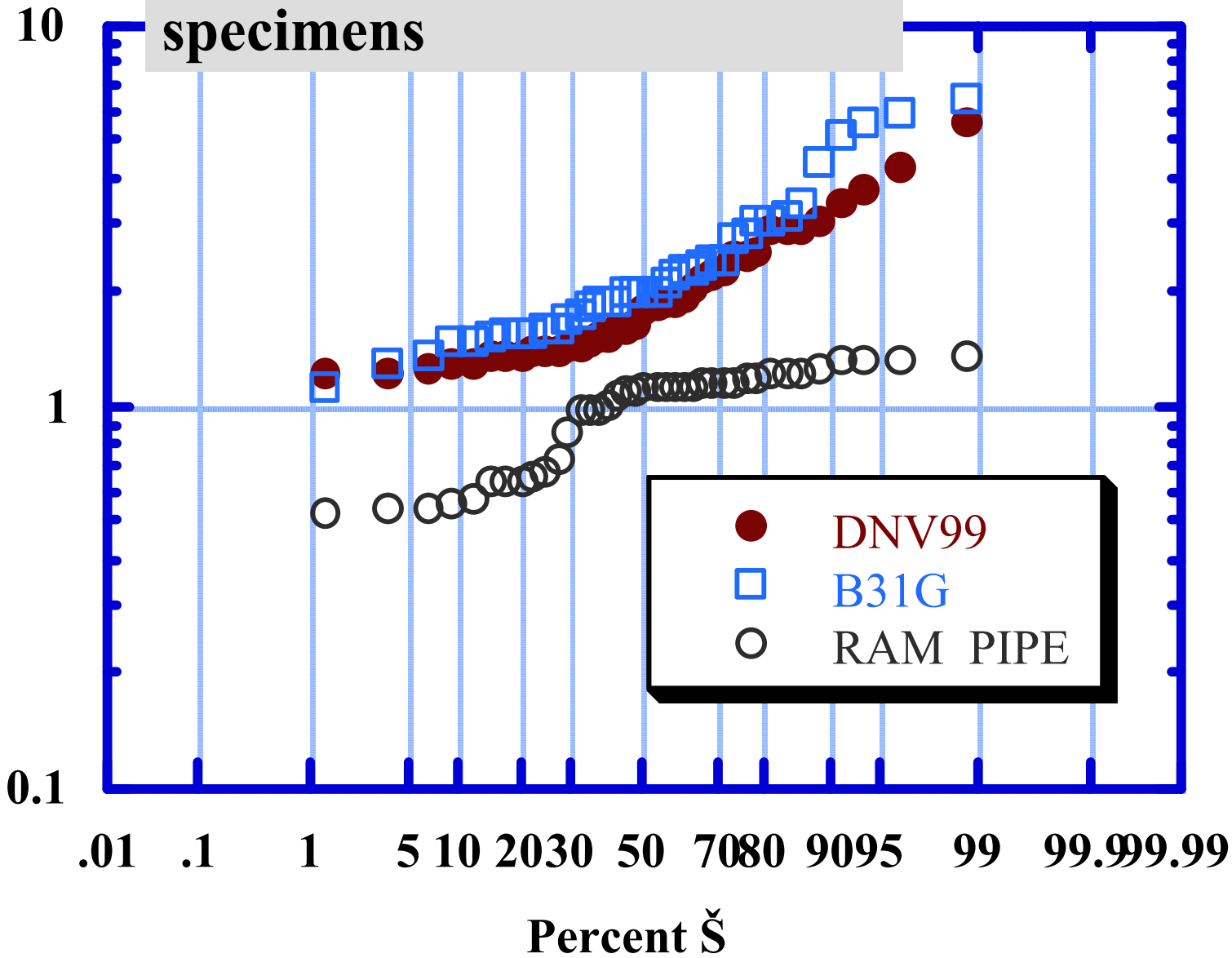

151 tests on naturally corroded & machined specimens
B_{50} = 1.2 and 1.0
V_B = 0.22
2
1.6
1.2
0.8
0.4
.01
.1
1
5
10
20
30
50
70
80
90
95
99
99.9
99.99
Percent Š

The ‘area’ parameter versus Pb for 151 specimens

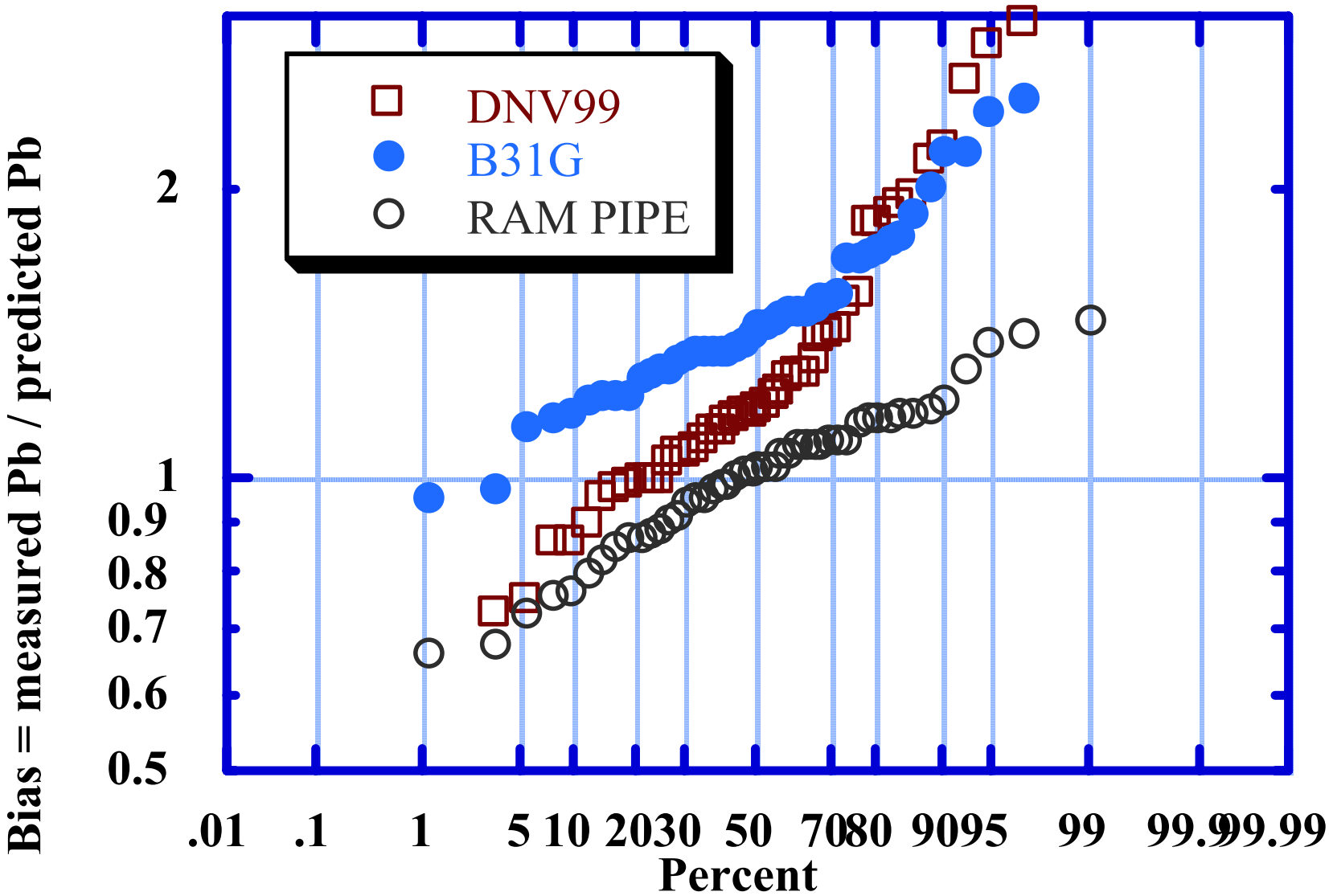



10
1
0.1
DNV99
B31G
RAM PIPE
.01
.1
1
5
10
20
30
50
70
80
90
95
99
99.9
99.99
Percent Š

Bias for naturally corroded specimens



Bias for machined specimens



MTMG Summary

- **9 Task project - predict burst pressures - smart pigged and unpigged pipelines**
- **18 month to complete tasks**
- **$98,000 cost**
- **MTMG has extensive background to perform project**