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NESC I - Inspection task group
Part II – Appendices

P2000/73

B. Eriksen & R. Houghton

EUR 19653/II EN

Network for Evaluating Structural Components

NESC

NESC I Spinning Cylinder Project

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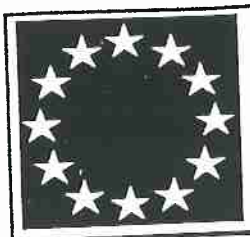
Appendix 1

Guidelines for reporting.



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+ TG3 Chairman

For programme use only

Guidelines for the Reporting of the Inspection Data for the NESC Spinning Cylinder

TABLE OF CONTENT

INTRODUCTION:

In order to enable the Reference Laboratory (RL) to document correctly your measurement results and also to perform a correct analysis of these results, the participating teams are requested to report their results according to the hereafter described data sheets (DS). The presence of an invigilator during the inspection and part of the data analysis stage is foreseen. Basically, eight data sheets are to be sent to the RL at the latest 1 month after the measurement campaign.

- DS 0 : Short procedure description
- DS 1 : Co-ordinates and reference description
- DS 2 : Full inspection procedure description
- DS 3 : Testing equipment description
- DS 4 : Raw inspection data records
- DS 5 : Inspection results
- DS 6 : Profile of lager fatigue cracks
- DS 7 : Questionnaire: training/qualification

More detailed comments on the information the RL wishes to receive on each data sheet is given hereafter. In house, existing formats are acceptable in so far they are implemented with the specific requirements indicated hereafter on each Data Sheet.

Do not forget to put your teams code on each document. This code will be communicated by the Referee Group (JRC Petten) and is to be considered as very confidential information.

TERMS AS USED IN NESC (taken over from PISC):

- Inspection method: Indicates the particular non-destructive evaluation method used for the examination of the test sample(s), e.g.: Ultrasonics, X-Rays, Gamma rays, Eddy Currents,.....

- **Inspection technique:** A technique involves one single physical principle or technical application without taking any decision on acceptability:

  e.g. for the ultrasonic method:

  - pulse-echo mode, SAFT, ALOK,...
  - probe angle, S or L wave, (0 deg L - 45 deg S - 70 deg SEL)
  - manual, automatic,
  - from inside, outside,
  - examination parallel or perpendicular to the weld,
  - calibration and recording level are generally characterising the whole procedure.

- **Inspection procedure:** A procedure often involves several techniques and embodies decision steps:

  e.g. in the ultrasonic field:

  - combination of techniques: 45 deg S + 70 deg SE
  - acceptance/rejection level: % DAC
  - scan plan: 10% probe width overlapping
  - .....

- **Flaws and Defects:** A flaw becomes a defect when recognised important enough to be re-evaluated or rejected.

PROCEDURE: Short Description (max. 1 page):

On the separate sheet included would you please provide the RL with a short overview of your inspection methodology. The sheet must begin with your Team Code and say whether the information is for the Pre-Test Inspection or the Post-Test Inspection.

As guidance, some of the points to cover are:

a) Summary of the inspection methods, and techniques used. (See list of definitions).

b) Identification of equipment and methodology, covering:
- Detection system (e.g. Krautkramer USIP 11)
- Data analysis and display system
- Manual or automatic scanning
- Scan directions with respect to cylinder axis
- Scanning from inside or outside of cylinder

c) General calibration procedure (e.g.: ASME XI)

d) Recording level (e.g. 50% DAC); reference reflectors used

e) Statement on the present or potential possibility to use the described measurement method for ISI / PSI or acceptance tests.

f) Correspondence of the proposed procedure with an existing national or international codes or recommendations.

On the following three sheets you are asked to put a circle around the parameter that fits your system. If none is relevant are listed please add the appropriate parameters.

The three sheets are:

- DS 0.1 for detection
- DS 0.2 for through wall sizing
- DS 0.3 for length sizing

PROCEDURE: Short Description:

PRE-TEST / POST TEST
(Circle the one applying)

TEAM CODE: ____

a) _____

b) _____

c) _____

d) _____

e) _____

f) _____

NESC 1

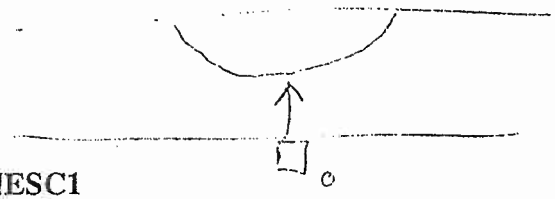
SUMMARY OF PROBES AND CALIBRATION USED FOR DETECTION

PRE-TEST / POST TEST
(Circle the one applying)

TEAM CODE: _____

INSONIFICATION	Frequency [MHz]	Type of Ultrasonic Wave	Beam Angle [degrees]	Scan Direction	Inside or Outside Surface	Manual or Automatic Scanning
Standard Pulse-Echo	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Twin-Crystal Probes	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Creeping Waves	0.5 1 2 3 4 5 ..	-	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Mode Conversion	0.5 1 2 3 4 5 ..	-	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Focusing Probes	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Pitch-Catch	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Tandem	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Phased Arrays	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
ALOK	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
TOFD	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
SAFT	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
HoloSAFT	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Acoustic holography	0.5 1 2 3 4 5 ..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
EMAT	0.5 1 2 3 4 5 ..	LW SW SH	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A

SUMMARY OF CALIBRATION METOD	Type of Reflector.	Reflector Dimensions [mm]	Reflector Depth [mm]	Type of Correction for Depth	Detection Treshold
ASME Block	SDH, FBH, Notch			Constant, DAC	Noise Level, 10% DAC, 20% DAC, Other
NESC Block	SDH, FBH, Notch			Constant, DAC	Noise Level, 10% DAC, 20% DAC, Other
Other: ____					



NESC1

SUMMARY OF PROBES USED FOR THROUGH WALL SIZING

PRE-TEST / POST TEST
(Circle the one applying)

TEAM CODE: _____

INSONIFICATION	Frequency [MHz]	Type of Ultrasonic Wave	Beam Angle [degrees]	Scan Direction	Inside or Outside Surface	Manual or Automatic Scanning
Standard Pulse-Echo	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Twin-Crystal Probes	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Creeping Waves	0.5 1 2 3 4 5..	-	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Mode Conversion	0.5 1 2 3 4 5..	-	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Focusing Probes	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Pitch-Catch	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Tandem	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Phased Arrays	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
ALOK	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
TOFD	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
SAFT	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
HoloSAFT	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Acoustic holography	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
EMAT	0.5 1 2 3 4 5..	LW SW SH	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A

TECHNIQUE USED FOR THROUGH WALL SIZING	6 dB Drop Metod	Crack Tip-Diffraction	Contouring	Mode Conversion	Maximum Amplitude	Other:

NESC 1
SUMMARY OF PROBES USED FOR LENGTH SIZING

PRE-TEST / POST TEST
(Circle the one applying)

TEAM CODE: _____

INSONIFICATION	Frequency [MHz]	Type of Ultrasonic Wave	Beam Angle [degrees]	Scan Direction	Inside or Outside Surface	Manual or Automatic Scanning
Standard Pulse-Echo	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Twin-Crystal Probes	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Creeping Waves	0.5 1 2 3 4 5..	-	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Mode Conversion	0.5 1 2 3 4 5..	-	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Focusing Probes	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Pitch-Catch	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Tandem	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Phased Arrays	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
ALOK	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
TOFD	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
SAFT	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
HoloSAFT	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
Acoustic holography	0.5 1 2 3 4 5..	LW SW	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A
EMAT	0.5 1 2 3 4 5..	LW SW SH	0 45 60 70 ..	+X -X +Y -Y	OD ID	M A

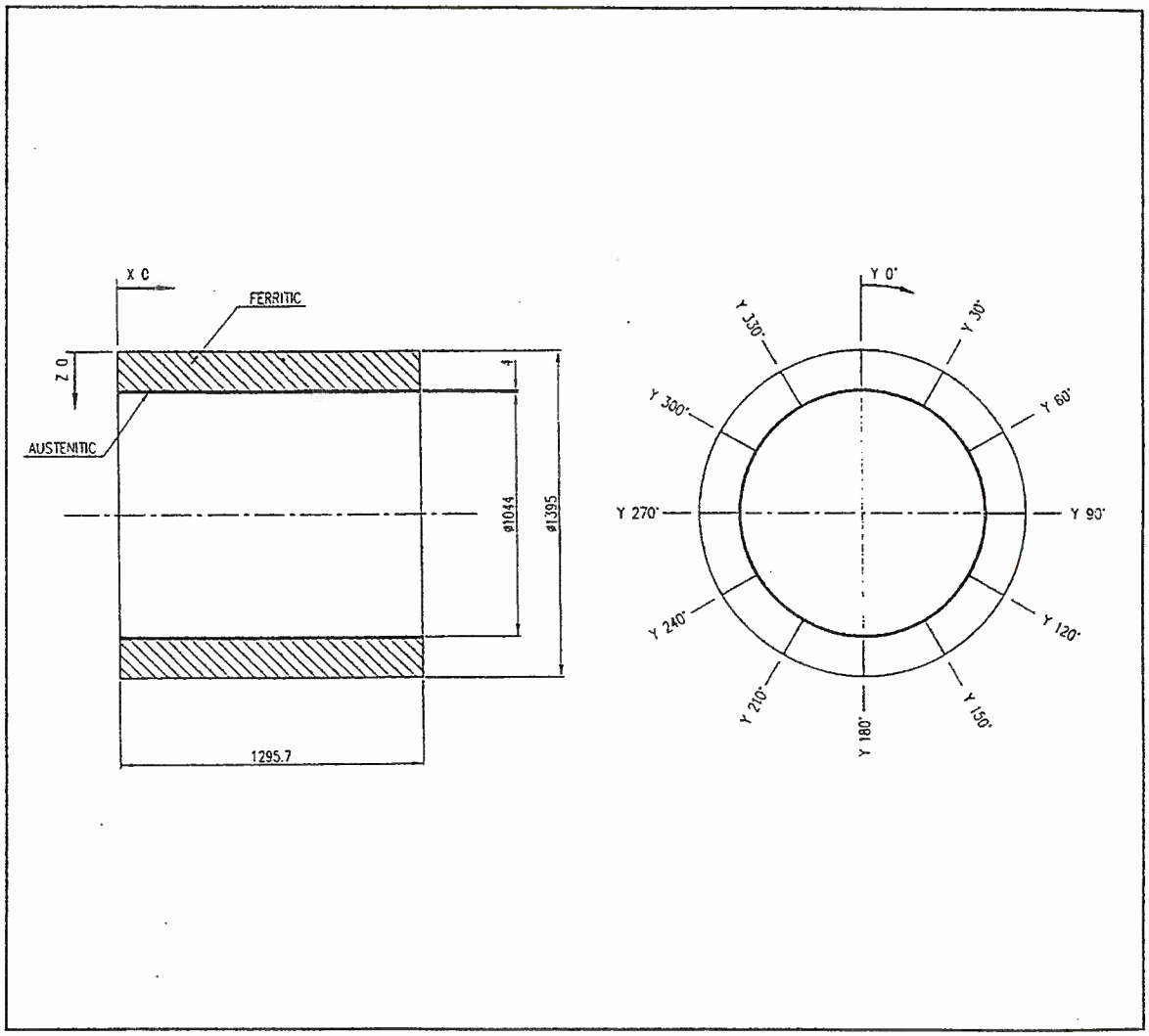
TECHNIQUE USED FOR LENGTH SIZING	6 dB Drop Metod	Maximum Amplitude	Contouring	DGS diagramme	Other:

COORDINATES AND REFERENCE DESCRIPTION:

PRE-TEST / POST TEST
(Circle the one applying)

TEAM CODE: ____

The cylinder has clearly marked references. Your team is kindly asked to use these co-ordinates as much as possible. If your teams co-ordinates deviates from the given references you are asked to indicate this very clearly on your data sheets.



INSPECTION PROCEDURE: Detection and Sizing Details

PRE-TEST / POST TEST
(Circle the one applying)

TEAM CODE: ____

The following information should be provided:

a) Detailed description of:
- couplant
- layout (scan plan - overlap)
- compensation for curvature
- any secondary or supplementary reference reflectors
- accuracy of instrumentation
- .....

b) Please describe how the information on indications is combined for detection.

c) Please describe how the sizing data from each technique is combined to give the reported size.

TESTING EQUIPMENT DESCRIPTION:

TEAM CODE: ____

PRE-TEST / POST TEST
(Circle the one applying)

The general features of the full measurement system used are to be described here.

Indicate also if the equipment has been calibrated or if the critical parameters have been checked before the execution of the inspection of the assemblies.

An example of a testing equipment description sheet is given hereafter for an ultrasonic testing system.

All ultrasonic systems used should be documented as follows:

A. Ultrasonic equipment: general description

B. Transducer characteristics
   1. Manufacturer -type
   2. Characteristics of transducers (components if complex probes)
      a) crystal size
      b) wedge characteristics
      c) presence of matching network
      d) frequency characteristics
      e) beam angle
      f) beam characteristics if measured

C. Scanning device characteristics
   1. Accuracy of positioning
   2. Scanning step

D. Data recording equipment: brief description

E. Data handling equipment (if relevant): brief description

RAW INSPECTION DATA RECORD: (Log Book)

TEAM CODE: ____

PRE-TEST / POST TEST
(Circle the one applying)

Your team is kindly requested to keep your data record for at least five years. Additionally it is advised to consult the JRC before destroying your data record.

DETAILED INSPECTION RECORD: (Guidance Instructions)

The difference between Data Sheet 5.1 and 5.2 is as follows:

- Data Sheet 5.1 should only consider the results of one of the techniques to create a defect envelope. It is thus a table of results relative to one of the techniques only. Several sheets may be required, numbered 5.1.n.

- Data Sheet 5.2 gives the final results of the location and size of all flaws determined from the combination of measurements by several different techniques.

The data requested on Data Sheets 5.1 are (one for each technique used):

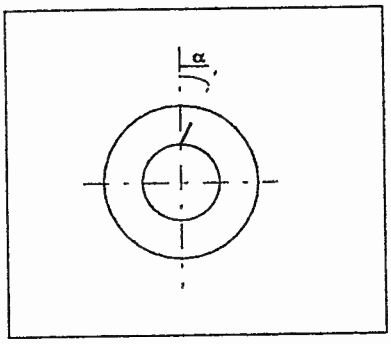
a) technique used
b) limits of the inspected area
c) scanning direction
d) co-ordinates of the envelope of each indication
e) position of the maximum amplitude of response
f) maximum amplitude of the flaw signal in % of DAC (e.g. 25% DAC or 150% DAC).
g) noise level in % of DAC or signal to noise level of signal from the flaw.

The data requested on Data Sheet 5.2 are (one for full procedure):

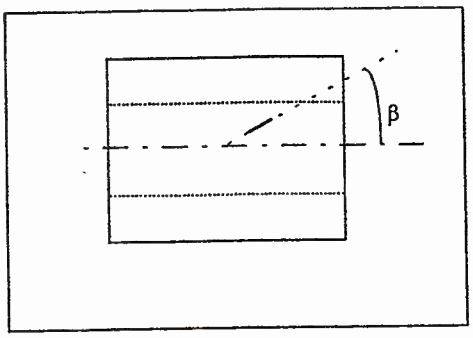
a) limits of the inspected area
b) scanning direction
c) which results in Data Sheet 5.1 used to arrive to results in Data Sheet 5.2
d) co-ordinates of the envelope of each indication
e) position of the maximum amplitude of response
f) the maximum amplitude of the flaw signal in % of DAC
g) the noise level in % of DAC or signal to noise level of signal from the flaw.
h) major characteristics of the flaw: volumetric, planar,.....
i) orientation of the flaw, if planar defined by:
   - tilt angle (see next page)
   - skew angle (see next page)
j) certainty coefficient: flaw - no flaw (D/N) (see next page)
k) confidence level in certainty coefficient (see next page)

Key to i):

α= Tilt angle:



β = Skew angle:



Key to j) and k):

D 100 = 100 % sure indication is a flaw
D 50 = 50 % sure indication is a flaw
D 10 = 10 % sure indication is a flaw
N 10 = 10 % sure indication is not a flaw
N 50 = 50 % sure indication is not a flaw
N 100 = 100 % sure indication is not a flaw

EXAMPLE OF NESC - DATA SHEET DS 5.1:

Data Sheet 5.1.n is to be produced for each technique used.

INSPECTION: (Pre-Test) or Post Test

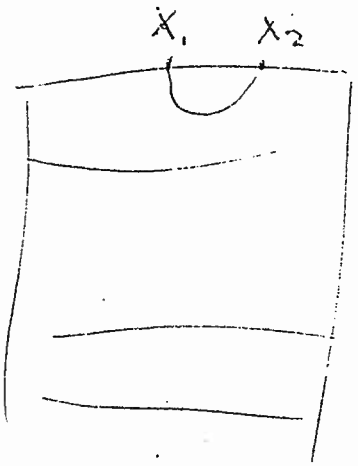
TEAM CODE: AB

TECHNIQUE: Echo 45 TRL

INSPECTED VOLUME: e.g. X1= 420 mm X2= 550 mm
Y1= 0 deg Y2= 360 deg
Z1= 15 mm Z2= 75 mm

SCANNING DIRECTION: -X

No.	X1 (mm)	X2 (mm)	Estimated accuracy X (mm)	Y1 (deg)	Y2 (deg)	Estimated accuracy Y (deg)	Z1 (mm)	Z2 (mm)	Estimated accuracy Z (mm)	Max amplitude (% DAC)	Comment on indication
1	480	502	2.0	150	163	0.2	15	75	2.0	60	
2	430	431	2.0	300	315	0.2	45	75	1.0	120	
3	500	510	2.0	12	59	0.2	65	70	1.0	30	



EXAMPLE OF NESC - DATA SHEET 5.2:

INSPECTION: (Pre-Test) or Post Test

TEAM CODE: AB

DATA SHEETS CONCERNED:
e.g. 5.1/1
5.1/2
5.1/6

INSPECTED VOLUME:
e.g. X1 = 400 mm X2 = 600 mm
Y1 = 0 deg Y2 = 360 deg
Z1 = 0 mm Z2 = 75 mm

No.	X1 [mm]	X2 [mm]	Estimated accuracy X [mm]	Y1 [deg]	Y2 [deg]	Estimated accuracy Y [deg]	Z1 [mm]	Z2 [mm]	Estimated accuracy Z [mm]	X-max [mm]	Flaw or non flaw	Confid. Level	S/N-ratio [db]	Orientation α Tilt	Orientation β Skew	Flaw characteristics (IIW Voc.)	Flaw shape
1	480	602	2.0	140	170	0.2	0	75	1.0	560	D	50	6	7°	10°	Planar fatigue crack	Half Ellipse
2	730	750	2.0	300	315	0.2	45	75	1.0	745	D	100	12	0	0	Planar Lack of fusion	-
3	300	410	2.0	10	20	0.5	65	70	1.0	380	D	100	6	-	-	Volumetric	Long slag

Addendum to Data Sheet 5.2

In order to allow a complete analysis at the level of techniques the following questions should be answered for each indication given in data sheet 5.2.

- Detection
  1. With which techniques/probes were you able to detect this indication.
  2. Describe the decision process that lead you to consider this indication as a defect.

- Through Wall Sizing
  1. With which techniques/probes were you able to size the through wall depth of this indication.
  2. Describe the decision process which allowed you to arrive at the dimensions given in data sheet 5.2.

- Length Sizing
  1. With which techniques/probes were you able to size the length of this indication.
  2. Describe the decision process which allowed you to arrive at the dimensions in data sheet 5.2.

Hereafter follow examples of tables of how this information could be given.

- Detection

	Detection technique 1	Detection technique 2	Detection technique 3	Detection technique 4	Decision process
Indication 1	detected	detected	detected	detected	- detected with 4 out of 4 techniques used. - high S/N ratio
Indication 2	not detected	not detected	not detected	detected	.
Indication 3	detected	not detected	detected	detected	.
Indication 4	not used	not used	detected	detected	.
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

- Through Wall Sizing

	Through Wall Sizing technique 1	Through Wall Sizing technique 1	.....	Decision process
Indication 1	Z1=15 mm Z2=25 mm	not able to size		maximum depth measured was reported as value for data sheet 5.2
Indication 2	Z1=10 mm Z2=25 mm	Z1=12 mm Z2=25 mm		
Indication 3	not used	Z1=10 mm Z2=25 mm		
. .				

- Length Sizing

	Length sizing technique 1	Length sizing technique 2	.....	Decision process
Indication 1	Y1=15 mm Y2=25 mm	not able to size		probe with highest S/N value was used
Indication 2	Y1=10 mm Y2=25 mm	Y1=12 mm Y2=25 mm		
Indication 3	not used	Y1=10 mm Y2=25 mm		
. .				

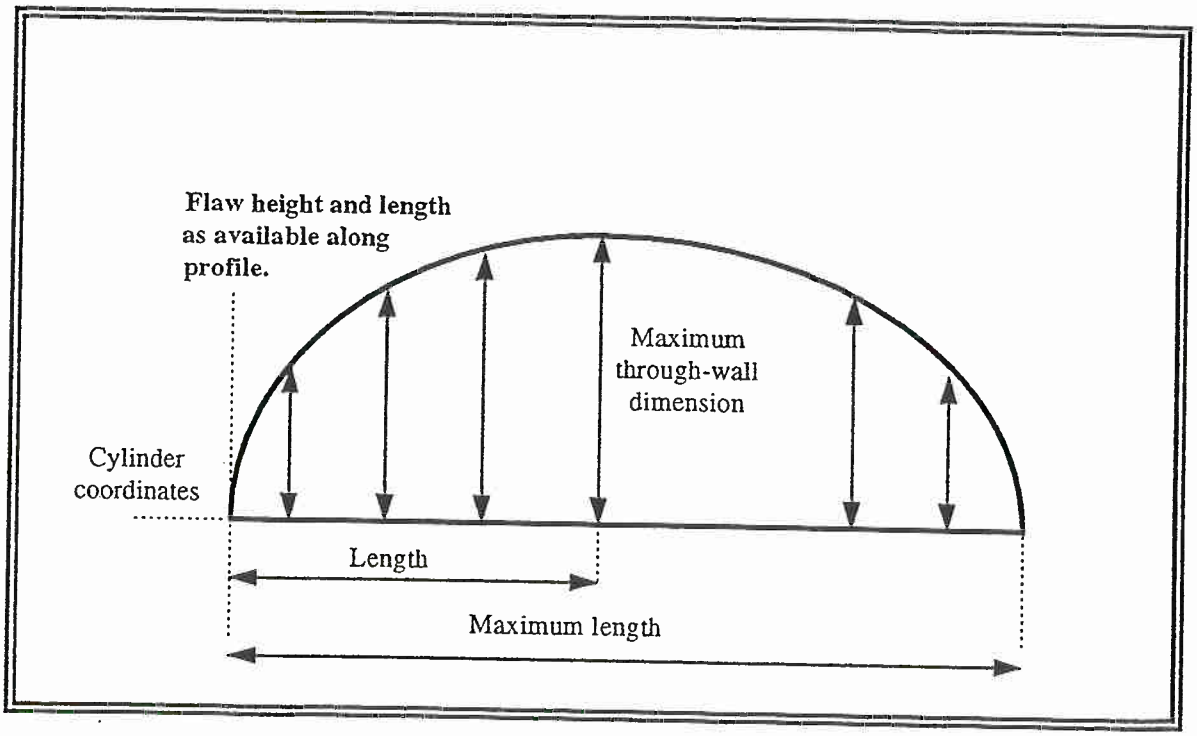
DATA ON PROFILE OF LARGER FATIGUE CRACKS:

PRE-TEST / POST TEST
(Circle the one applying)

TEAM CODE: ____

You are requested to give as accurately as possible the profile of the larger fatigue cracks present in the NESC cylinder. The data will be used by TG 3 (fracture mechanics group) for their calculation of the crack growth during the spinning cylinder test. Please indicate on a separate set of Data Sheets DS 0.2 and DS 0.3 which technique you used for crack profiling

Example:



TRAINING / QUALIFICATION:

THIS QUESTIONNAIRE SHOULD BE FILLED IN BY ALL OF THE INSPECTORS

PRE-TEST / POST TEST
(Circle the one applying)

TEAM CODE: ____

ROLE IN INSPECTION TEAM:
(Circle the one/ones applying)

- Data interpreter
- UT-inspector
- Other _____

1. NDT TRAINING:

A. What type of training have you had?

_____
_____
_____
_____

B. Do you receive periodic training? How often? How many hours/year (average)?

_____
_____
_____
_____

C. Any other comments about training?

_____
_____
_____
_____

2. CERTIFICATION / QUALIFICATION:

a) What qualification do you have (certificates, levels)?

_____
_____
_____
_____

b) Comments about qualification?

_____
_____
_____
_____

3. EXPERIENCE:

A. How much experience do you have with inspection of vessels?

_____
_____
_____
_____

B. What is your experience with sub-clad defects in vessels?

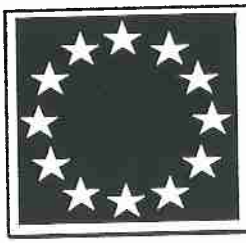
_____
_____
_____
_____

C. What is your experience in sizing large fatigue cracks in vessels?

_____
_____
_____
_____

Appendix 2

Handling of the cylinder.



NESC
Network for Evaluating Steel Components

Document No.: NESC.TG1(95)3

Version: Final

Date: 18.12.1995.

Distribution: All TG1 members
+ TG3 chairman

For programme use only

Technical Specification Of Information Relevant To The Inspection Of The NESC Spinning Cylinder Specimen

INDEX:

1. CYLINDER DESCRIPTION

1.1. Dimensions

Internal Diameter:	1044 mm
External Diameter:	1395 mm
Total Wall Thickness (theoretical):	175.5 mm
Austenitic Cladding Thickness:	+/- 4 mm
Length:	1295.7 mm
Weight:	≈ 6.800 kg
Lifting Provision:	a support plate for the cylinder is provided (Figure 2).

1.2. Coordinate System

Figure 1 shows drawing of the cylinder. The origins and the positive directions of the coordinate system to be used for reporting of the defects, are clearly indicated on one of the end-faces of the cylinder. This end-face is the zero point for length measurements. Grooves are machined around the end-face every 30 degrees.

1.3. Surface Details

Internal Surface:	Austenitic Strip Cladding ≈ 4 mm thickness
External surface:	Ferritic.
Surface Finish:	All examination surfaces are R_a = 1.6 μm and free of irregularities, loose foreign matter and coatings.

1.4. Handling precautions

As the cylinder is an extremely valuable and heavy item, the following precautions are strongly recommended for his handling.

It is the responsibility of the organisations concerned with the inspection /lifting/handling to ensure the safety of their personnel and the cylinder itself during handling. The Reference Laboratory should be consulted if any further guidance is required.

Following the meeting of Task Group 1 (07.11.1995) it is requested that the cylinder be transported and inspected vertically with its lower face sealed on a rubber mat. A plate (1700 x 1700 x 10mm.) covered with rubber is provided with the cylinder.

Raising and lowering the cylinder on its vertical position

The support plate has three M36 threads into which are screwed three standard M36 DIN 580 eye bolts all of which must be used with standard lifting tackle. The support plate is attached to the cylinder by means of eight M20 bolts and lifting discs.

For the inside of the cylinder, each disc is located into a recess, an M20 x 100 bolt passed through and screwed into the thread via the support plate with a M20 x 30 nut with a tightening torque of 200 Nm.

The lifting chains, provided by the Reference Laboratory must be used to raise and lower the cylinder.

During loading the cylinder must be maintained in a vertical position.

Removal of the support plate for the inspection

- unscrew the upper nuts from above.
- insert hands through access grooves to unscrew the bolts through the plate and remove them with the 79 mm. diam.lifting discs and locking washers.

This operation is possible from the outside of the cylinder.

- Remove the support plate.

Installation of the Support plate

This operation must again be performed from the outside of the cylinder. It is imperative that the eight threaded holes around the perimeter of the plate are lined up with the lifting discs recesses machined into the top of the cylinder. For this alignment a line is engraved on the support plate, which corresponds to the Y0° line engraved on the cylinder.

- through the access grooves machined around the perimeter of the plate, screw the M20 bolts containing the lifting discs (79 diam.mm x 20mm) and the locking washers via the thread of the support plate.

- screw the M20 bolts with the M20 nuts in order to tighten the lifting discs against the recesses of the cylinder, making sure that the discs are in their proper position in the recesses. Use 12mm and 30mm keys to tighten the nuts with the bolts.

- tighten the eight nuts with a torque of 200Nm.

In order to avoid dropping the 79 mm diameter lifting rings it is recommended to hold them with a string through the 25mm diameter. holes. This string can be removed as soon as the M20 bolt is engaged in the M20 thread of the support plate.

Supplementary bolts are supplied by the Reference Laboratory in case the bolts drop inside the cylinder. The upper support plate has been provided as a means of lifting when it is in the vertical position only.

Under NO circumstances should the upper disc be used for lifting the test cylinder and positioning it in the horizontal position.

It is the responsibility of the receiving and dispatching organisations concerned to ensure that the cylinder is handled in a safe manner and is not damaged.

The operations should be carried out by experienced and qualified riggers. The cylinder must not be dropped or handled roughly and its surfaces and edges must be protected from scratches or other damage.

The check list of the items supplied must be completed when the cylinder is received and dispatched.

Check list of items supplied with the cylinder.

- Calibration block A
- Calibration block B
- Calibration block C
- Calibration block D
- 10 liters WD 40 oil with spray bottles
- 3 lifting eye bolts M36 following DIN 580
- 1 lifting block and tackle (Max. 10 tonnes for an angle between the chains of 45°)
- 4 M20 x 100 supplementary bolts
- 8 M30 x 30 nuts (DIN 6331 class 10)
- 8 locking washers (DIN 6798A)

Corrosion protection for the cylinder and the calibration blocks

The cylinder and also the calibration blocks must be covered with the supplied WD 40 oil in order to prevent corrosion.

A special care is asked to the teams for the narrow slots (0.15mm width) and the side drilled holes present in the calibration blocks.
They must be lubricated with WD 40 when they are not used for U.T. calibration.

Through clad defect

Between each transport, the through clad defect must be protected with water resistant tape in order to avoid corrosion inside of the defect.
During inspection under immersion the same defect should also be protected with water resistant tape as far as possible.

The Reference Laboratory remains complete at disposition of the teams for further information's.

1.5. Calibration Blocks

Four calibration blocks are provided by the NESC Reference Laboratory. The drawings of these calibration blocks are given in figures 3 and 4.

1.5.1. Uncladded calibration block A (see figure 3, drawing number JRC 10083B) with the same internal radius as that of the cylinder and a wall thickness of 169.8 mm, 150 mm wide, containing a narrow slot at the inner surface (50 mm depth, 0.15 mm width, radius tip 0.08 mm, all along the width).

1.5.2. Uncladded calibration block B (see figure 3, drawing number JRC 10083B) with the same internal radius as that of the cylinder and a wall thickness of 169.8mm, 150 mm wide, containing a narrow slot at the inner surface (30 mm depth, 0.15 mm width, radius tip 0.08 mm, all along the width).

1.5.3. Uncladded calibration block C (see figure 3, drawing number JRC 10083B) with the same internal radius as that of the cylinder and a wall thickness of 169.8 mm, 150 mm wide, containing a narrow slot at the inner surface (10 mm depth, 0.15 mm width, radius tip 0.08 mm, all along the width). It also contains eight side drilled holes, diameter 3 mm, 7 of them equally spaced along the thickness.

1.5.4. Cladded calibration block with a cladding thickness of 4 to 5 mm (see figure 4, drawing number JRC 10082D) according to ASME Section V, Article 4 (basic calibration block for ultrasonic examination methods of in-service inspection) with the same internal radius as that of the cylinder and a wall thickness of 172.5mm.
The following calibration defects are present:
Six 8 mm side drilled holes (SDH) at 1/4, 1/2 and 3/4 of the wall thickness three slots, two on the outside surface and one through the cladding on the inside.
A 2 mm Side Drilled Hole, 80 mm deep, is inserted in the cladding tangential to the ferritic material.

1.6. Cylinder Circulation Time scale

The start date for the first circulation of the cylinder is December 1995 and completion is required by May 1996. The second circulation is planned to take place October 1996 to April 1997 after the cylinder has been spun. It is desirable that teams indicate to Mr. P. Lemaitre that they will participate in the second phase at an early date.

1.7. Referee Group Requirements

The Referee Group will preserve the confidentiality of the teams and aspects of the inspections as considered necessary by each participant. To facilitate interpretation of results and the performance of inspection techniques, discussion is required with each team at the time of data analysis and reporting of results.

2. INFORMATION REQUIRED FROM THE INSPECTION TEAM

The reporting of inspection data should be done in accordance with the guidelines. See NESC document NESC.TG1(95)4 "**Guidelines for the Reporting of the Inspection Data for the NESC Spinning Cylinder**".

3. INFORMATION ABOUT THE FLAWS

3.1. Flaws and Areas to be Scanned

Some of each of following:	Large Fatigue Cracks Real Under-Clad Cracks Artificial Under-Clad Cracks
Flaw Orientation:	axial to within +/- 10 degrees

The following areas are not to be inspected (to be confirmed!):

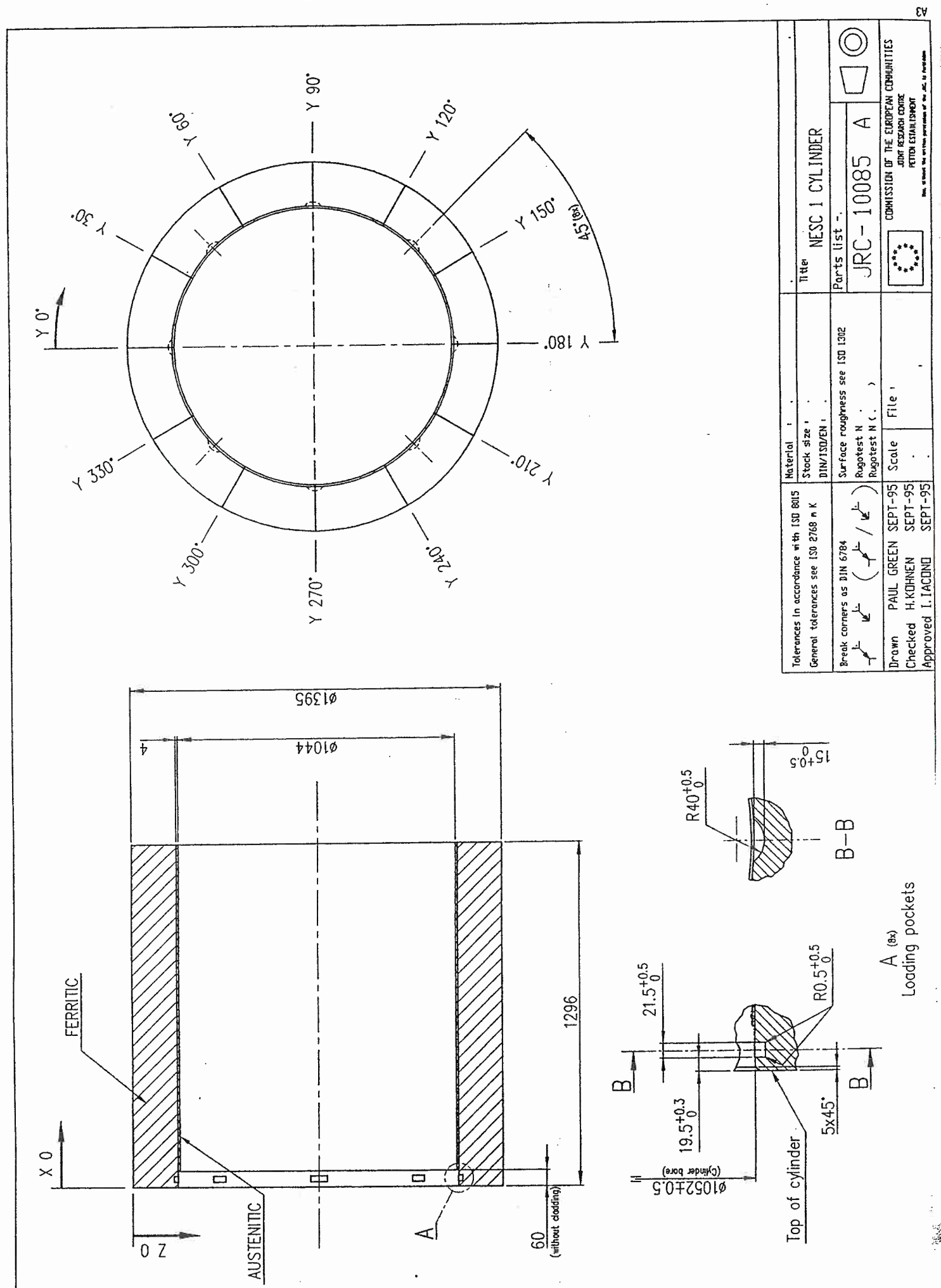
• Y = 0° to 360°	X= 0 mm to 150 mm	end of cylinder
• Y = 0° to 360°	X= 1145 mm to 1296 mm	end of cylinder
• Y = 353° to 7°	X = 0 mm to 1295.7 mm	welded area
• Y = 173° to 187°	X = 0 mm to 1295.7 mm	welded area
• Y = 263° to 277°	X = 0 mm to 1295.7 mm	cladding start area
• Y = 91.0° to 100.0°	X = 395 mm to 405 mm	thermocouple holes
• Y = 91.0° to 100.0°	X = 895 mm to 905 mm	thermocouple holes

3.2. Reporting Requirements

Large Fatigue Cracks:	Maximum length and depth, and location. (Crack profile is an optional measurement but is highly desirable)
Real Under-Clad Cracks:	Size and location of box enclosing cracked area. Depth, length and position of largest crack in the boxed area.

Artificial Under-Clad Cracks: Length, depth and location.

Figure 1:.Drawing of the cylinder with references



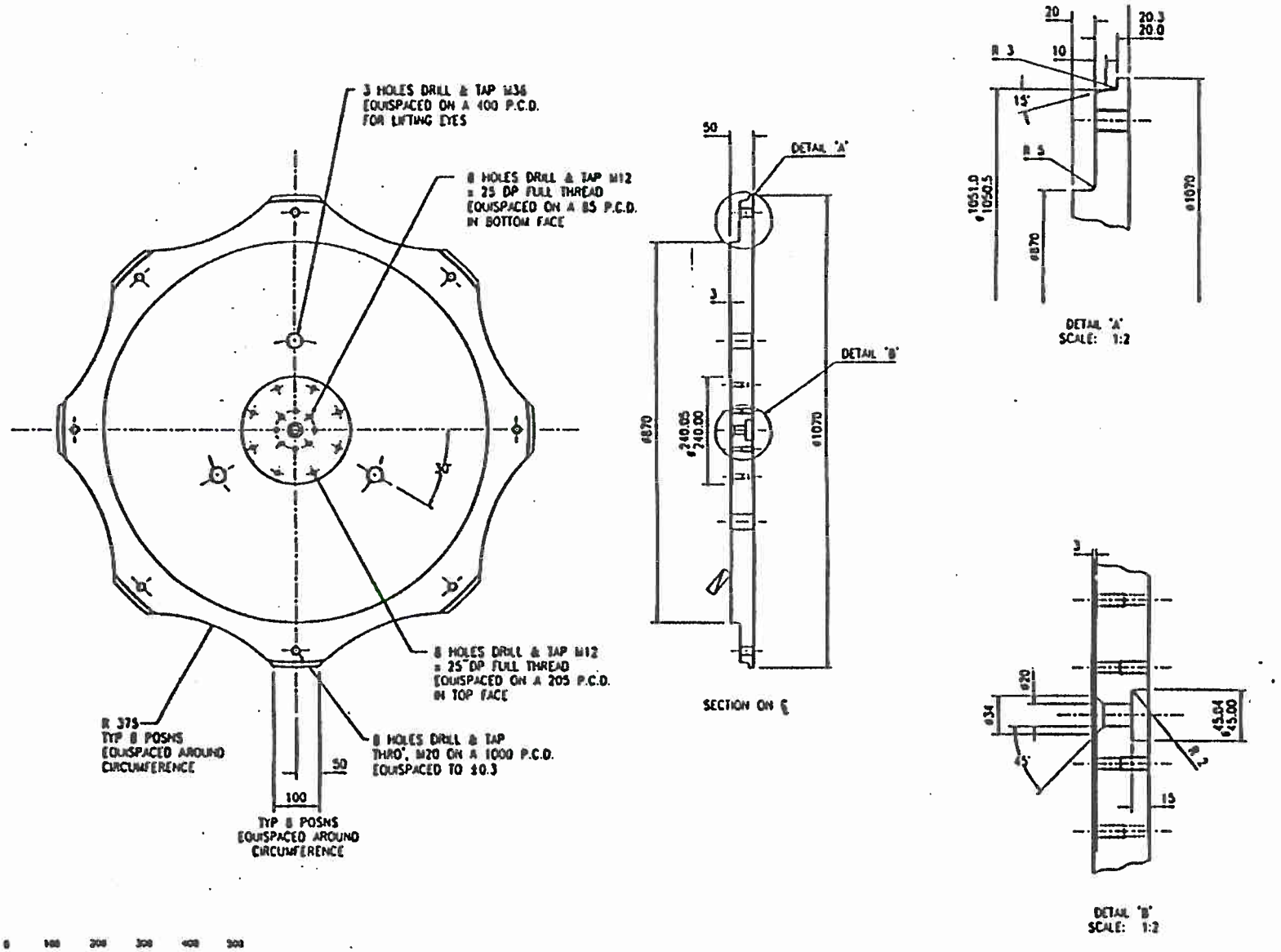


Figure 2: Support plate of the cylinder

BUILDING No.		DES OFFICE	DOR
PLANT No.		DRAWN BY	S BARLETT
JOB/FILE No.		CHECKED BY	R A Bowerbank
SITE/DIV	RISLEY	APPROVED BY	

RISLEY
AEA TECHNOLOGY

ISSUE	DATE	MOD BY	CHECKED BY	APPROVED BY

ISSUE	DATE	MOD BY	CHECKED BY	APPROVED BY

USED ON/REFERENCE DRAWINGS
24E 568168
24E 568167

CONTRACTOR'S REFERENCE

MATERIAL & SPECIFICATION
CARBON STEEL TO BS4360 GRADE 43A

SURFACE TREATMENT

SURFACE I.S. ▽ UNLESS OTHERWISE STATED

TOLERANCES EXCEPT WHERE OTHERWISE STATED
UP TO 300 ±0.25
301 TO 1000 ±0.5
ABOVE 1000 ±1.0
ON ANGLES ±30'

DIMENSIONS IN MILLIMETRES UNLESS STATED

ORIGINAL SCALE 1:2

TITLE
DETAIL SUPPORT DISC (MEDIUM SPEC.)

ISSUE DATE

DRG No. 1AE 568168

Figure 3: Drawing of calibration blocks A, B and C

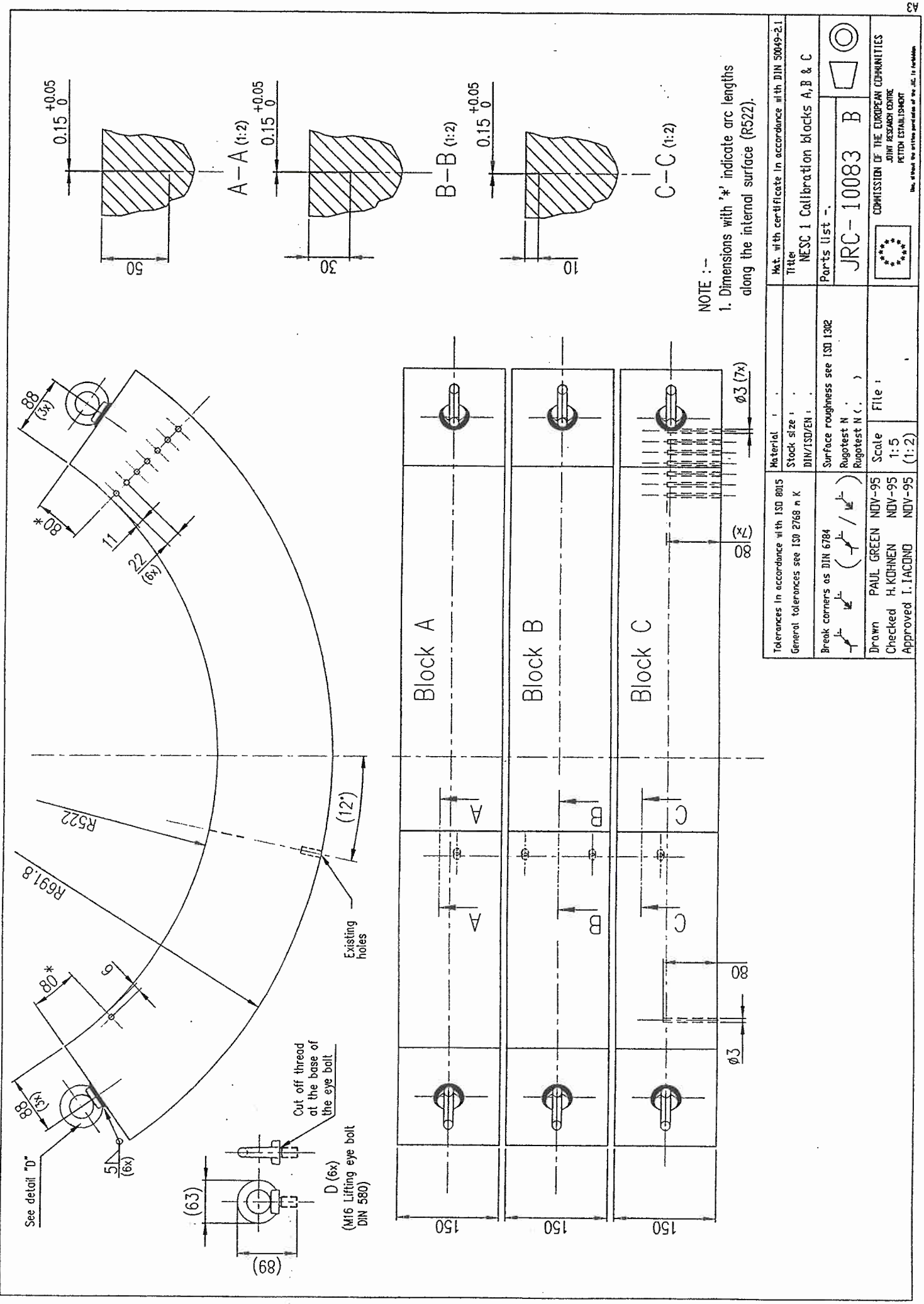


Figure 4: Drawing of calibration block D

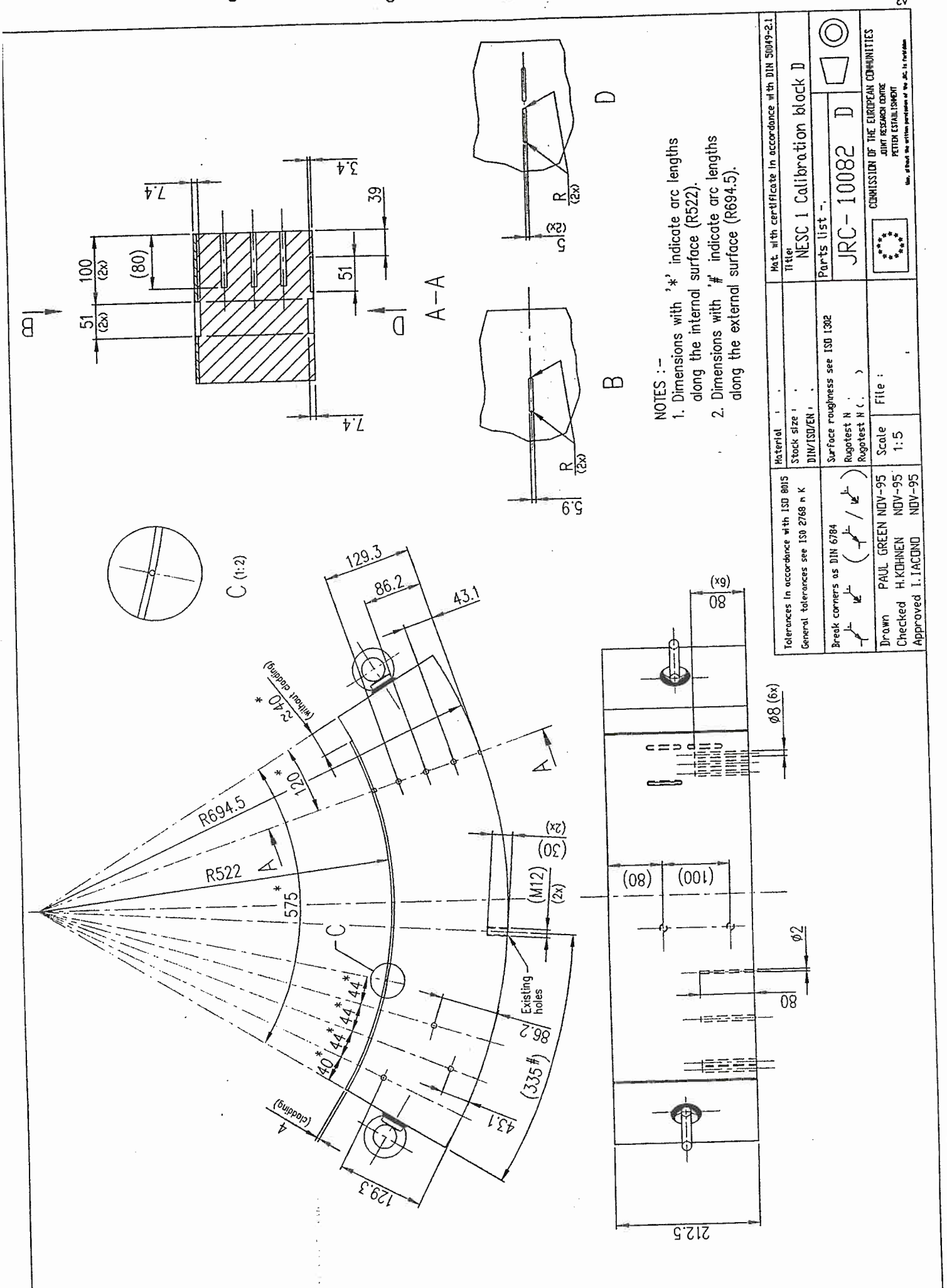
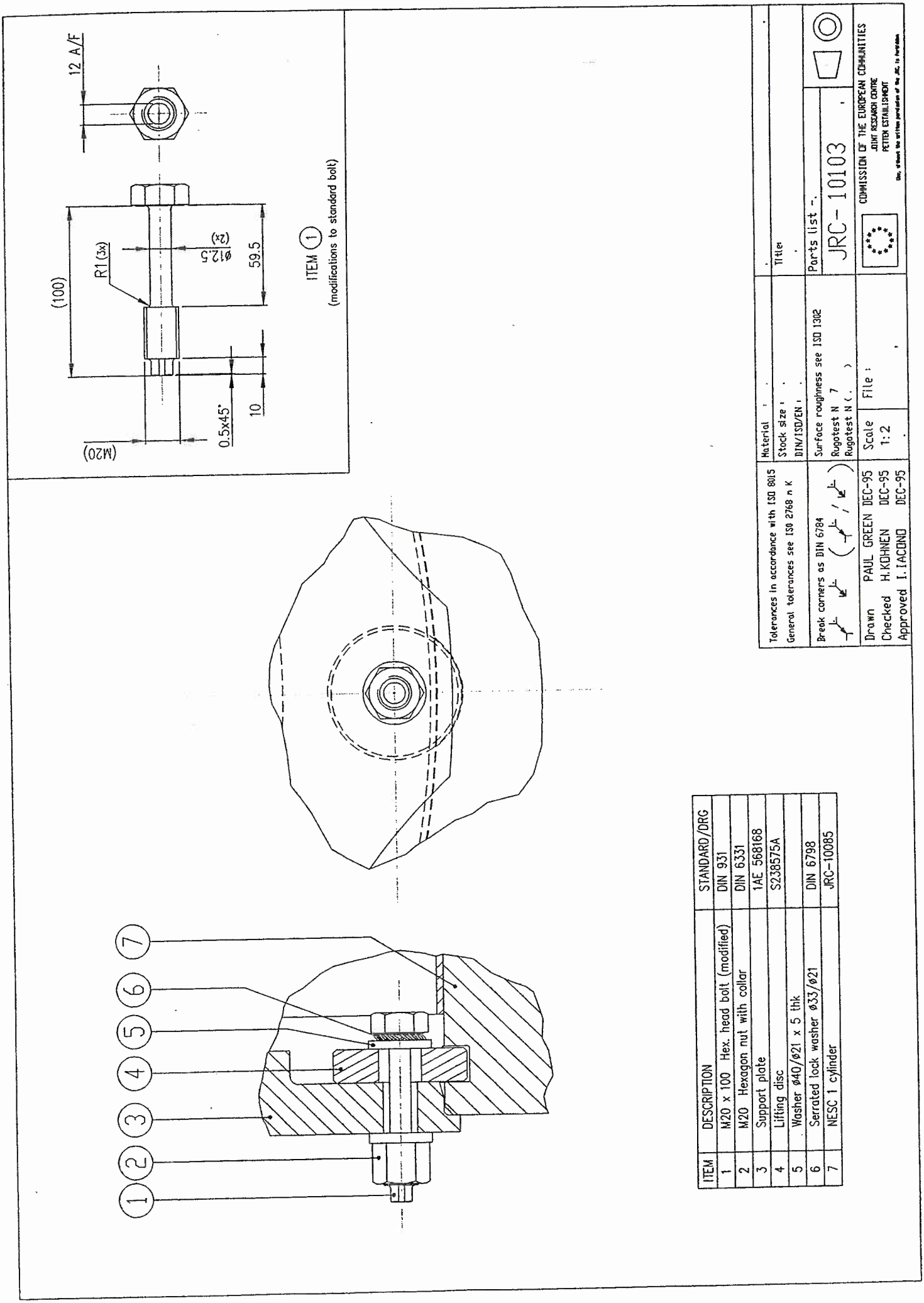


Figure 5: Drawing of bolt assembly for lifting attachement



ITEM	DESCRIPTION	STANDARD/DRG
1	M20 x 100 Hex. head bolt (modified)	DIN 931
2	M20 Hexagon nut with collar	DIN 6331
3	Support plate	1AE 568168
4	Lifting disc	S238575A
5	Washer ø40/ø21 x 5 thk	
6	Serrated lock washer ø33/ø21	DIN 6798
7	NESC 1 cylinder	JRC-10085

PLANNED INSPECTION DATES FOR THE PRE-TEST OF THE NESC I SPINNING CYLINDER:

HSE Health & Safety Executive

NESC Network for Evaluating Steel Components

Team / Week	Year: 1995								Year: 1996																											
	45	46	47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
K. Högberg ABB, TRC Sweden					INSP.																															
P. Kauppinen KOLA NPP Russia											INSP.																									
P. Kauppinen VTT Finland													INSP.																							
S.R. Doctor PNL USA																			INSP.																	
Ph. Benoist EDF & CEA France																								INSP.												
R.K. Chapman Nuclear Electric UK																												INSP.								
Participation to be confirmed (Germany)																																INSP.				
Participation to be re-confirmed Spain																																			INSP.	

Transportation of the NESC spinning cylinder

Number	Means of Transport	Transport From: Place	Post code	Contry	Transport To: Place	Post code	Contry	Time alloved for transportation From	To	VOX International Price [Hfl]
A1	Truck	Petten	1755 ZG	Holland	Taby	S-18322	Sweden	20.11.1995	01.12.1995	3120
A2	Truck	Taby	S-18322	Sweden	Espoo	FIN-02044	Finland	02.01.1996	12.01.1996	2125
A3	Truck	Espoo	FIN-02044	Finland	Petten	1755 ZG	Holland	12.02.1996	23.02.1996	3975
A4	Truck	Petten	1755 ZG	Holland	Gif/Yvette Cedex	91191	France	18.03.1996	29.03.1996	2350
A5	Truck	Gif/Yvette Cedex	91191	France	Manchester	M23 9LL	UK	29.04.1996	10.05.1996	2920
Total price for A1 to A6										14490
								"+ 17.5 % BTW		17026
B1	Truck	Manchester	M23 9LL	UK	Saarbrucken	D-66123	Germany	28.05.1996	07.06.1996	2950
B2	Truck	Saarbrucken	D-66123	Germany	San Sebastian	E-28709	Spain	24.06.1996	05.07.1996	5750
B3	Truck	San Sebastian	E-28709	Spain	Manchester	M23 9LL	UK	22.07.1996	02.08.1996	6700
Total price for B1 to B3										15400
								"+ 17.5 % BTW		18095
C1	Truck/Air	Petten	1755 ZG	Holland	Richland	WA 99352	USA	19.02.1996	01.03.1996	
C2	Truck/Air	Richland	WA 99352	USA	Petten	1755 ZG	Holland	18.03.1966	29.03.1996	
Total price for C1 to C2										46773
								"+ 17.5 % BTW		54958

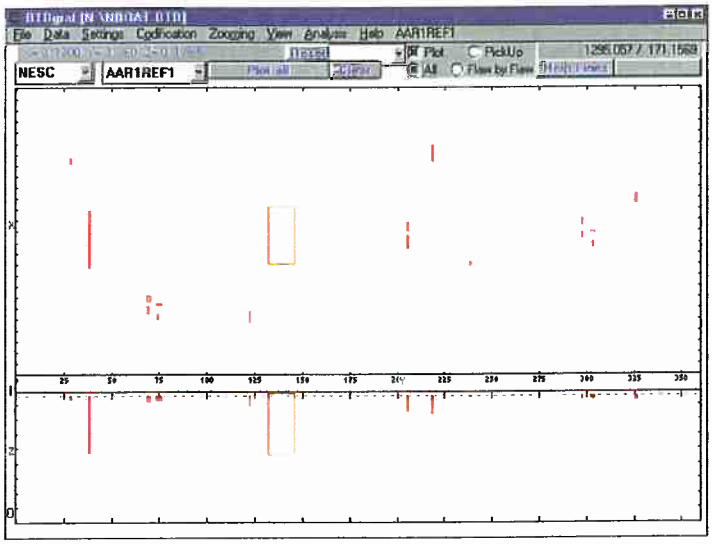
Appendix 3

BTB BOAT plots for all inspection teams.

Red indicates a reference defect. Green is a successful location by the team (within the set tolerance) and blue is a false call.

NB The blue indications on graph J3 are unintended flaws.

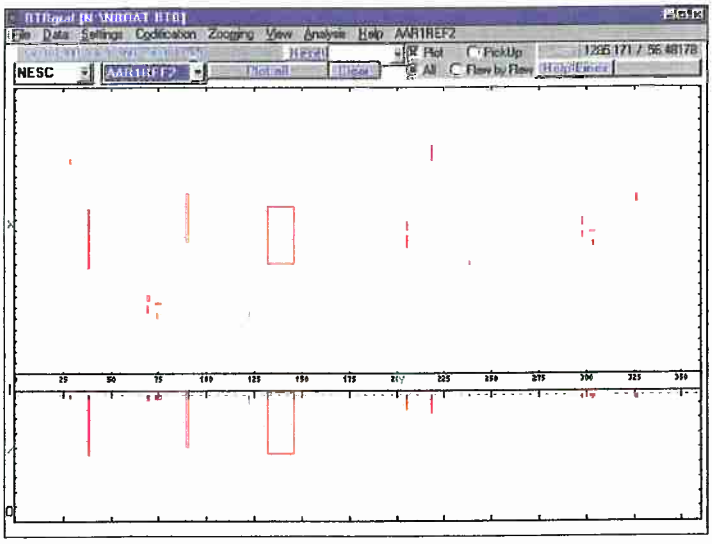
BTB-BOAT
Pre-test reference data AAR1REF1



Graph: J1

Date: 23-03-99

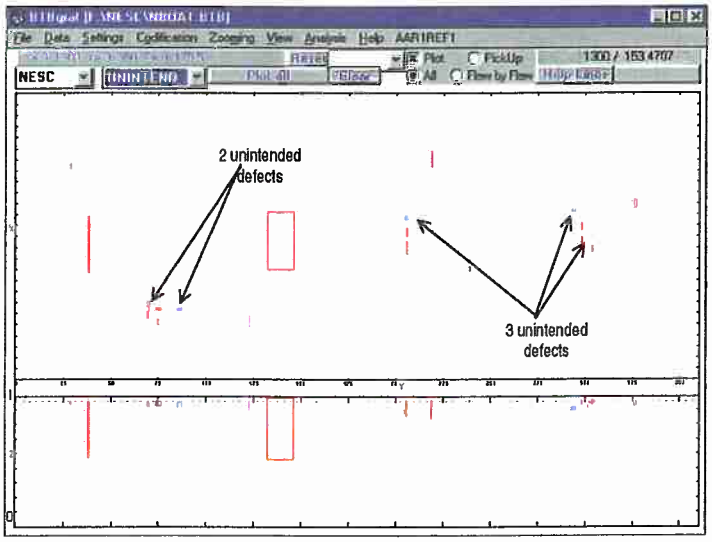
BTB-BOAT
Post-test reference data AAR1REF2



Graph: J2

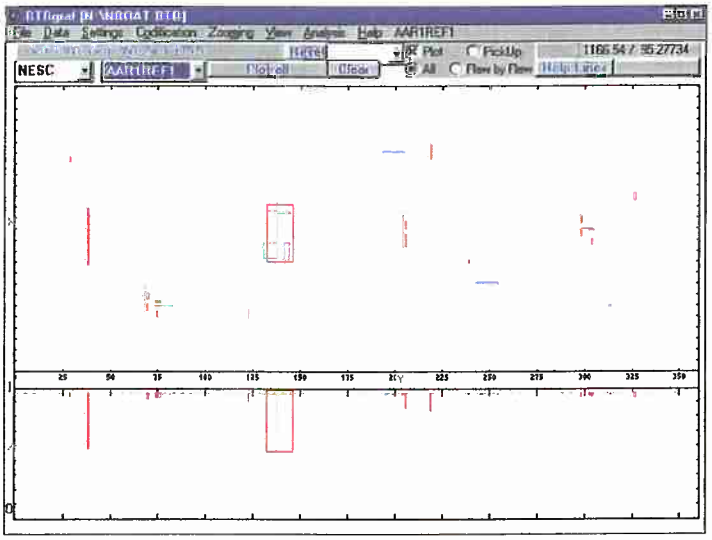
Date: 23-03-99

BTB-BOAT
Pre-test reference data including unintended defects



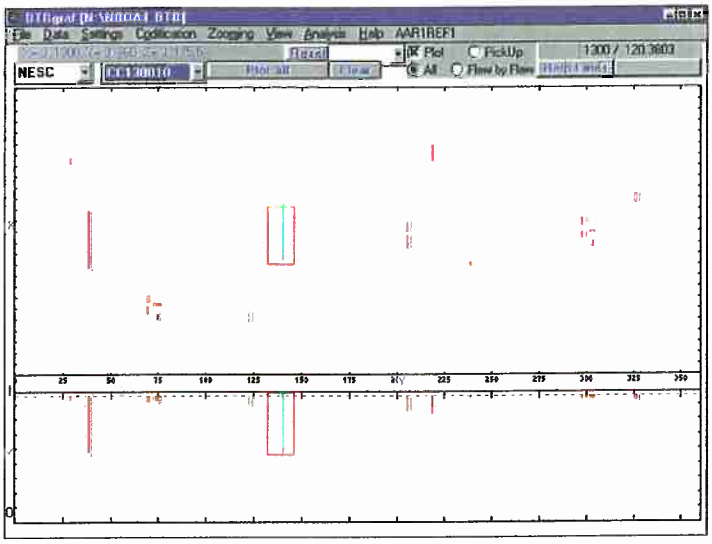
Graph: J3 Date: 23-03-99

BTB-BOAT
Pre-test data team BB



Graph: J4 Date: 23-03-99

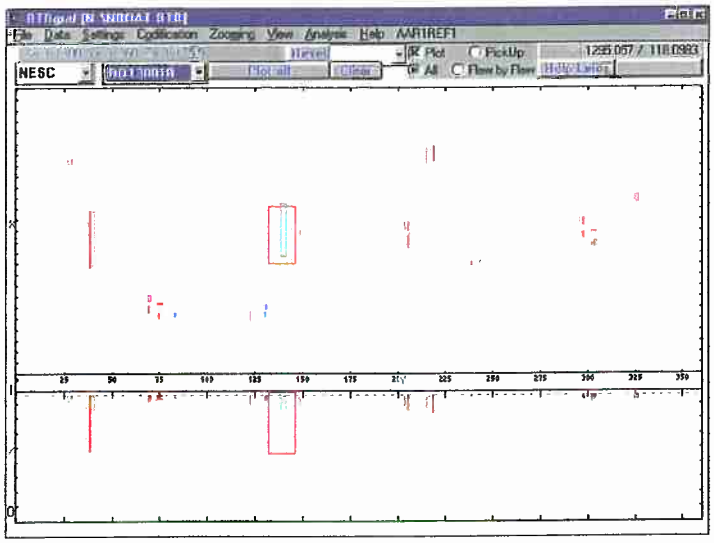
BTB-BOAT
Pre-test data team CC



Graph: J5

Date: 23-03-99

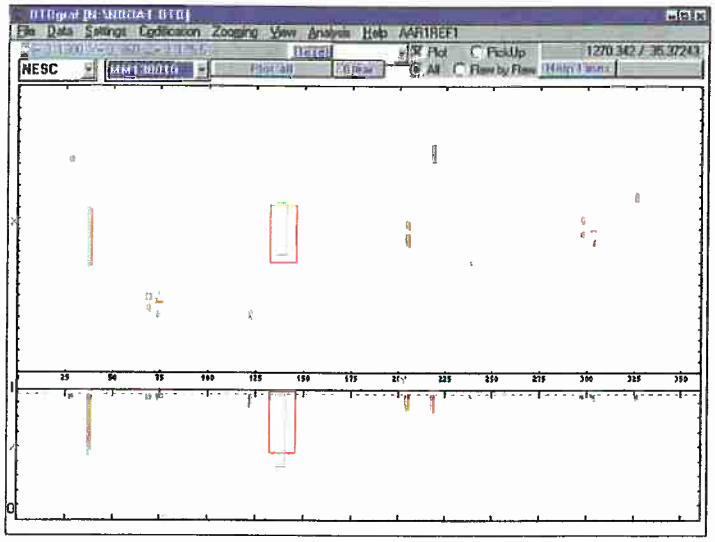
BTB-BOAT
Pre-test data team DD



Graph: J6

Date: 23-03-99

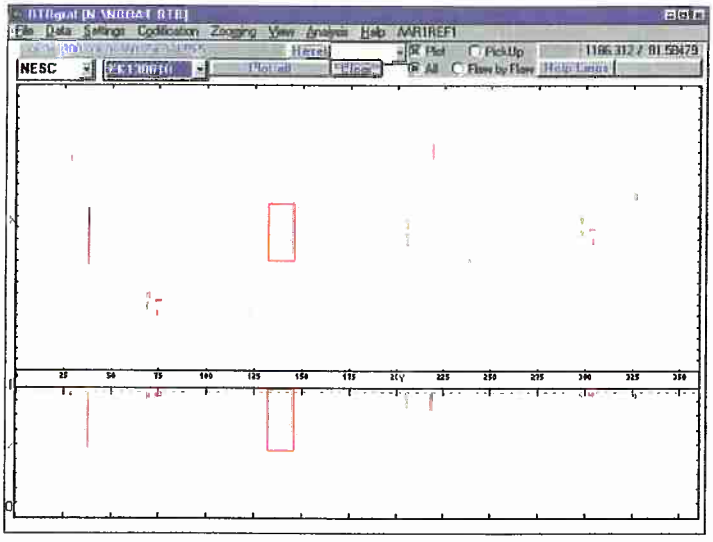
BTB-BOAT
Pre-test data team MM



Graph: J8

Date: 23-03-99

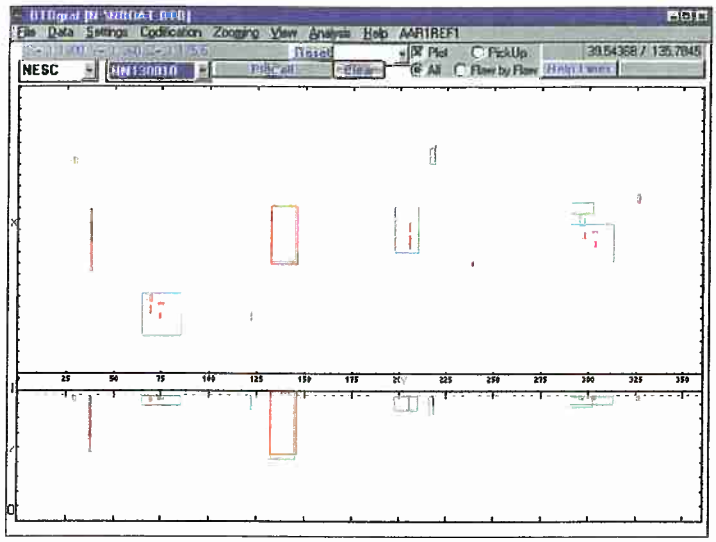
BTB-BOAT
Pre-test data team KK



Graph: J7

Date: 23-03-99

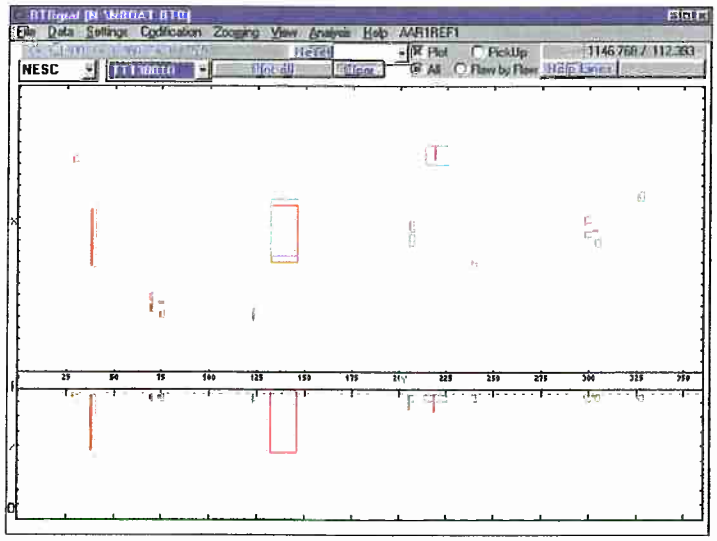
BTB-BOAT
Pre-test data team NN



Graph: J9

Date: 23-03-99

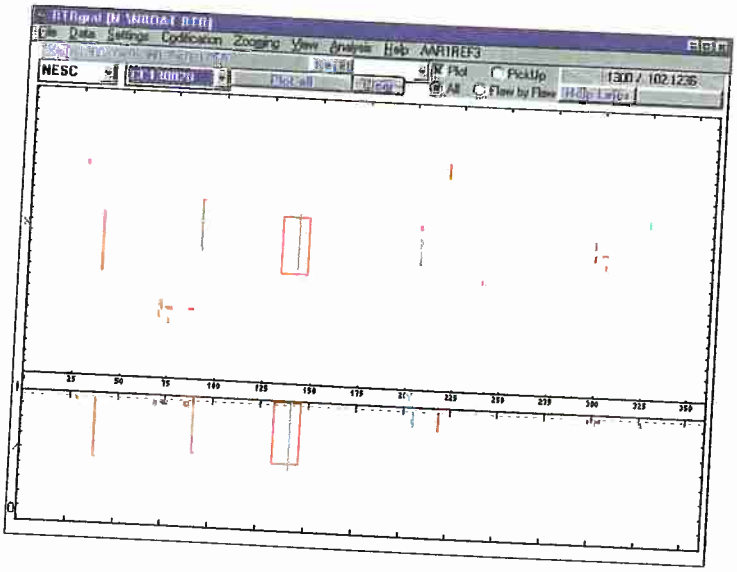
BTB-BOAT
Pre-test data team TT



Graph: J10

Date: 23-03-99

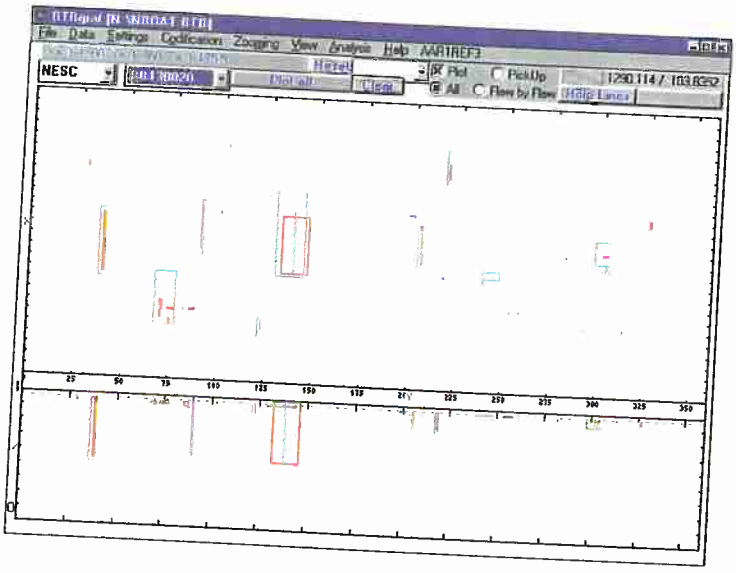
BTB-BOAT
Post-test data team CC



Graph: J12

Date: 23-03-99

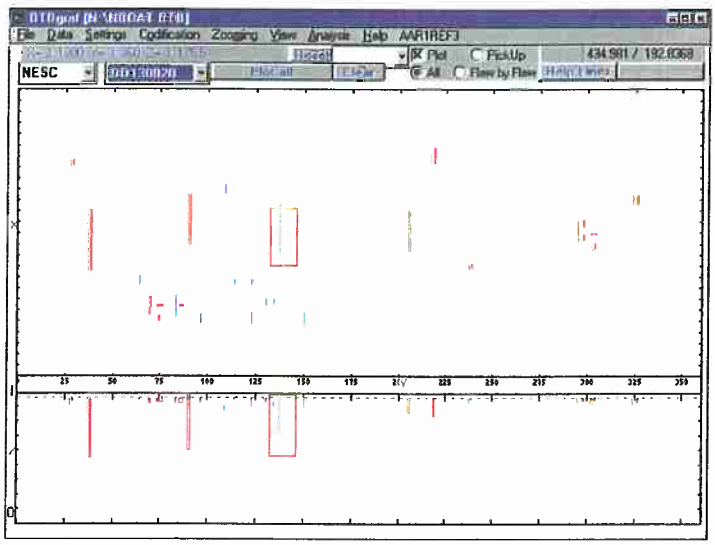
BTB-BOAT
Post-test data team BB



Graph: J11

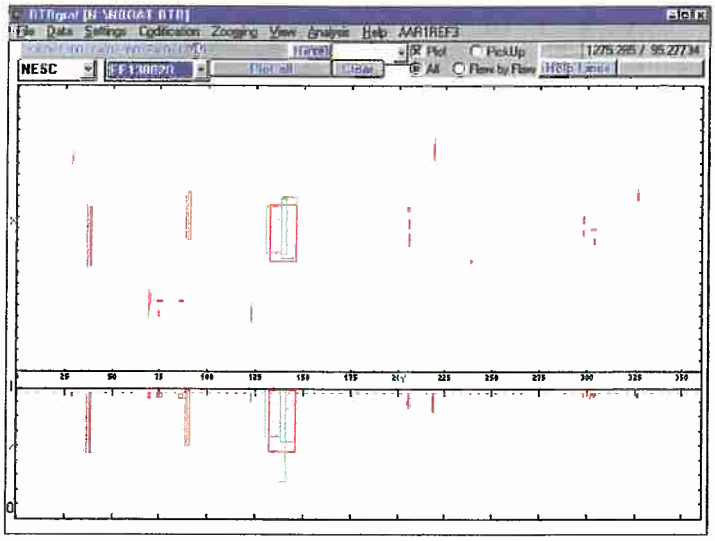
Date: 23-03-99

BTB-BOAT
Post-test data team DD



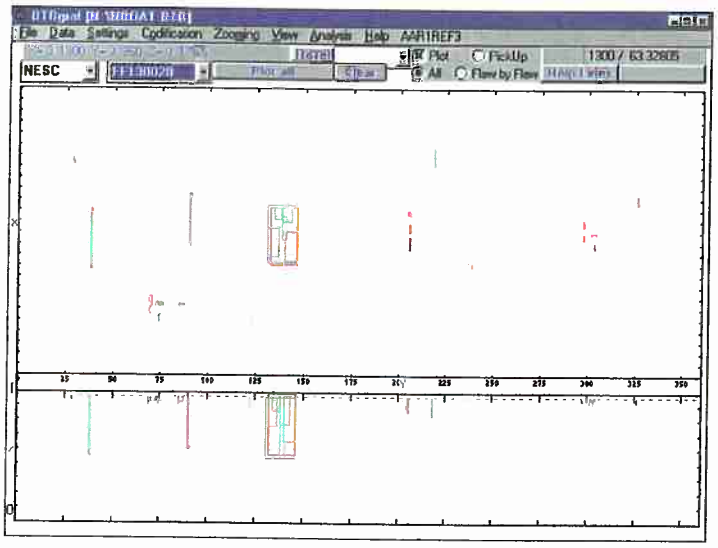
Graph: J13 Date: 23-03-99

BTB-BOAT
Post-test data team EE



Graph: J14 Date: 23-03-99

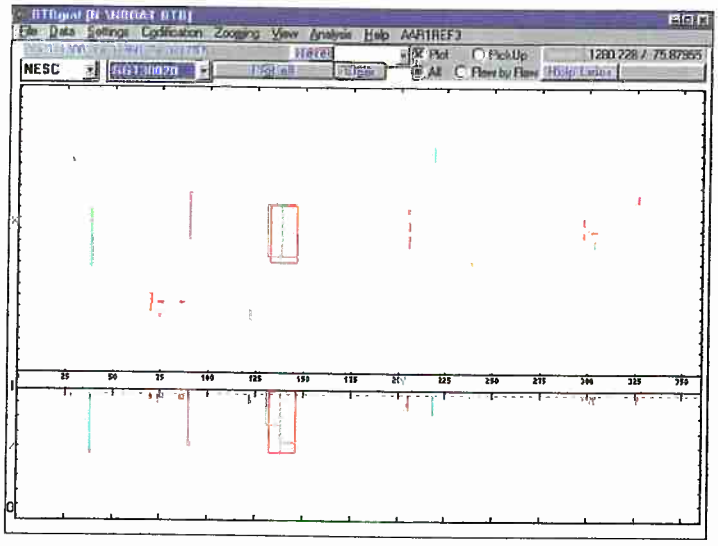
BTB-BOAT
Post-test data team FF



Graph: J15

Date: 23-03-99

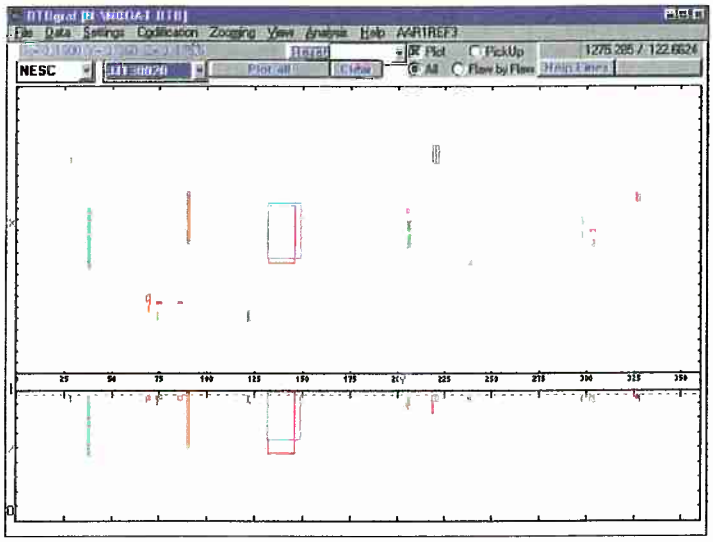
BTB-BOAT
Post-test data team GG



Graph: J16

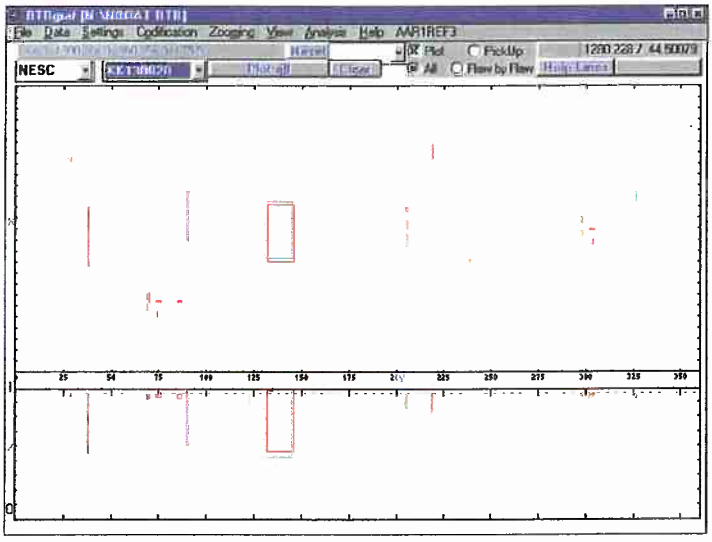
Date: 23-03-99

BTB-BOAT
Post-test data team JJ



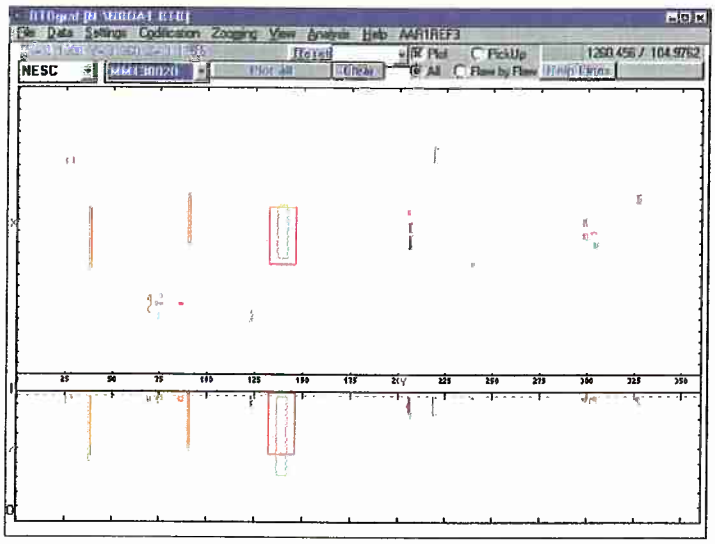
Graph: J17 Date: 23-03-99

BTB-BOAT
Post-test data team KK



Graph: J18 Date: 23-03-99

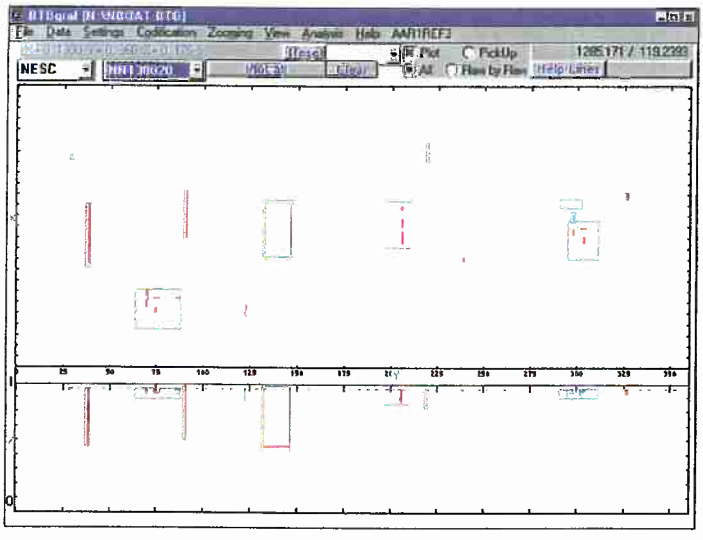
BTB-BOAT
Post-test data team MM



Graph: J19

Date: 23-03-99

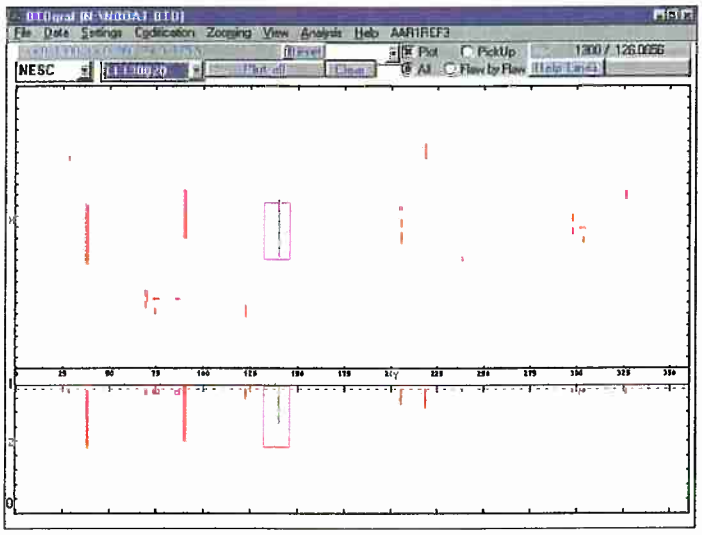
BTB-BOAT
Post-test data team NN



Graph: J20

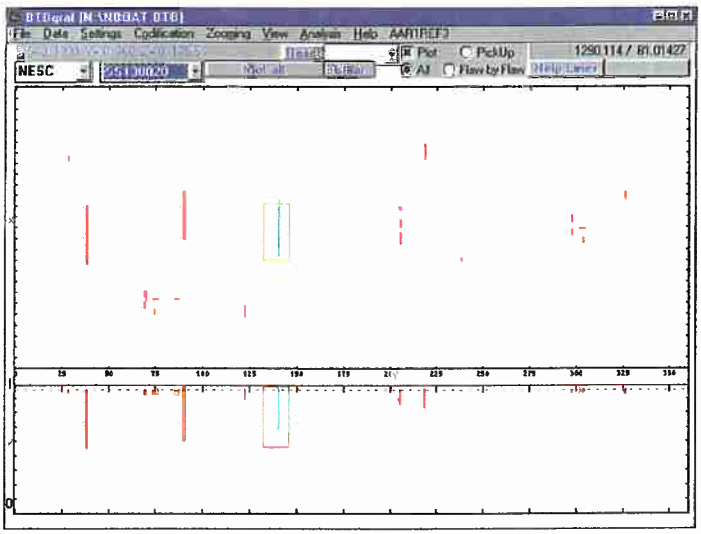
Date: 23-03-99

BTB-BOAT
Post-test data team LL



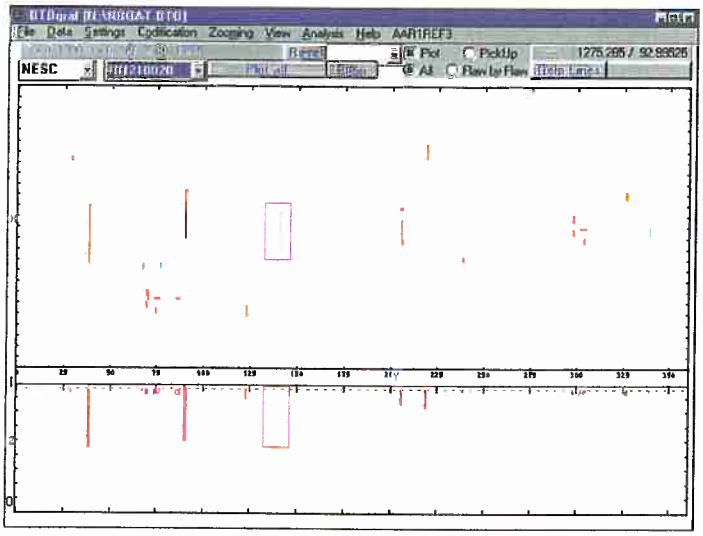
Graph: J21 Date: 23-03-99

BTB-BOAT
Post-test data team SS



Graph: J22 Date: 23-03-99

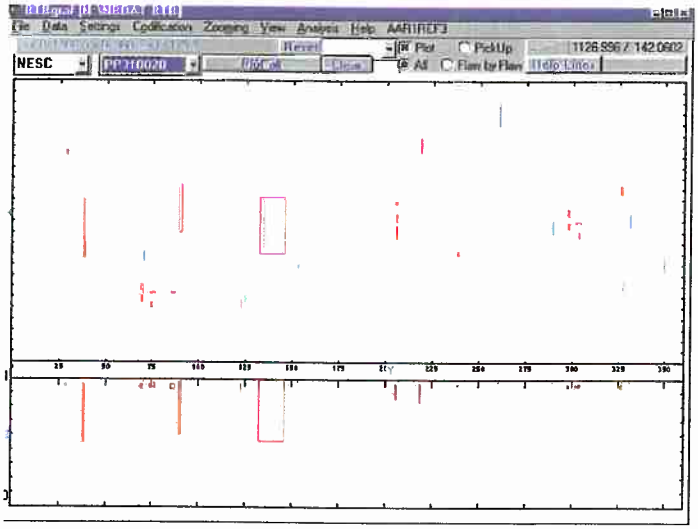
BTB-BOAT
Post-test data team HH



Graph: J23

Date: 23-03-99

BTB-BOAT
Post-test data team PP



Graph: J24

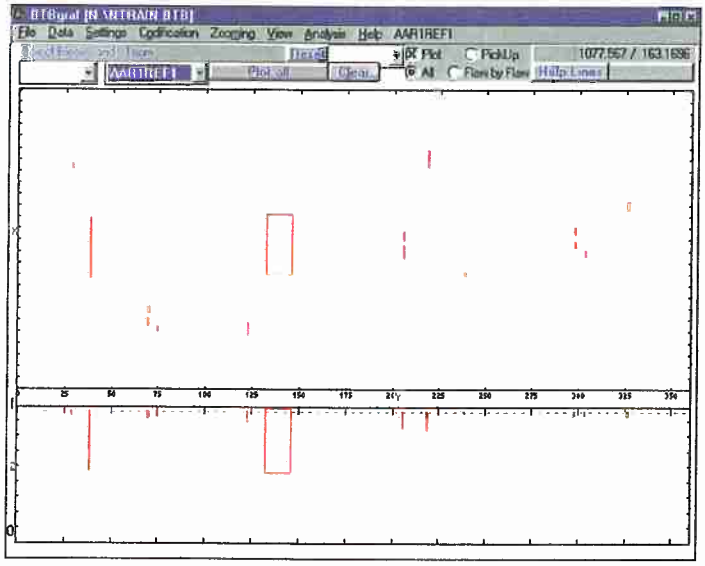
Date: 23-03-99

Appendix 4

BTB TRAIN plots for all inspection teams.

Red indicates a reference defect. Green is a successful location by the team (within the set tolerance) and blue is a false call.

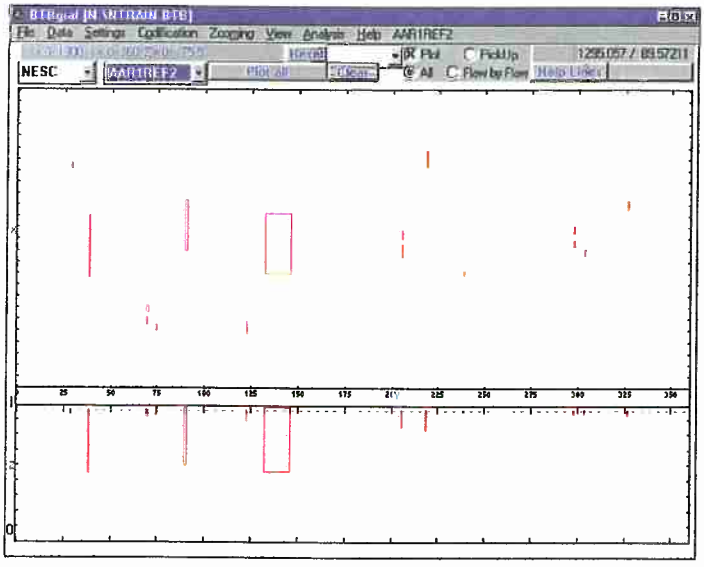
BTB-TRAIN
Pre-test reference data AAR1REF1



Graph: J25

Date: 23-03-99

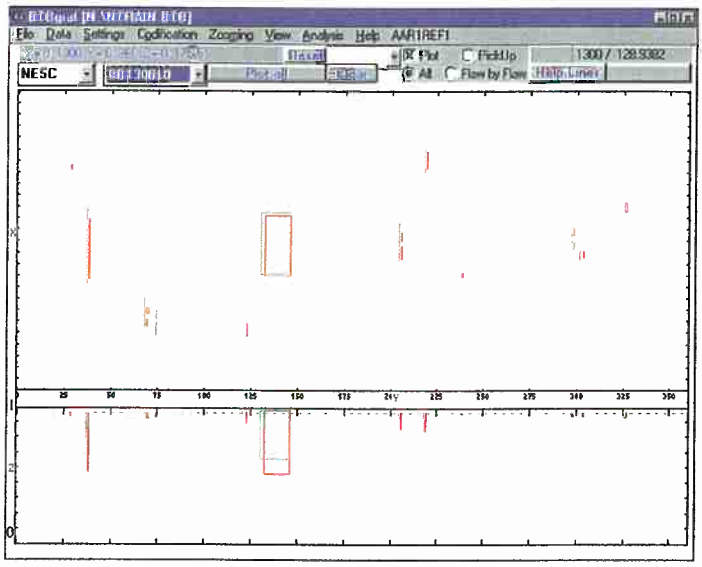
BTB-TRAIN
Post-test reference data AAR1REF2



Graph: J26

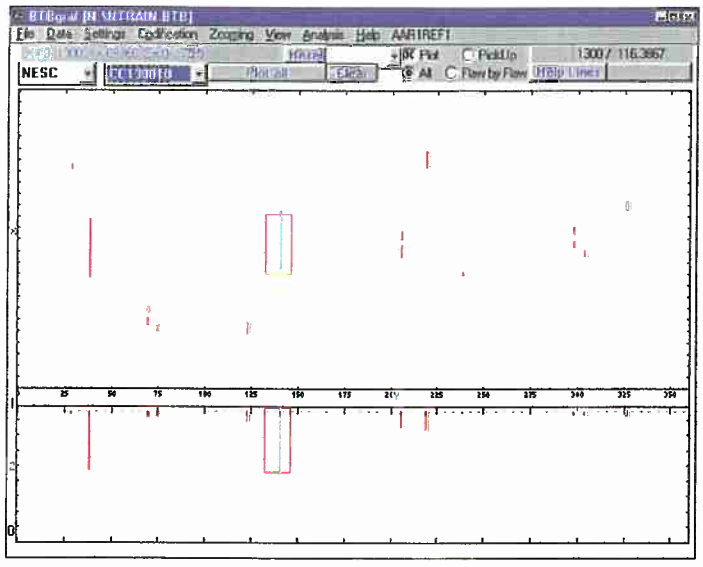
Date: 23-03-99

BTB-TRAIN
Pre-test data team BB



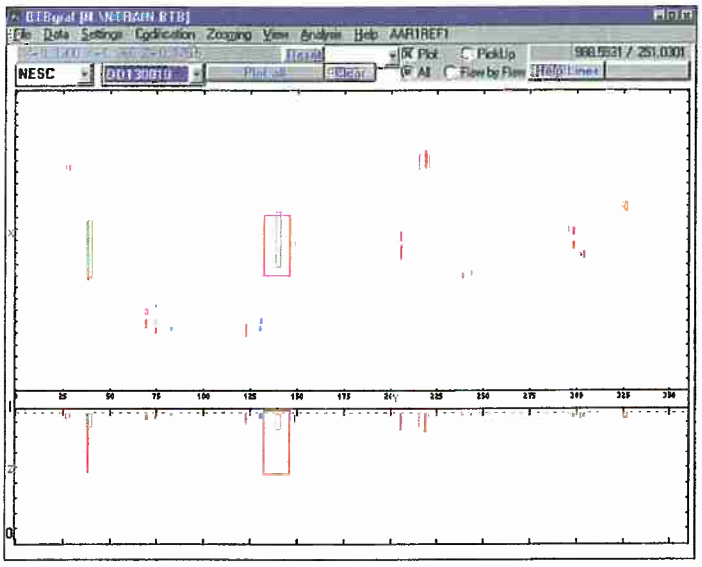
Graph: J27 Date: 23-03-99

BTB-TRAIN
Pre-test data team CC



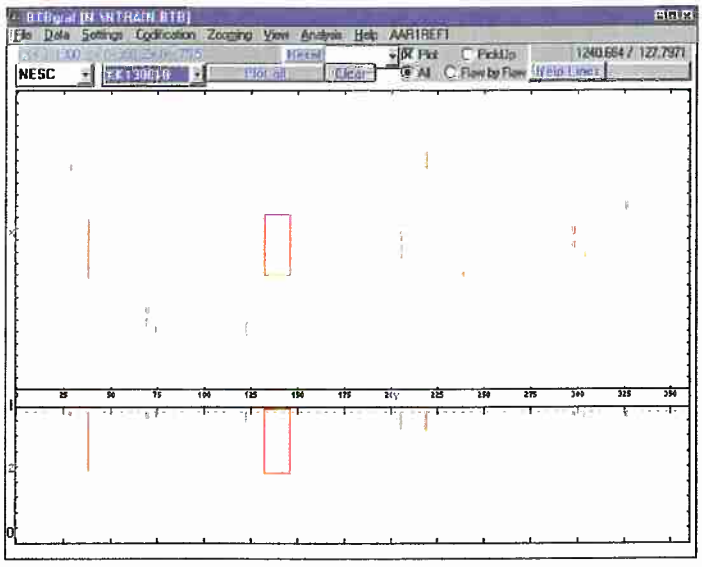
Graph: J28 Date: 23-03-99

BTB-TRAIN
Pre-test data team DD



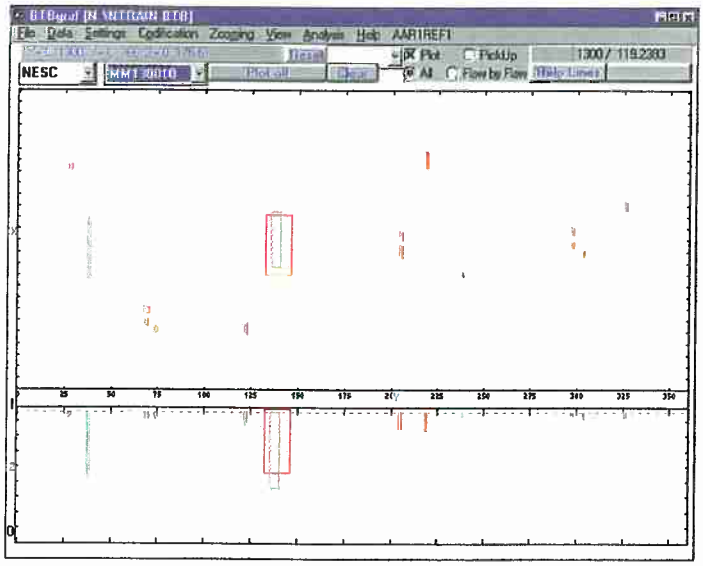
Graph: J29 Date: 23-03-99

BTB-TRAIN
Pre-test data team KK



Graph: J30 Date: 23-03-99

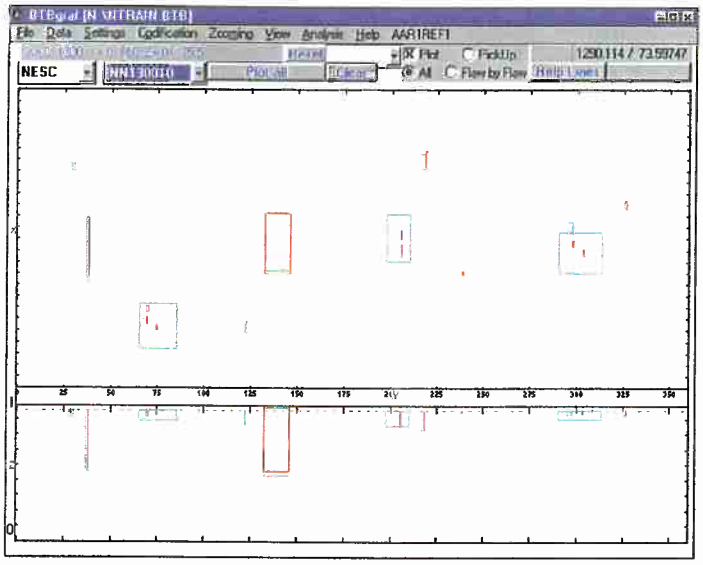
BTB-TRAIN
Pre-test data team MM



Graph: J31

Date: 23-03-99

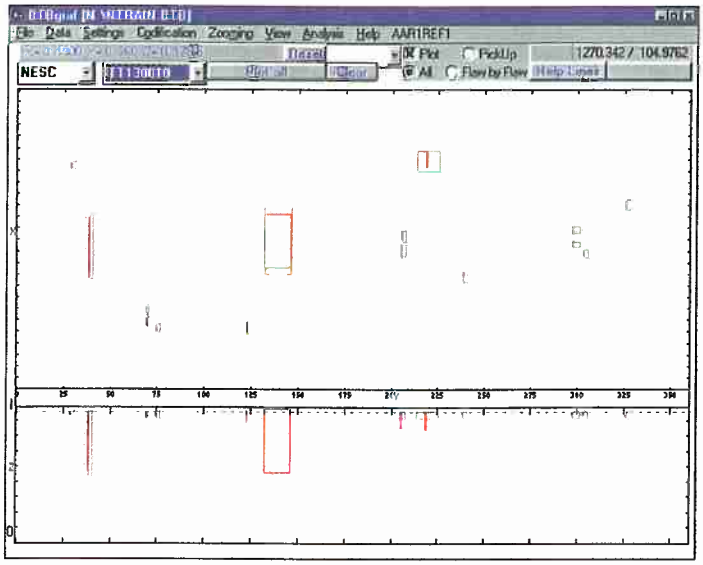
BTB-TRAIN
Pre-test data team NN



Graph: J32

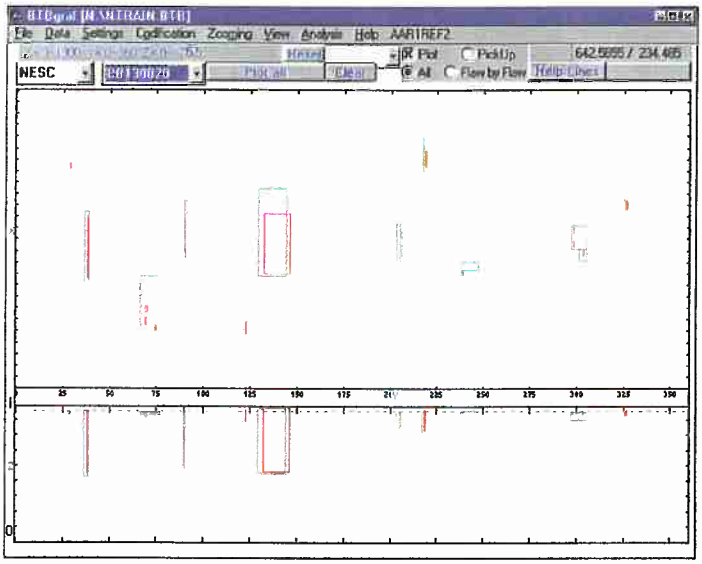
Date: 23-03-99

BTB-TRAIN
Pre-test data team TT



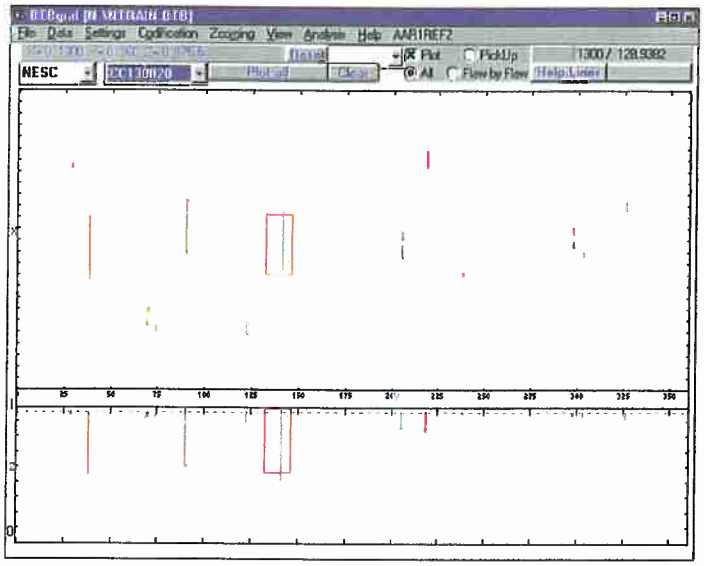
Graph: J33 Date: 23-03-99

BTB-TRAIN
Post-test data team BB



Graph: J34 Date: 23-03-99

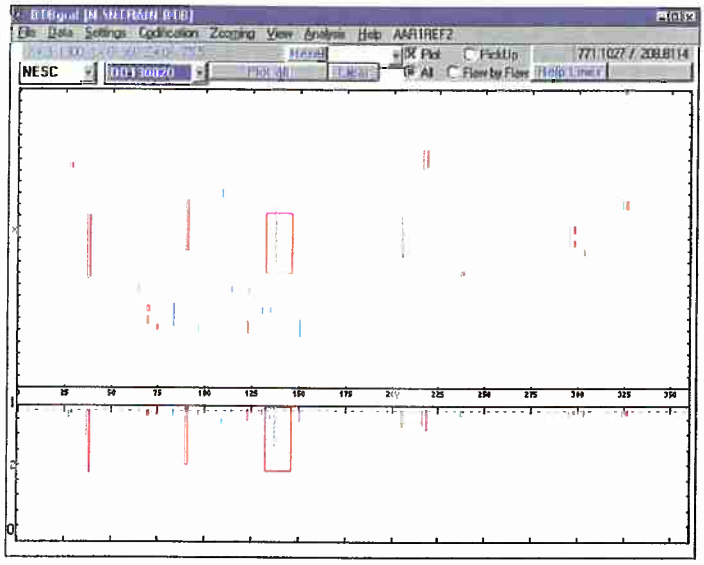
BTB-TRAIN
Post-test data team CC



Graph: J35

Date: 23-03-99

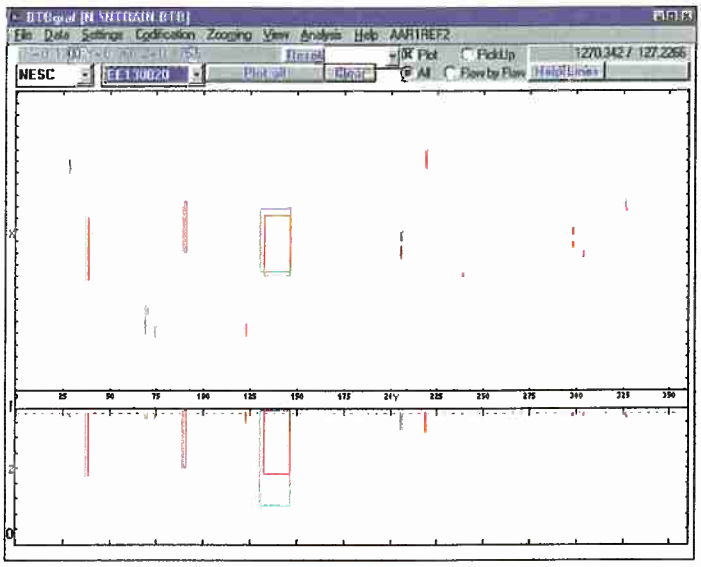
BTB-TRAIN
Post-test data team DD



Graph: J36

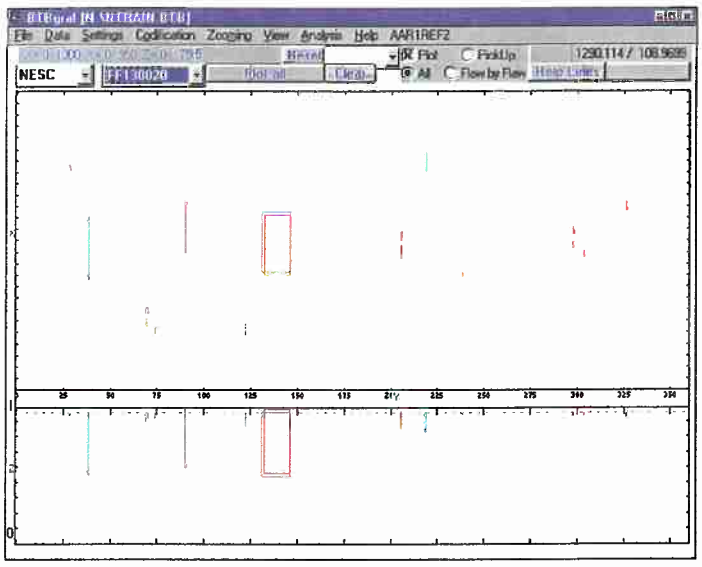
Date: 23-03-99

BTB-TRAIN
Post-test data team EE



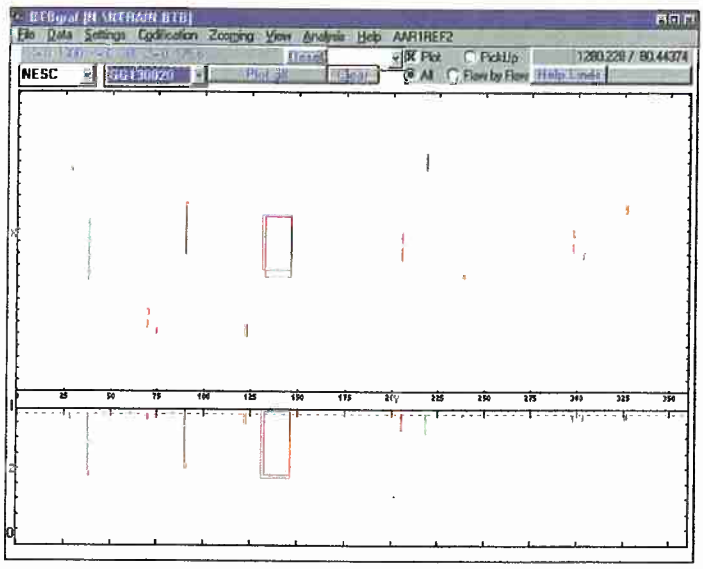
Graph: J37 Date: 23-03-99

BTB-TRAIN
Post-test data team FF



Graph: J38 Date: 23-03-99

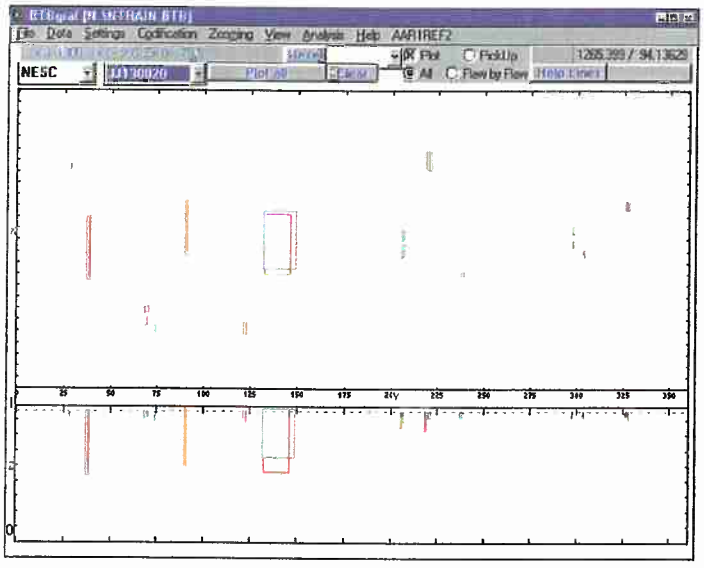
BTB-TRAIN
Post-test data team GG



Graph: J39

Date: 23-03-99

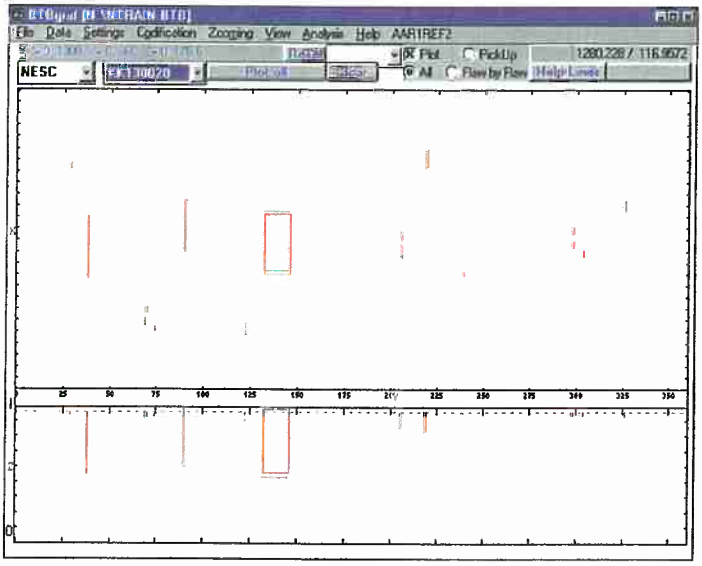
BTB-TRAIN
Post-test data team JJ



Graph: J40

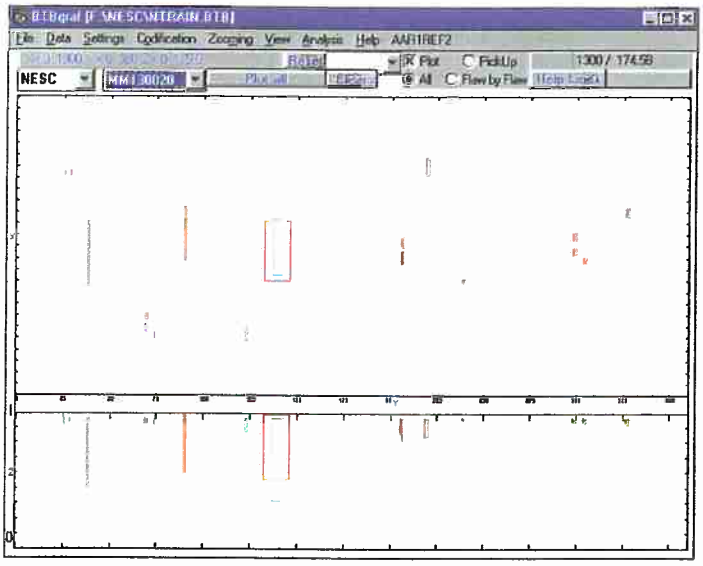
Date: 23-03-99

BTB-TRAIN
Post-test data team KK



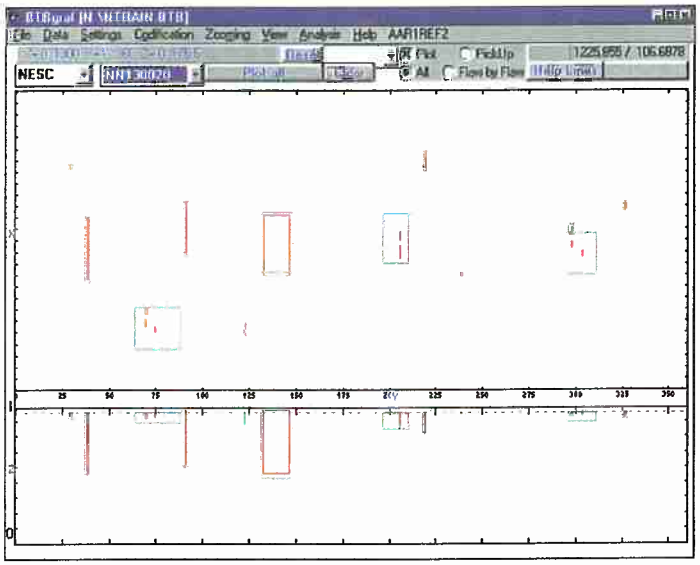
Graph: J41 Date: 23-03-99

BTB-TRAIN
Post-test data team MM



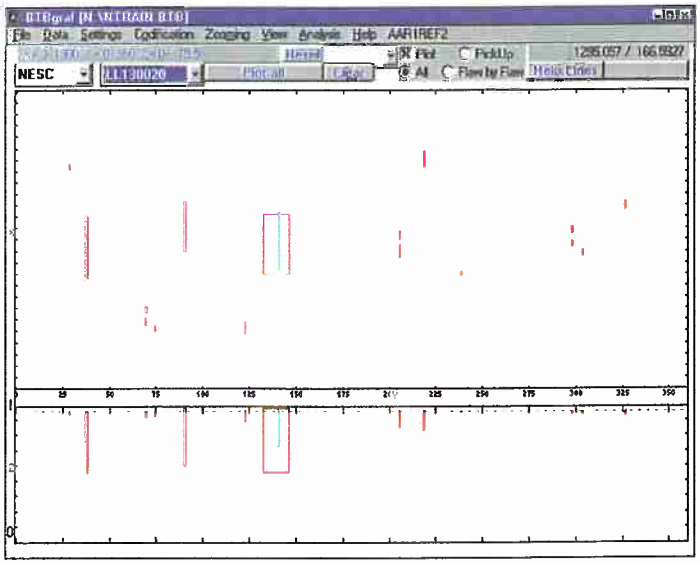
Graph: J42 Date: 23-03-99

BTB-TRAIN
Post-test data team NN



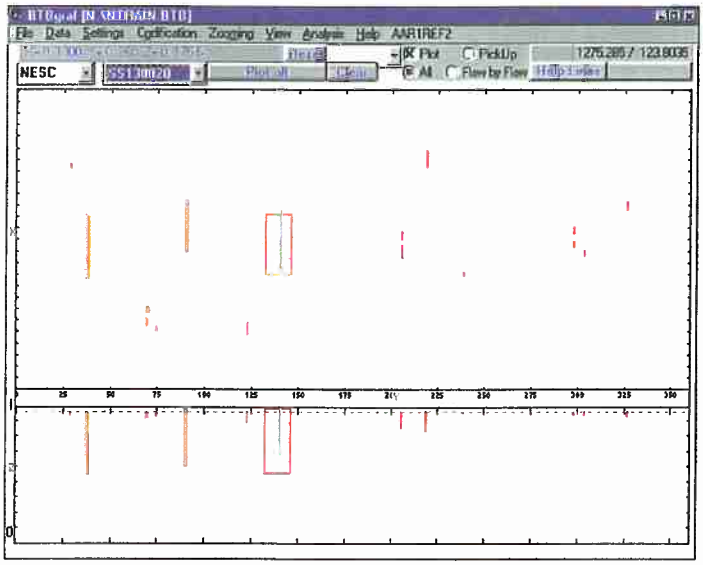
Graph: J43 Date: 23-03-99

BTB-TRAIN
Post-test data team LL



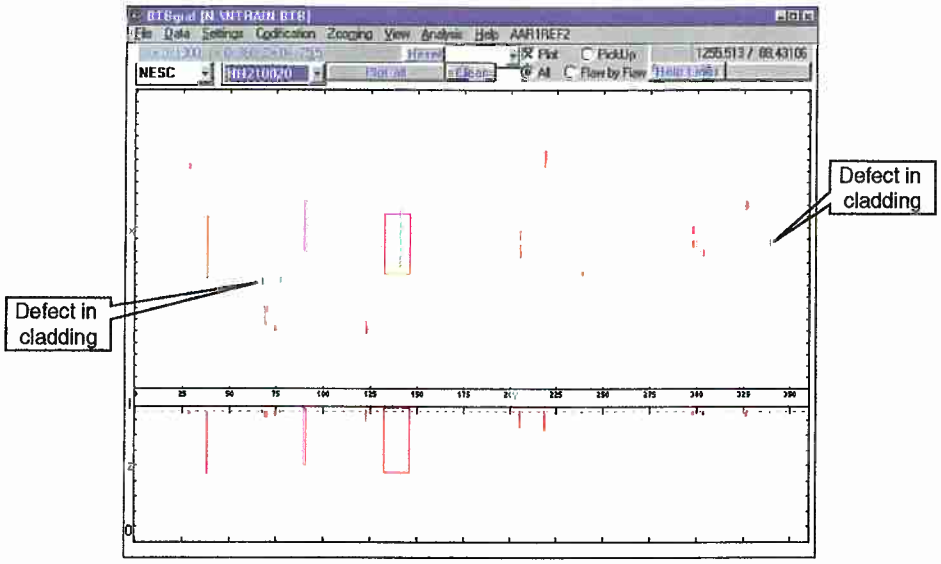
Graph: J44 Date: 23-03-99

BTB-TRAIN
Post-test data team SS



Graph: J45 Date: 23-03-99

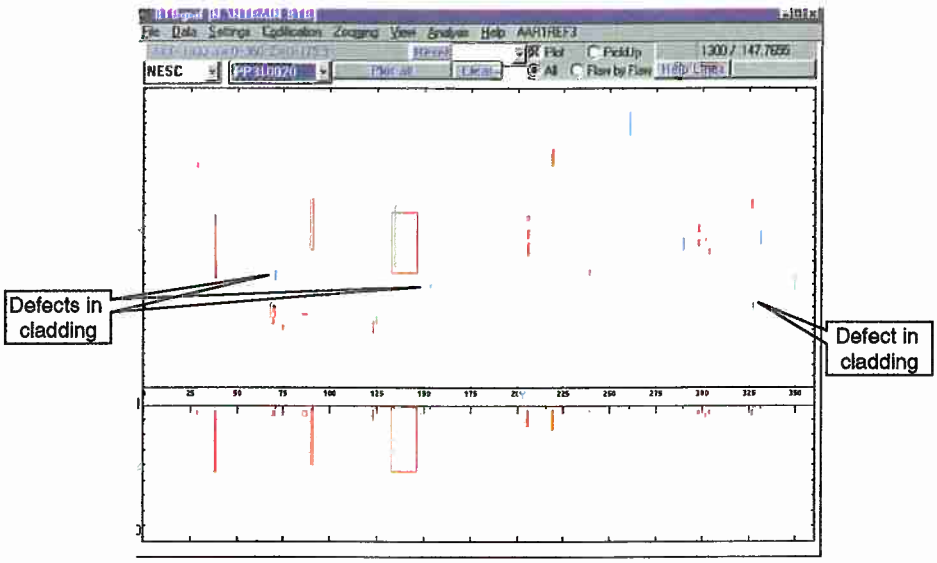
BTB-TRAIN
Post-test data team HH



Graph: J46 Date: 23-03-99

Only false calls NOT in the cladding were used in the data analysis

BTB-TRAIN
Post-test data team PP



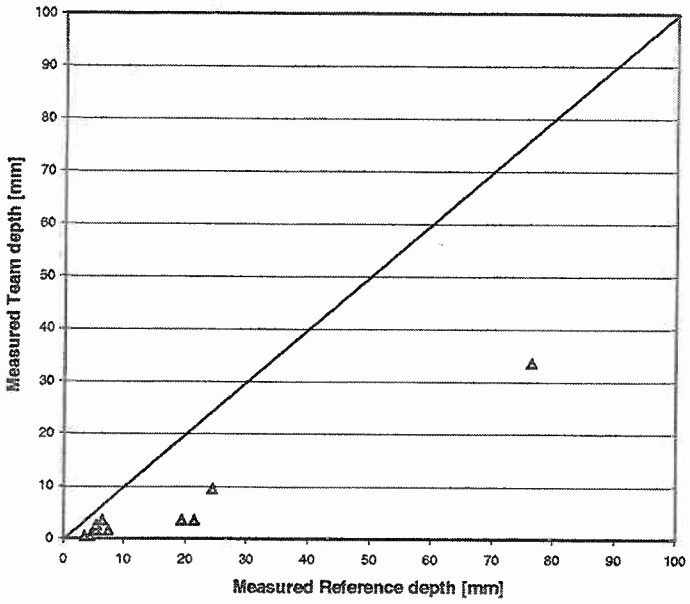
Graph: J47

Date: 23-03-99

Appendix 5

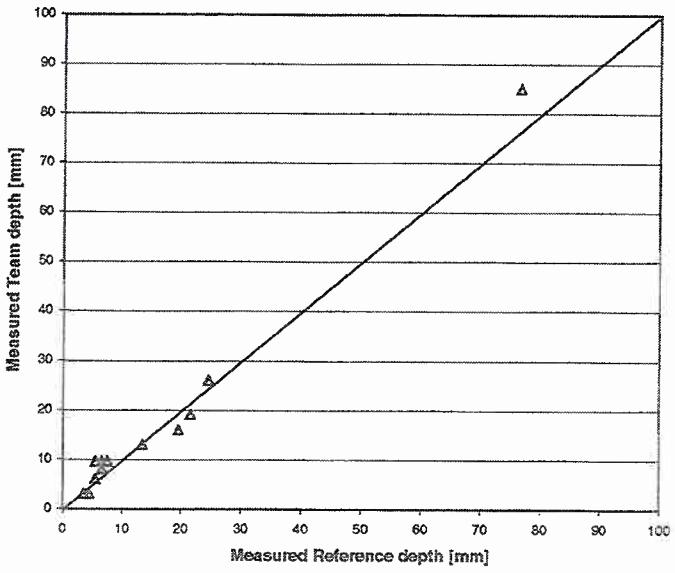
Depth sizing for pre test inspection teams.

Sizing performance in TWE for pre test inspection team BB



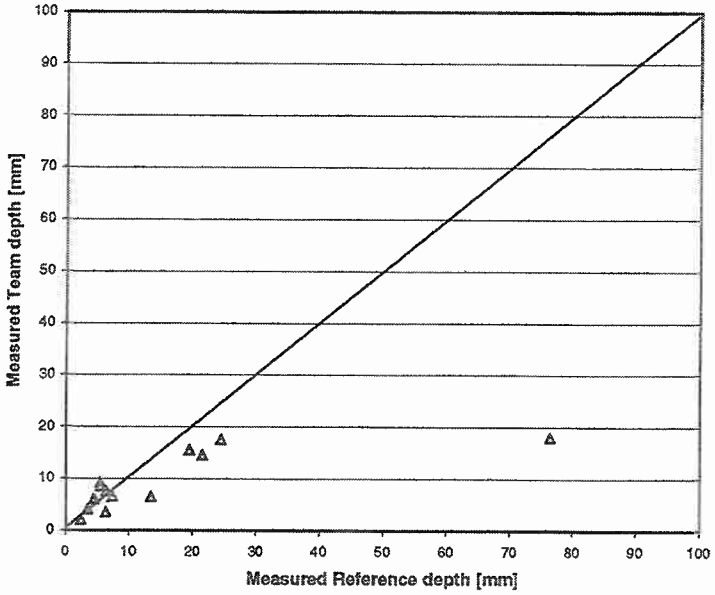
I5

Sizing performance in TWE for pre test inspection team CC



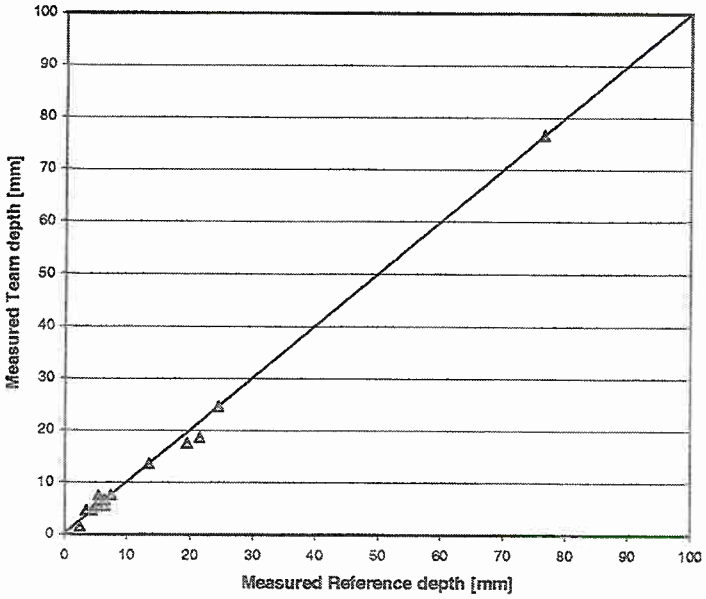
I6

Sizing performance in TWE for pre test inspection team DD



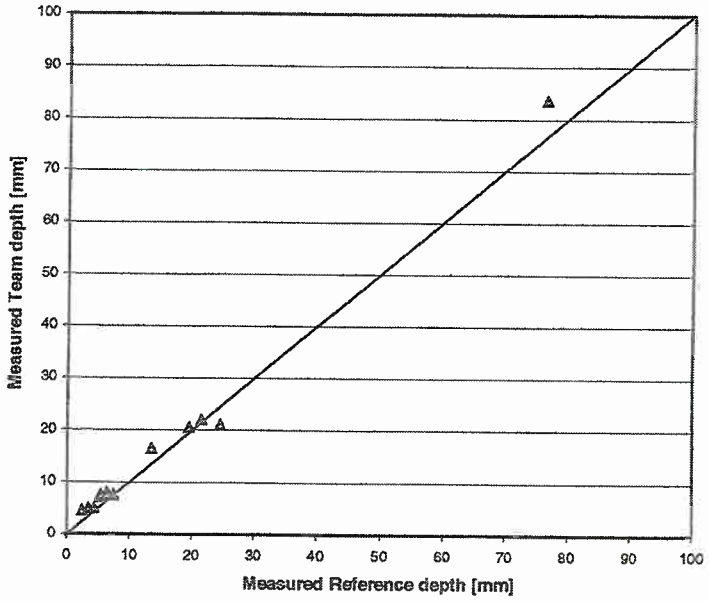
I7

Sizing performance in TWE for pre test inspection team KK



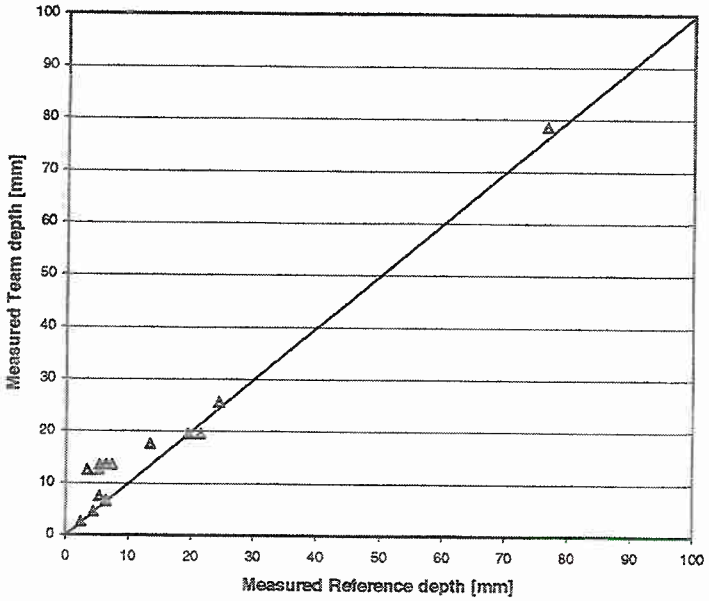
I8

Sizing performance in TWE for pre test inspection team MM



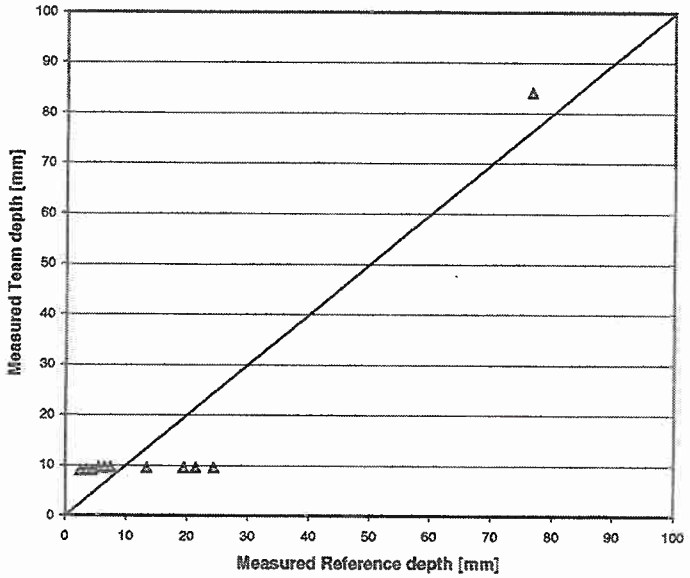
I9

Sizing performance in TWE for pre test inspection team NN



I10

Sizing performance in TWE for pre test inspection team TT

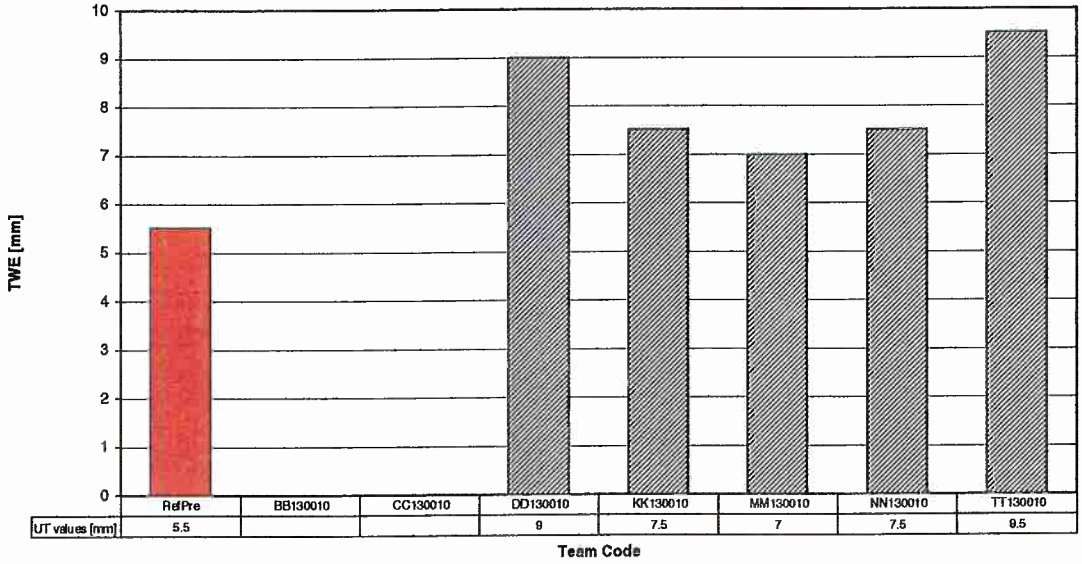


I11

Appendix 6

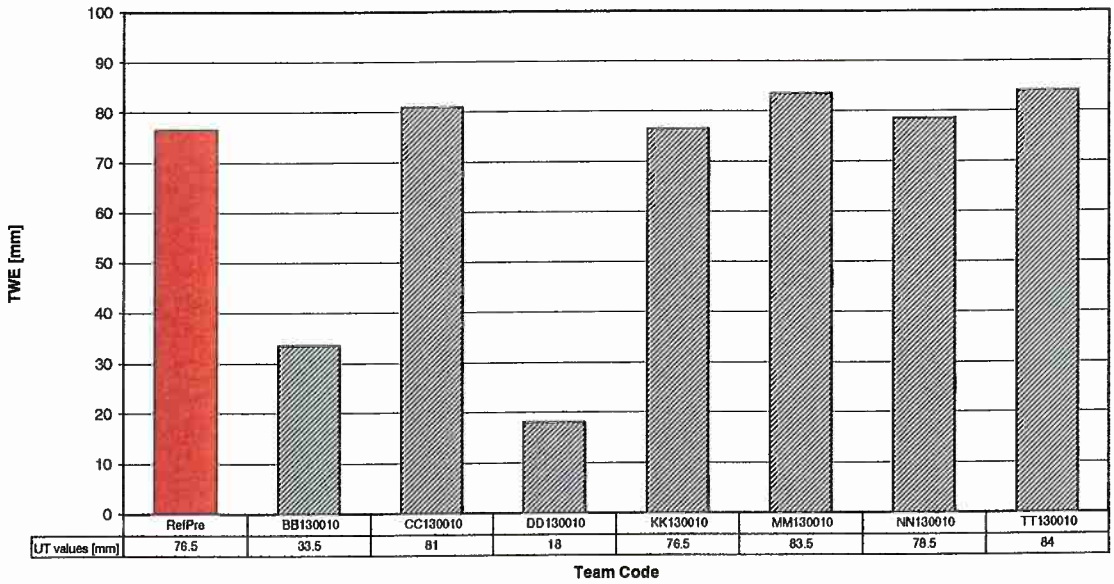
Depth sizing for individual flaws for pre test inspection teams.

TWE sizing for all pre test teams inspecting defect A
(PISC A defect, L = 19 mm, D = 5.5 mm)



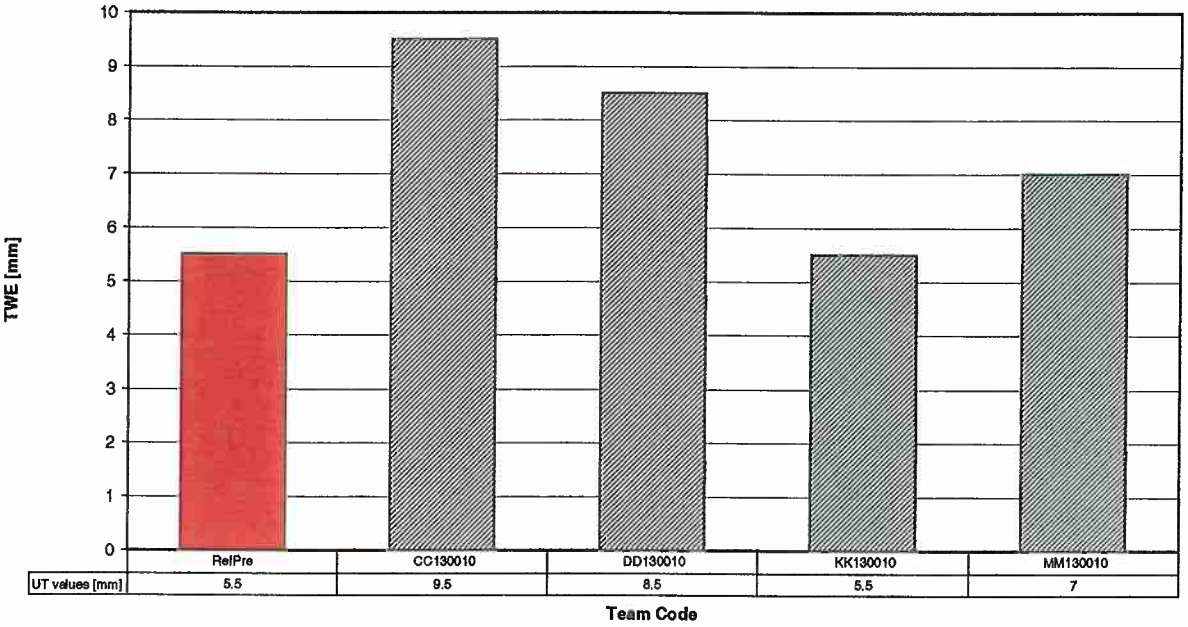
C1

TWE sizing for all pre test teams inspecting defect B
(Large underclad fatigue defect, L = 261 mm, D = 76.5 mm)



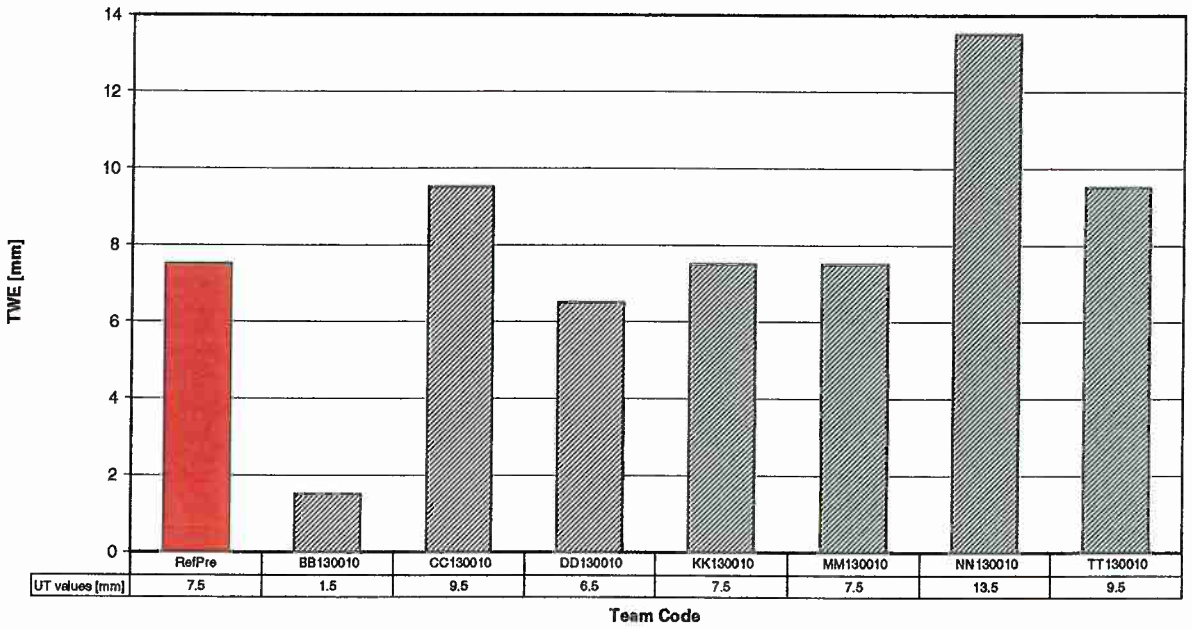
C2

TWE sizing for all pre test teams inspecting defect C
(local brittle zone, L = 30 mm, D = 5.5 mm)



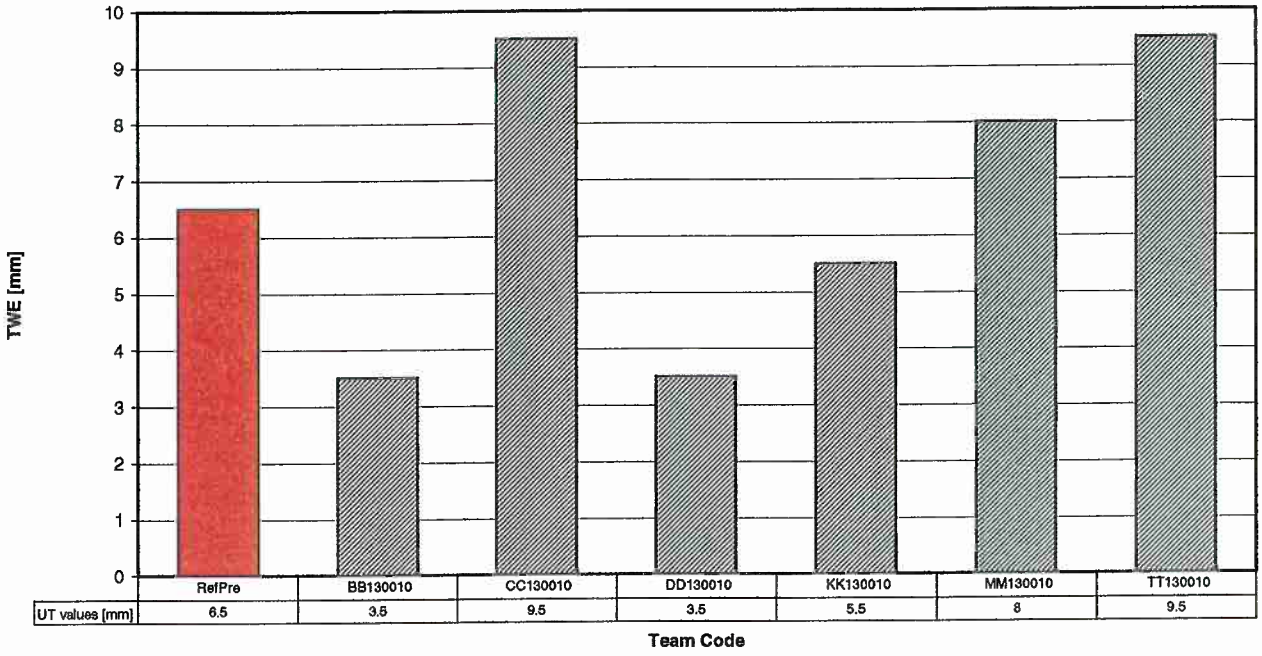
C3

TWE sizing for all pre test teams inspecting defect D
(local brittle zone, L = 25 mm, D = 7.5 mm)



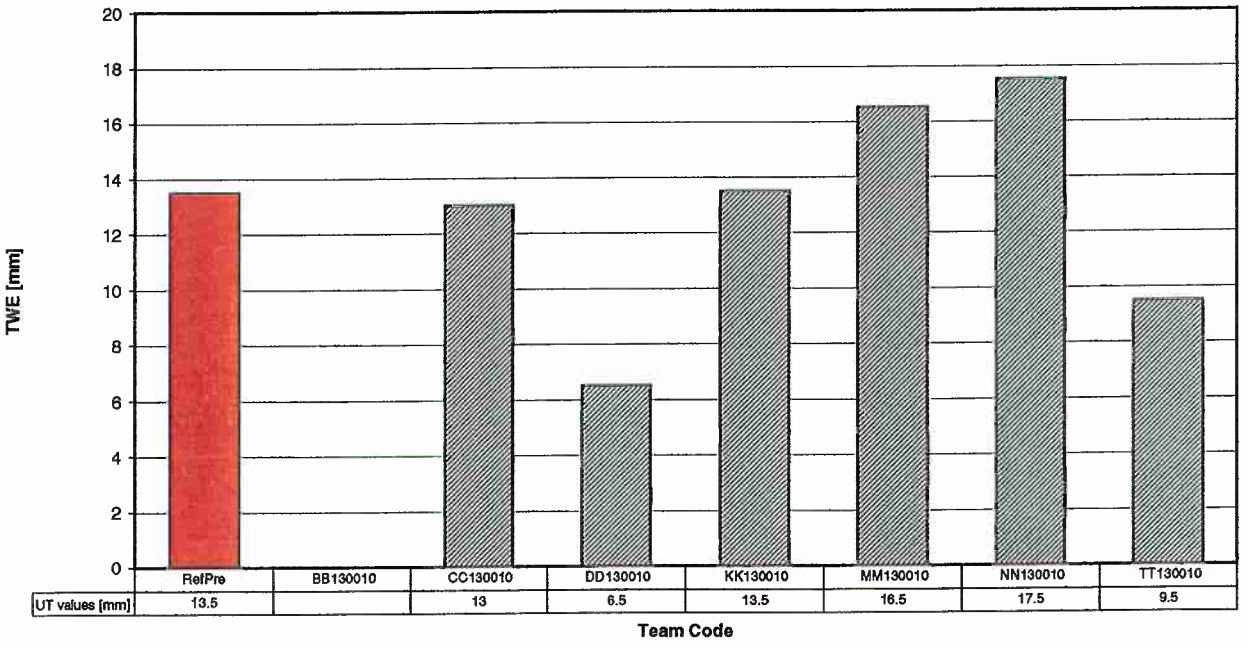
C4

TWE sizing for all pre test teams inspecting defect E
(local brittle zone, L = 22 mm, D = 6.5 mm)



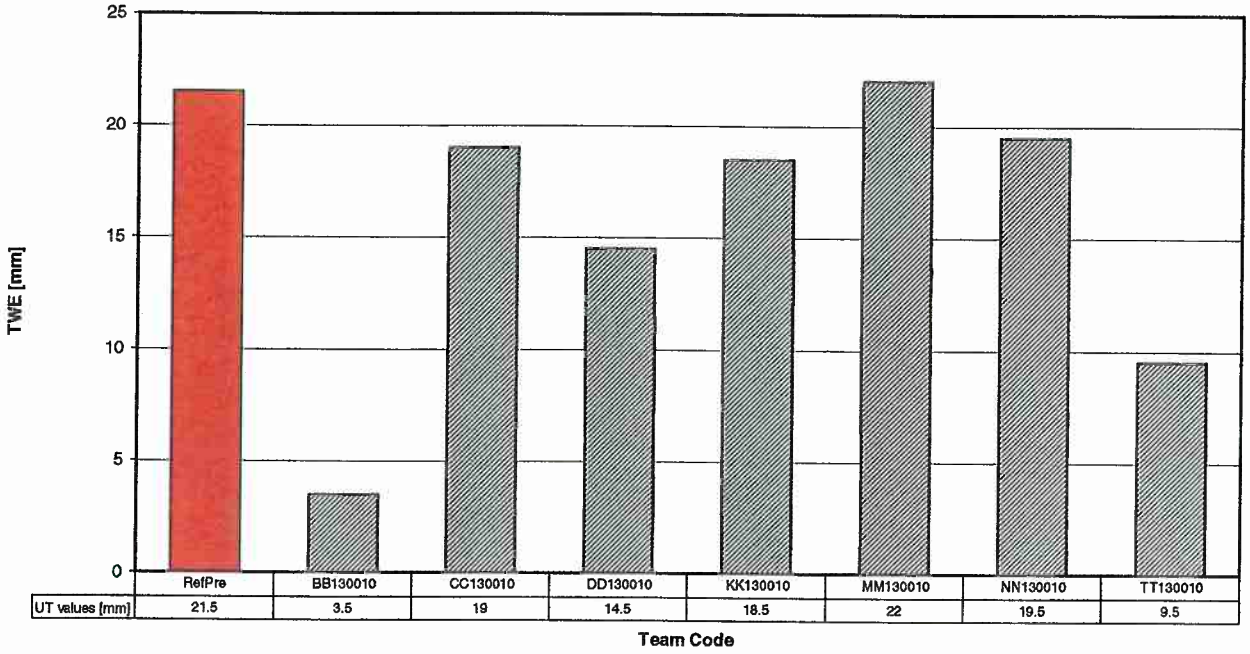
C5

TWE sizing for all pre test teams inspecting defect G
(PISC A defect, L = 47 mm, D = 13.5 mm)



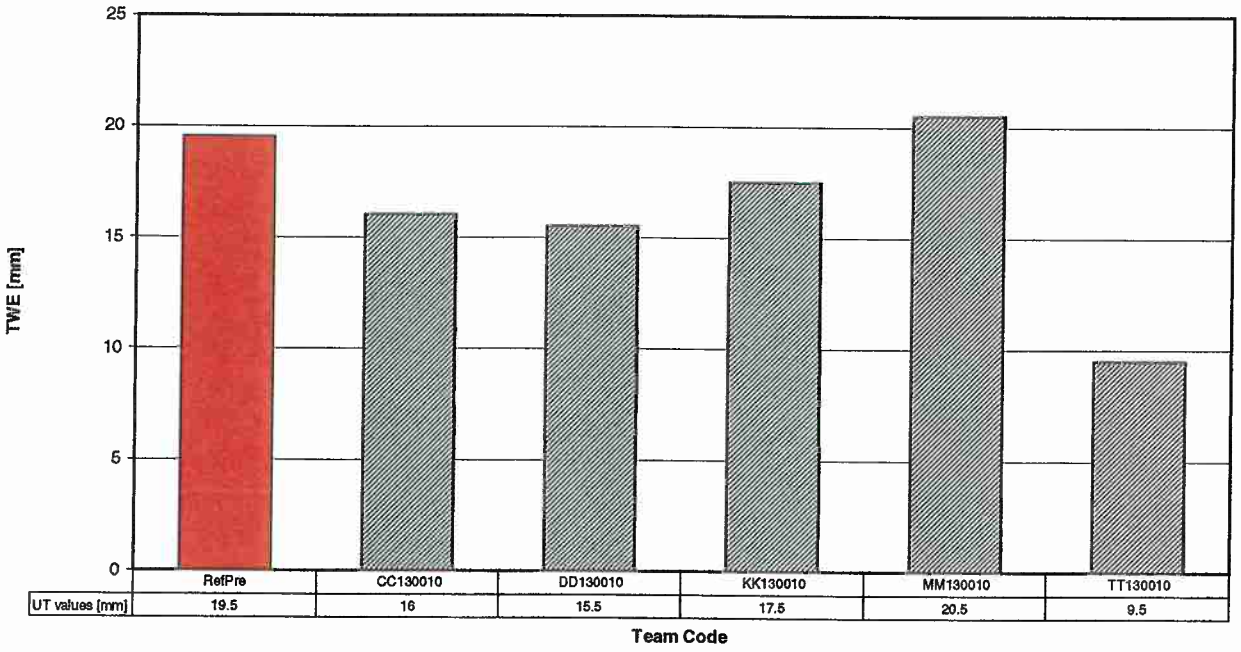
C7

TWE sizing for all pre test teams inspecting defect I
(cold cracking, L = 55 mm, D = 21.5 mm)



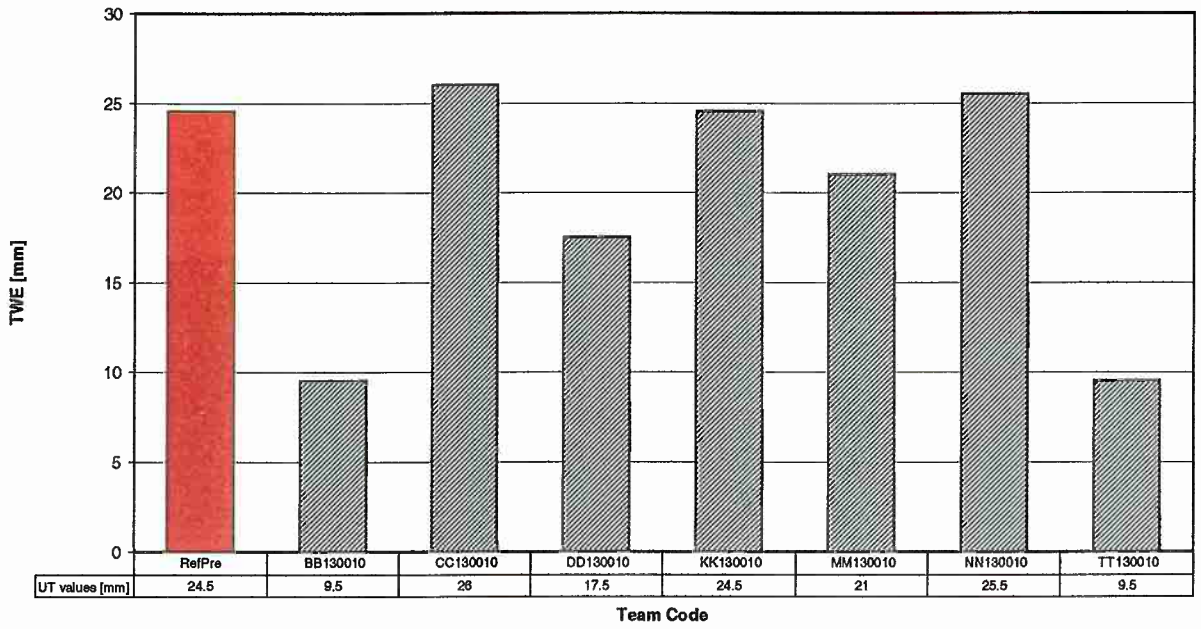
C9

TWE sizing for all pre test teams inspecting defect J
(cold cracking, L = 38 mm, D = 19.5 mm)



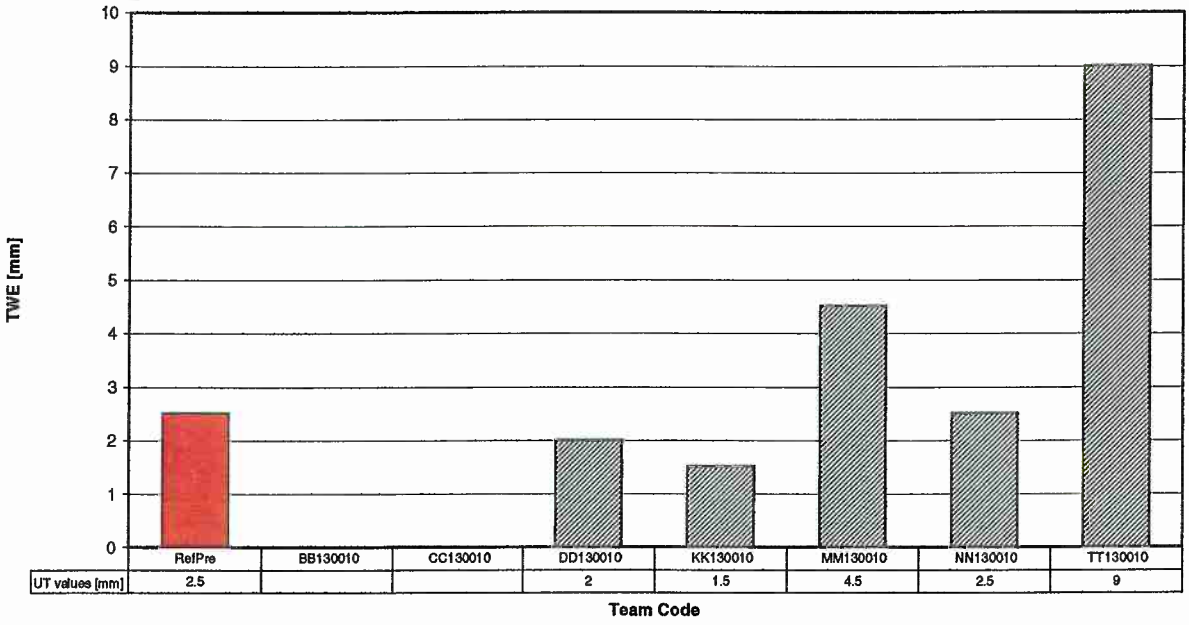
C10

TWE sizing for all pre test teams inspecting defect K
(PISC A defect, L = 69 mm, D = 24.5 mm)



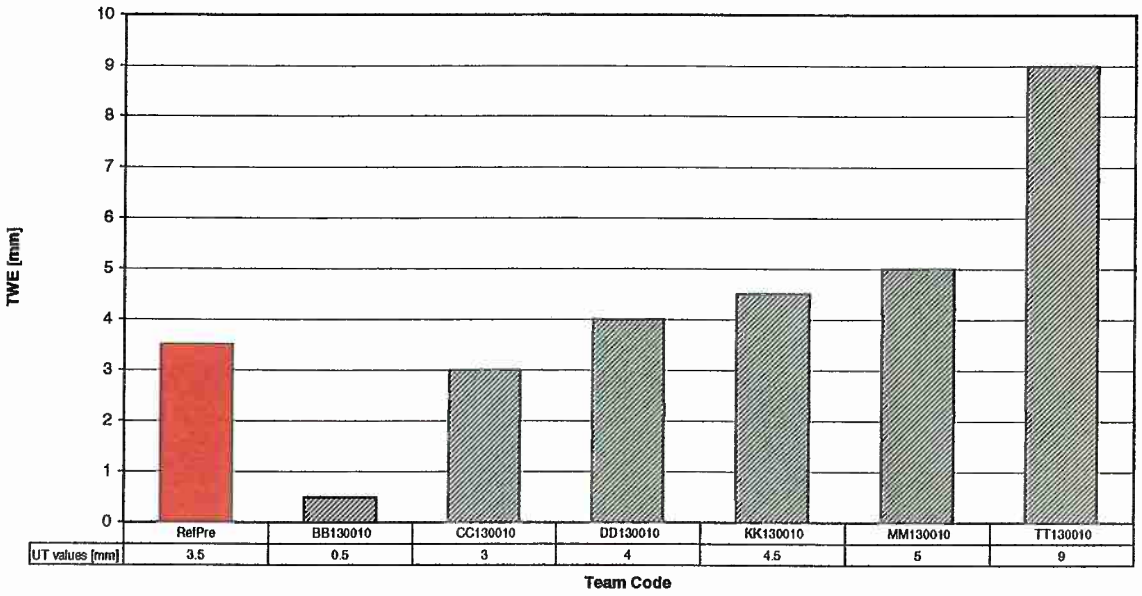
C11

TWE sizing for all pre test teams inspecting defect L
(PISC A defect, L = 17 mm, D = 2.5 mm)



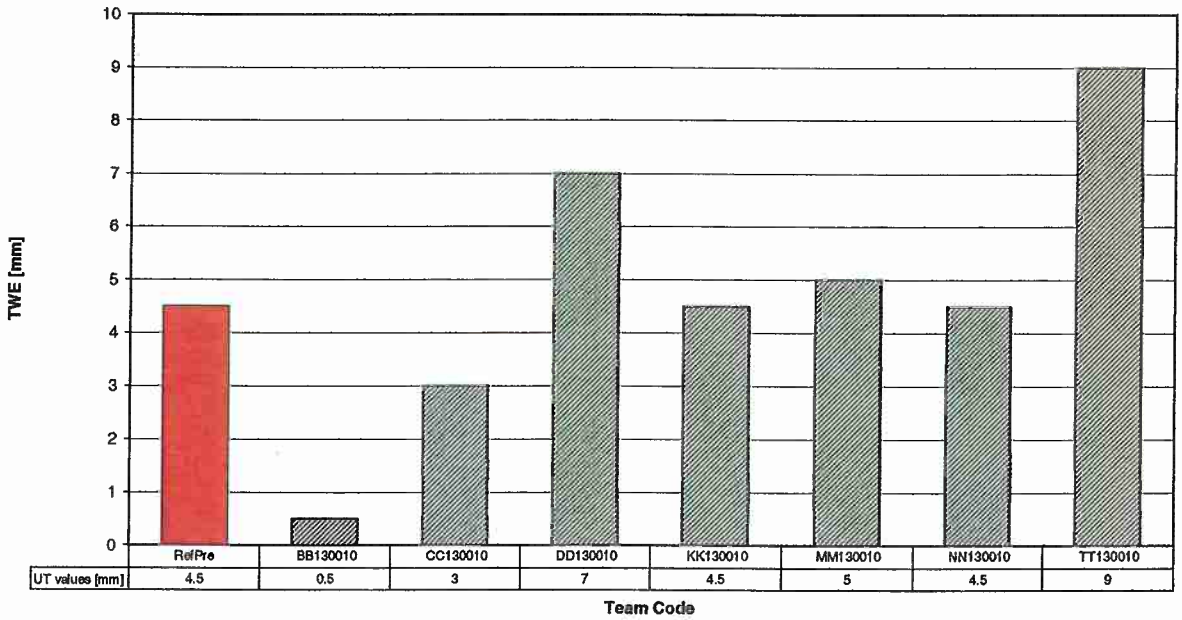
C12

TWE sizing for all pre test teams inspecting defect M
(local brittle zone, L = 25 mm, D = 3.5 mm)



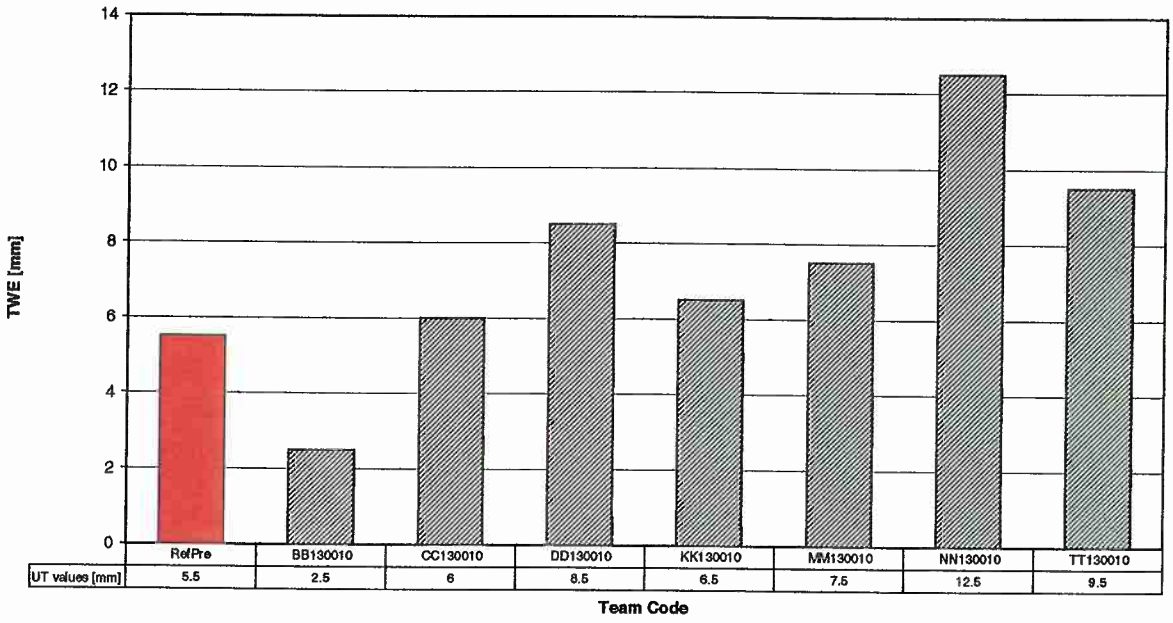
C13

TWE sizing for all pre test teams inspecting defect N
(local brittle zone, L = 27 mm, D = 4.5 mm)



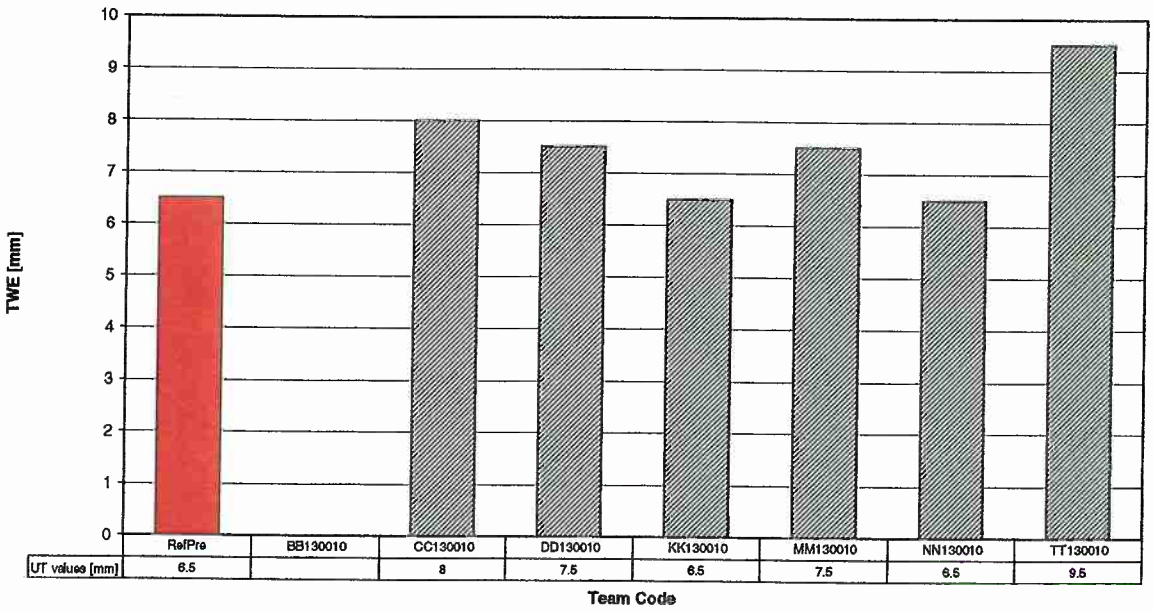
C14

TWE sizing for all pre test teams inspecting defect O
(local brittle zone, L = 25 mm, D = 5.5 mm)



C15

TWE sizing for all pre test teams inspecting defect Q
(PISC A defect, L = 37 mm, D = 6.5 mm)

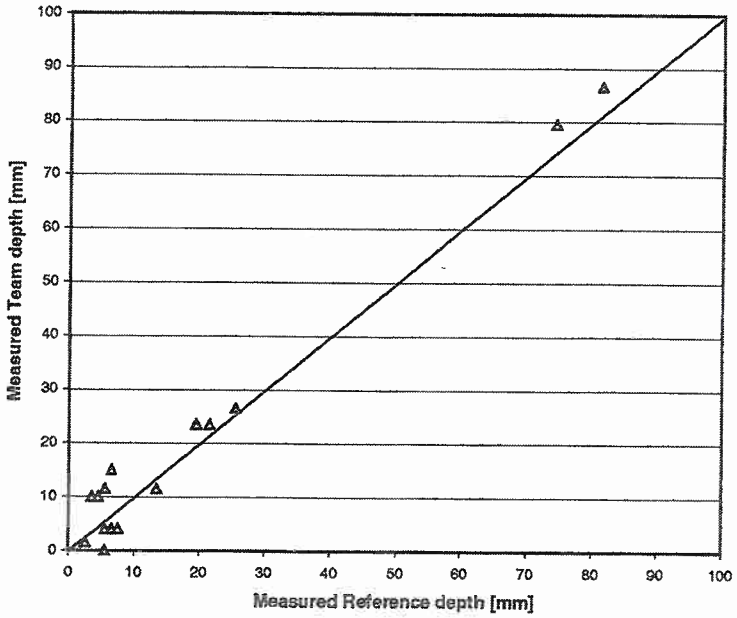


C17

Appendix 7

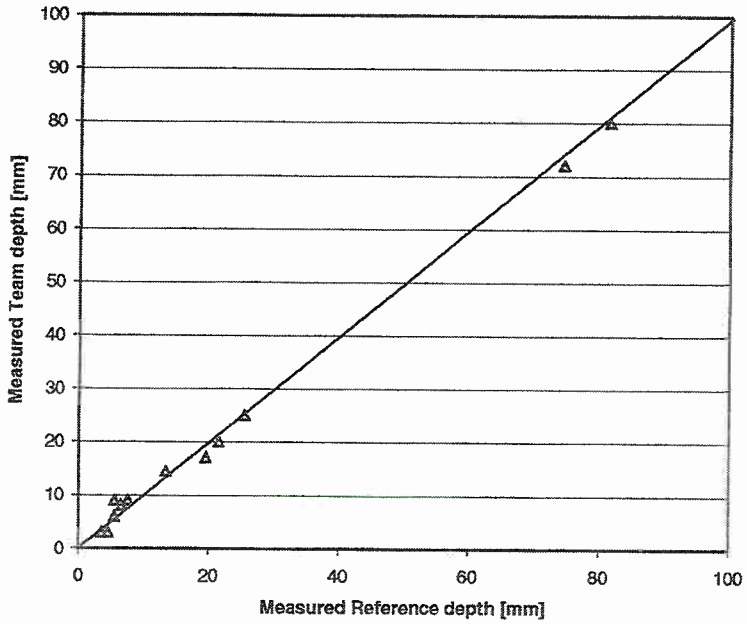
Depth sizing for post test inspection teams.

Sizing performance in TWE for post test inspection team BB



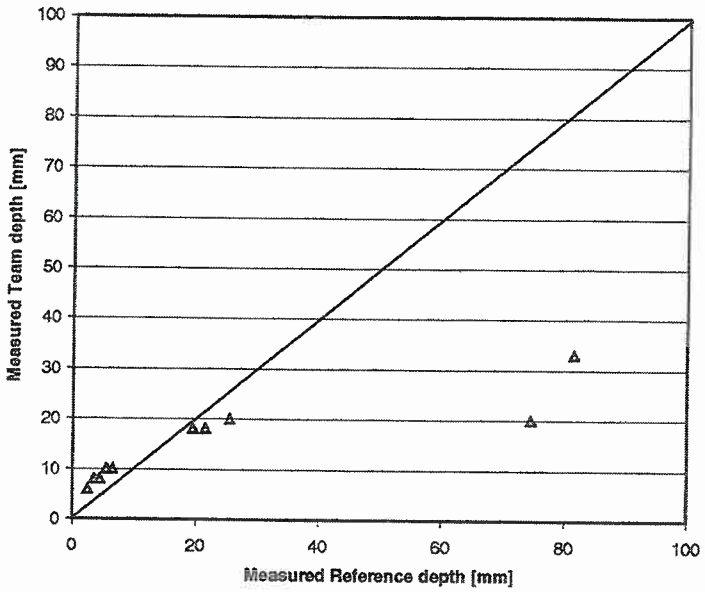
I12

Sizing performance in TWE for post test inspection team CC



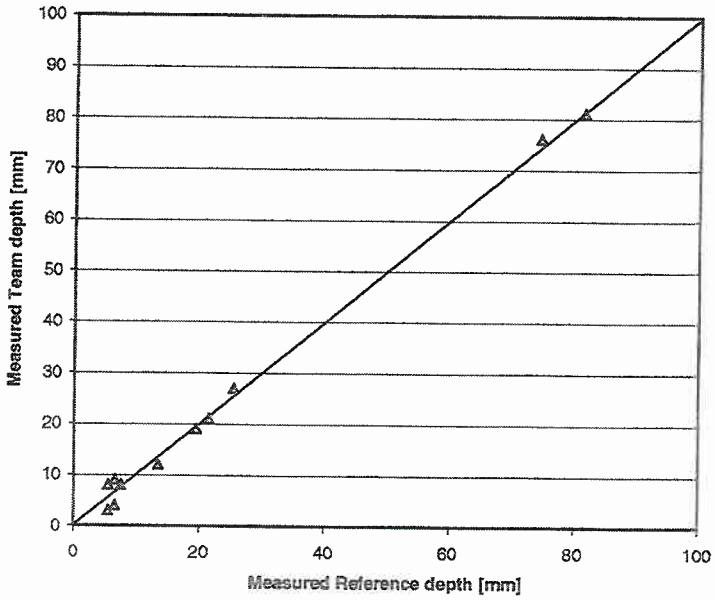
I13

Sizing performance in TWE for post test inspection team DD



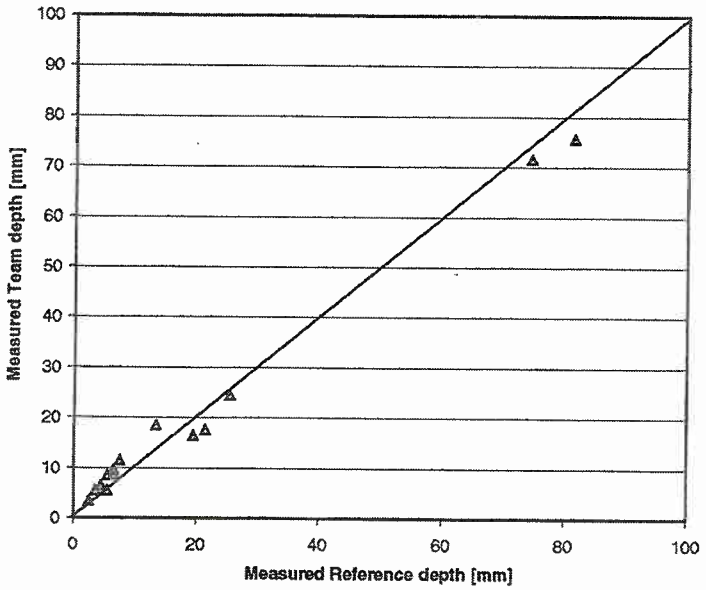
I14

Sizing performance in TWE for post test inspection team EE



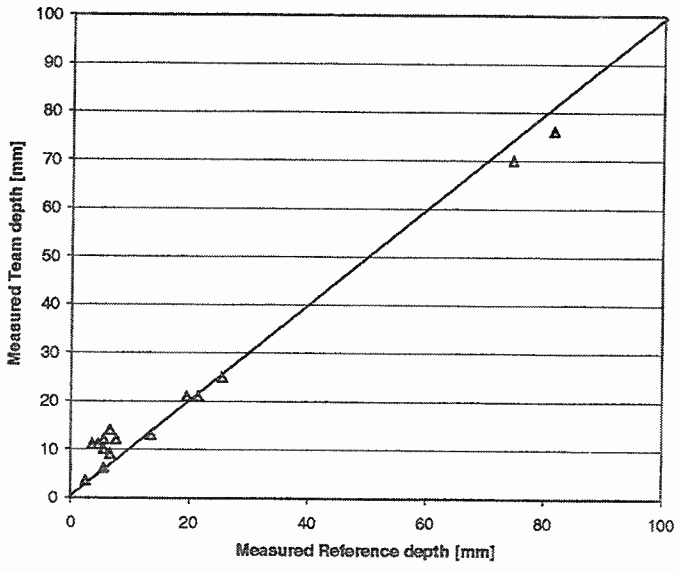
I15

Sizing performance in TWE for post test inspection team FF



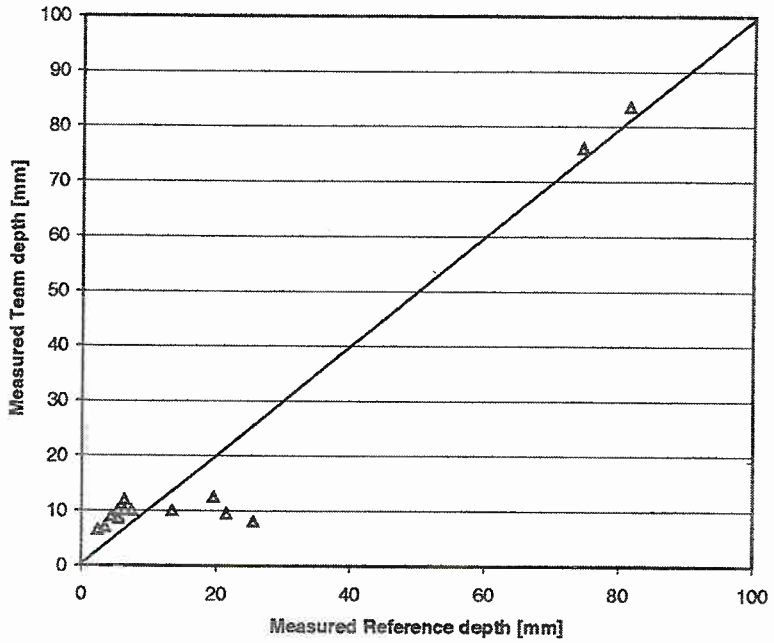
I16

Sizing performance in TWE for post test inspection team GG



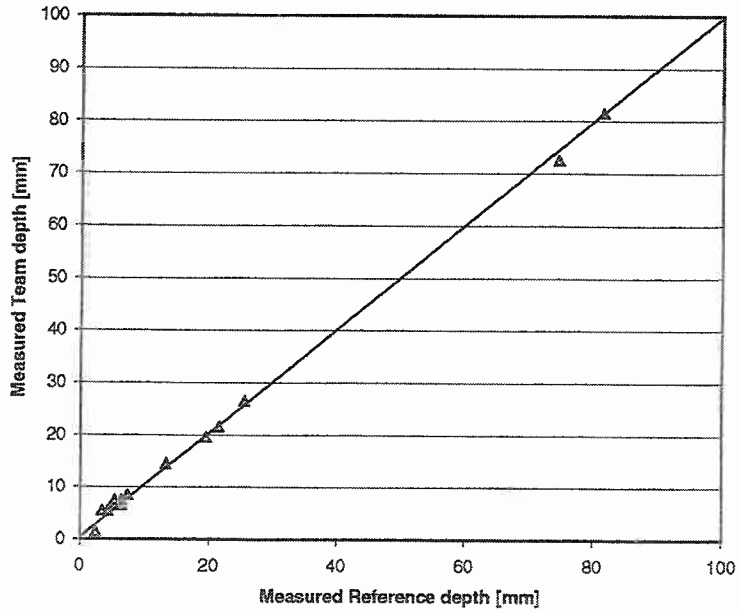
I17

Sizing performance in TWE for post test inspection team JJ



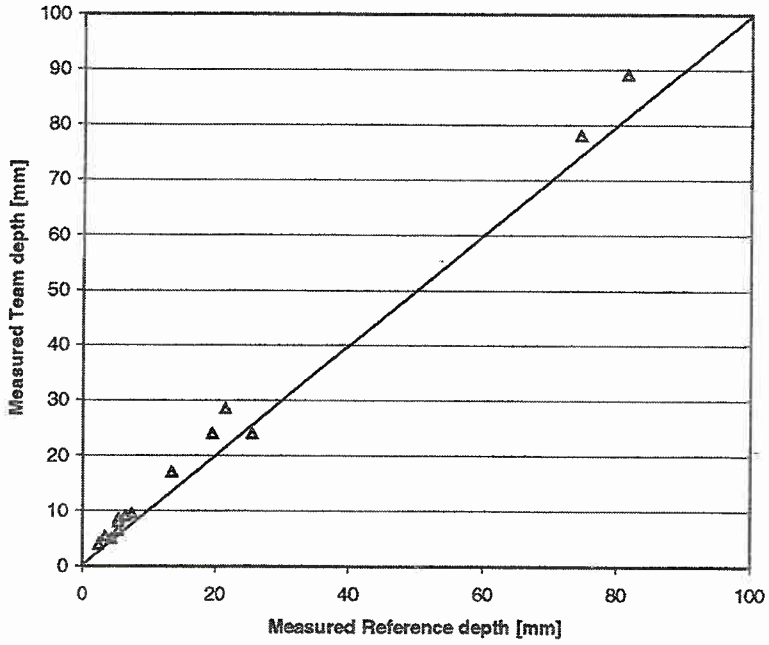
I18

Sizing performance in TWE for post test inspection team KK



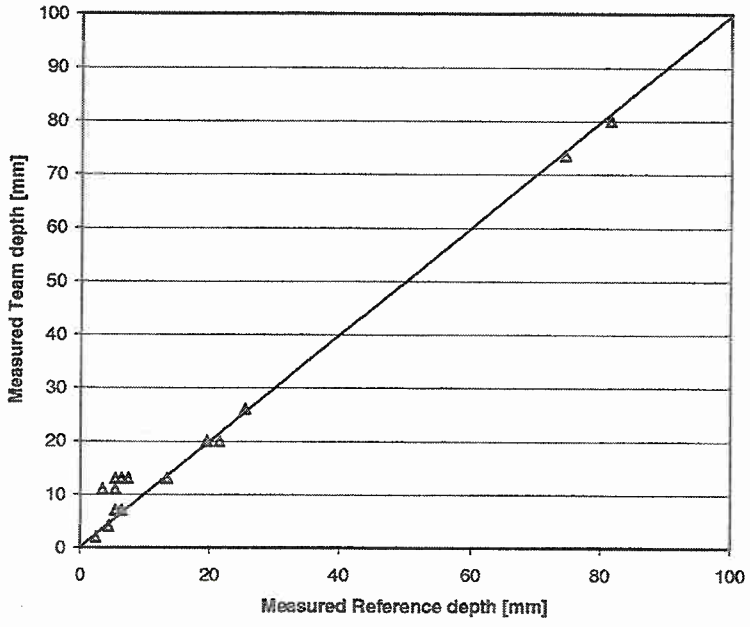
I19

Sizing performance in TWE for post test inspection team MM



I20

Sizing performance in TWE for post test inspection team NN

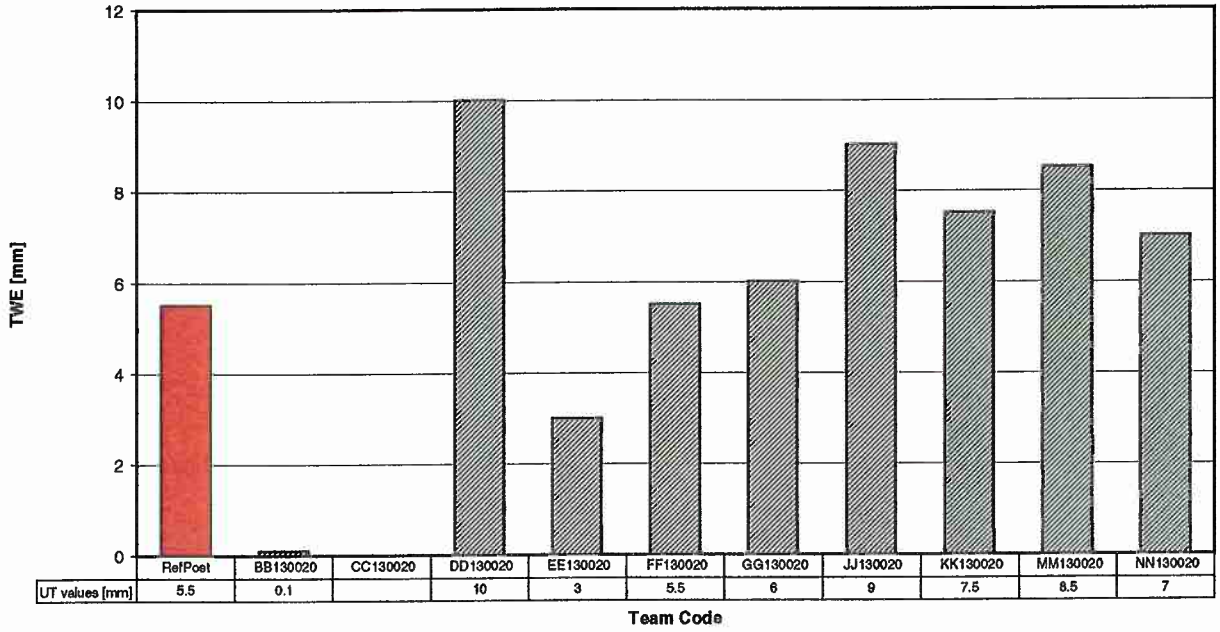


I21

Appendix 8

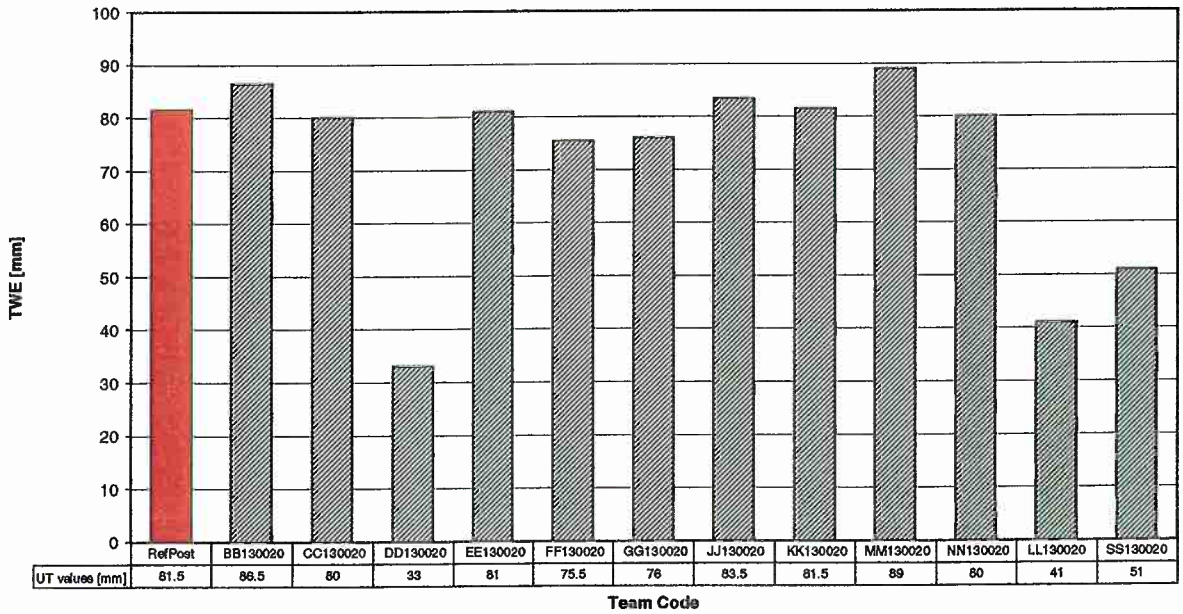
Depth sizing for individual flaws for post test inspection teams.

TWE sizing for all post test teams inspecting defect A
(PISC A defect, L = 19 mm, D = 5.5 mm)



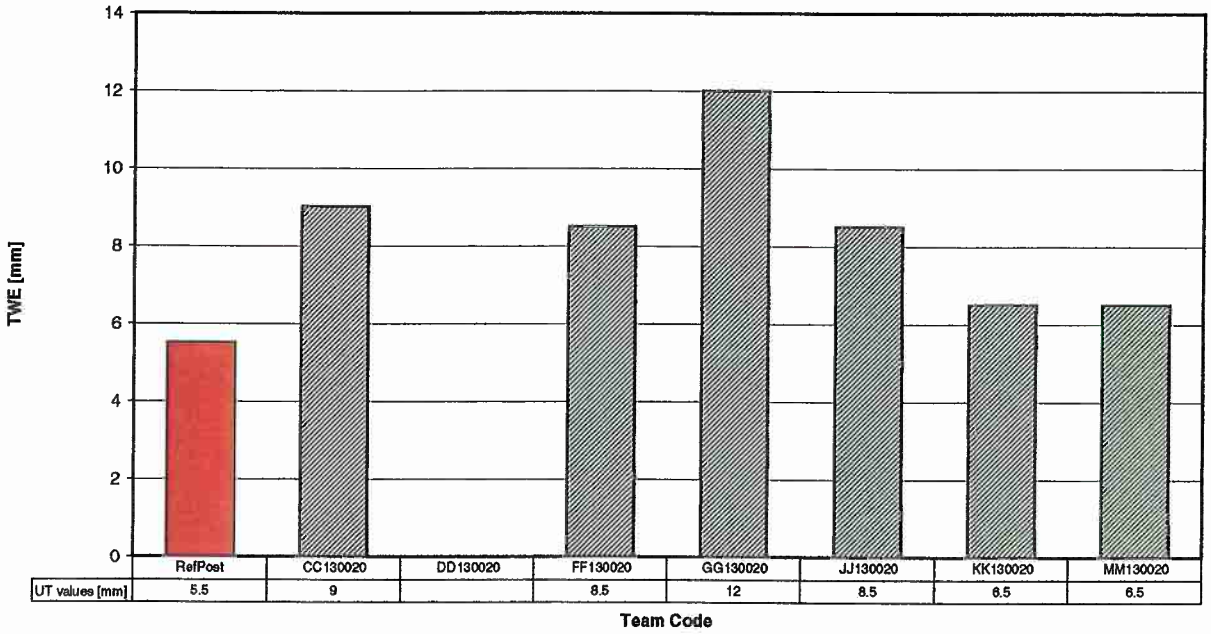
C18

TWE sizing for all post test teams inspecting defect B
(Large underclad fatigue defect, L = 276 mm, D = 81.5 mm)



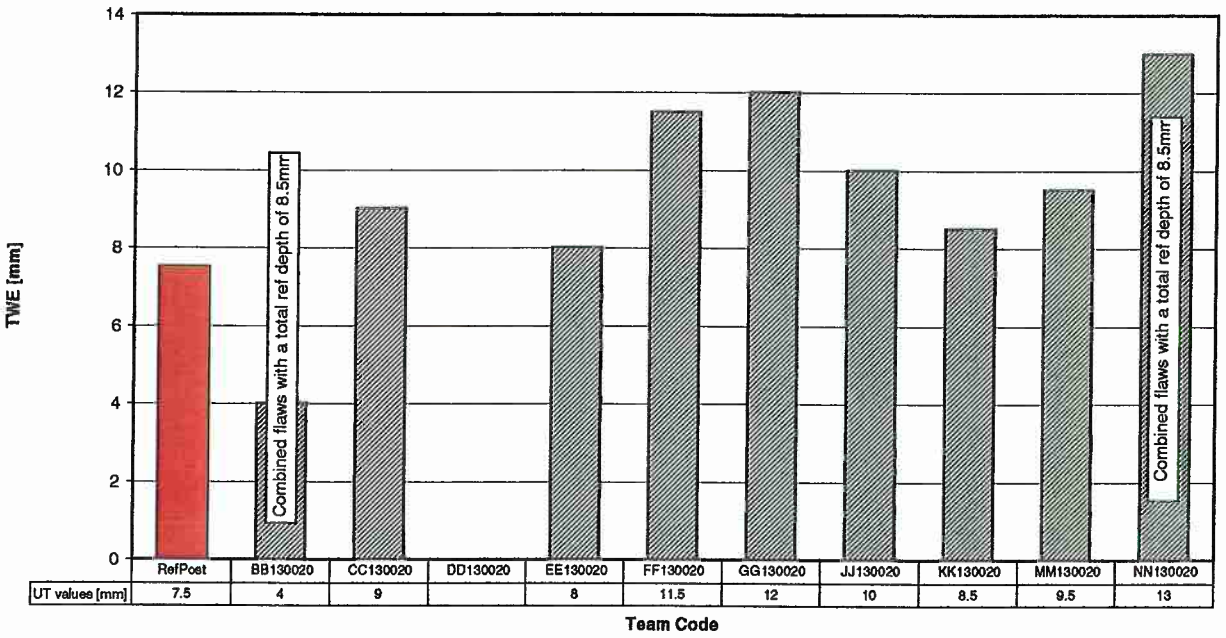
C19

TWE sizing for all post test teams inspecting defect C
(local brittle zone, L = 30 mm, D = 5.5 mm)



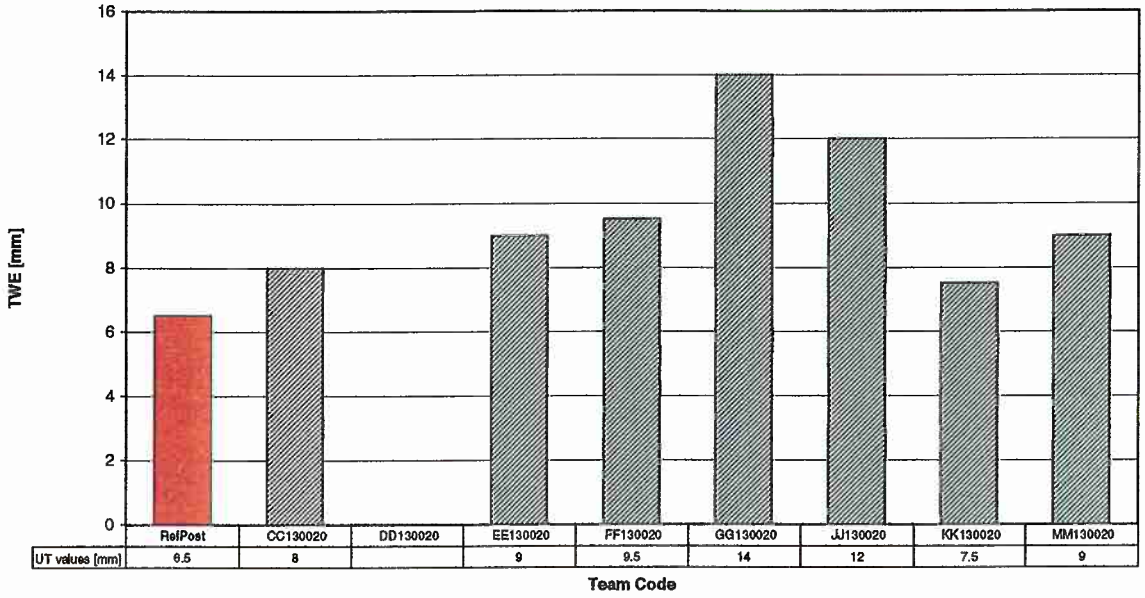
C20

TWE sizing for all post test teams inspecting defect D
(local brittle zone, L = 25 mm, D = 7.5 mm)



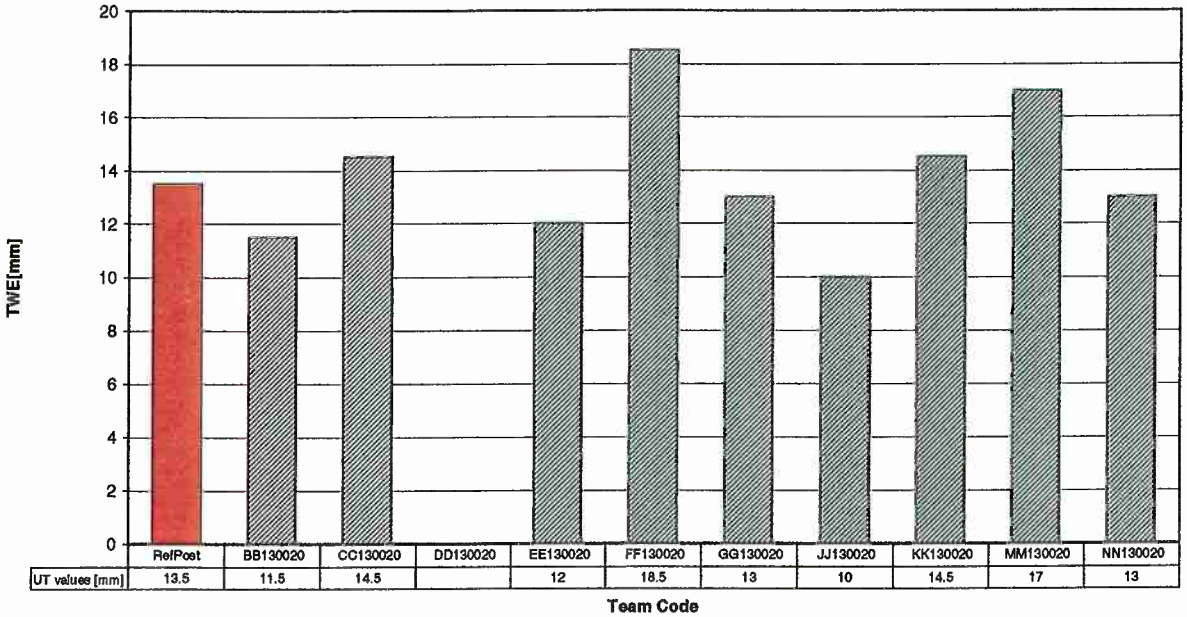
C21

TWE sizing for all post test teams inspecting defect E
(local brittle zone, L = 22 mm, D = 6.5 mm)



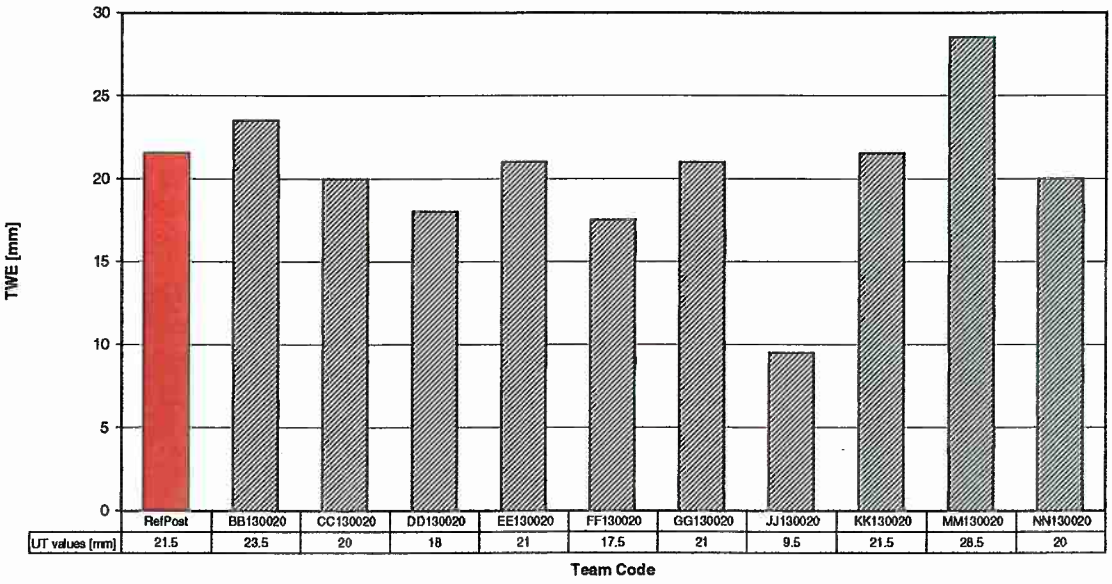
C22

TWE sizing for all post test teams inspecting defect G
(PISC A defect, L = 47 mm, D = 13.5 mm)



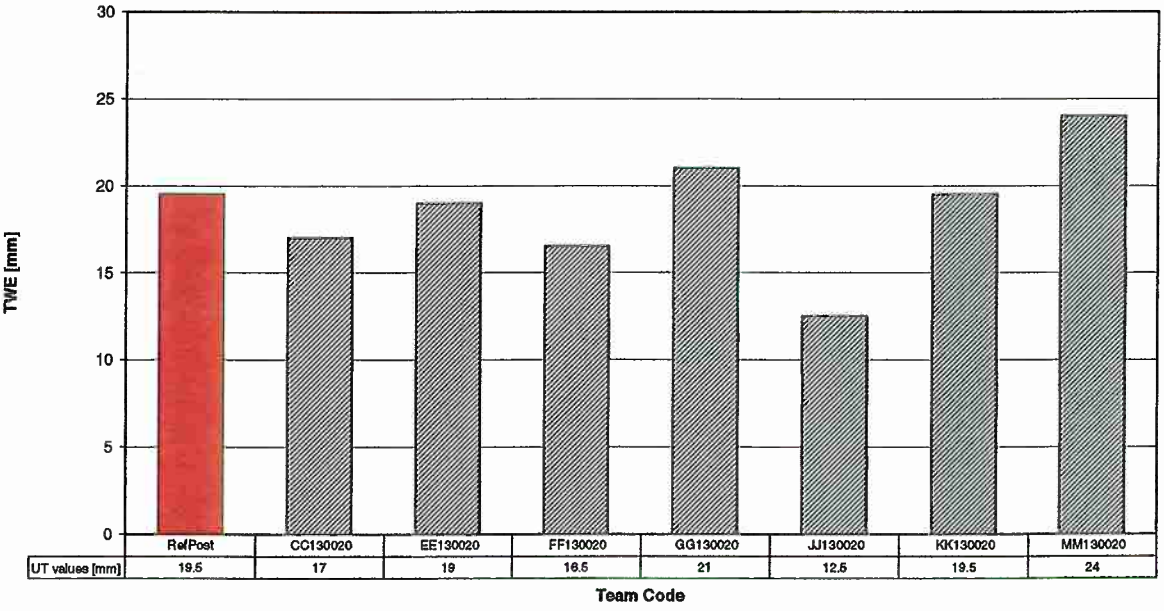
C24

TWE sizing for all post test teams inspecting defect I
(cold cracking, L = 55 mm, D = 21.5 mm)



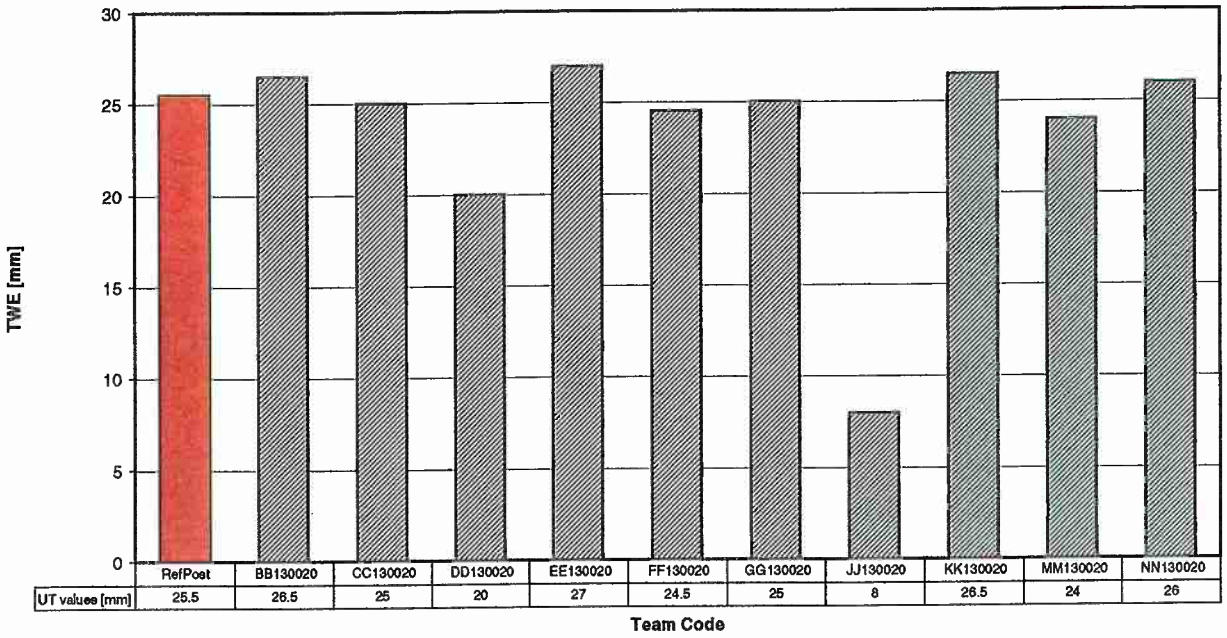
C26

TWE sizing for all post test teams inspecting defect J
(cold cracking, L = 38 mm, D = 19.5 mm)



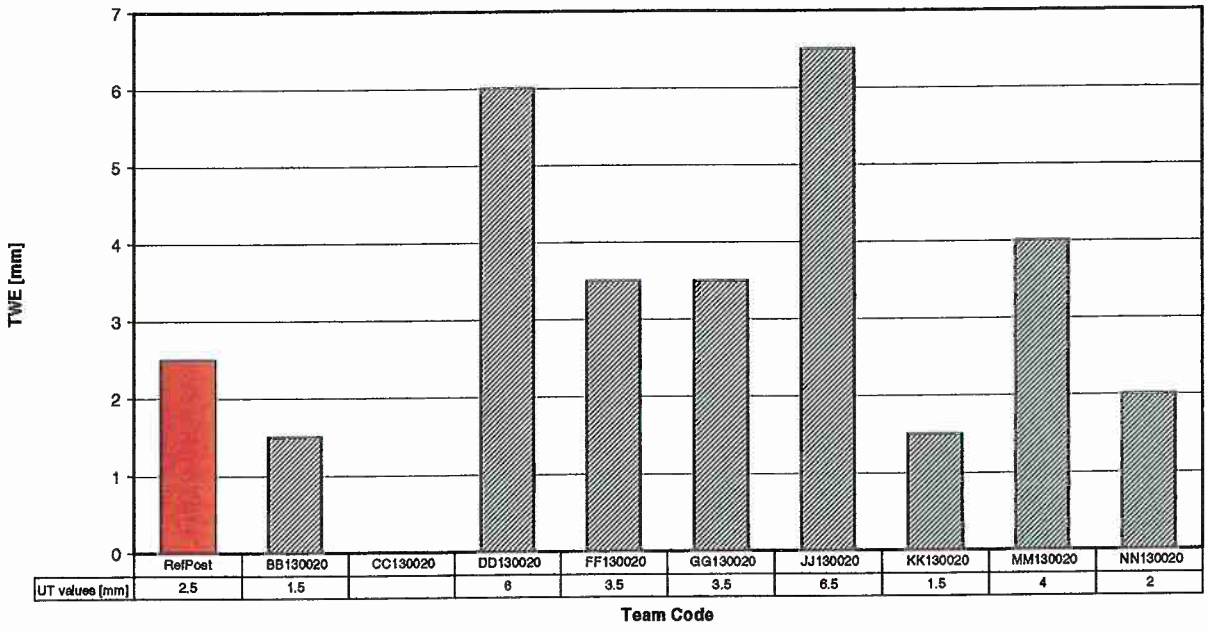
C27

TWE sizing for all post test teams inspecting defect K
(PISC A defect, L = 69 mm, D = 25.5 mm)



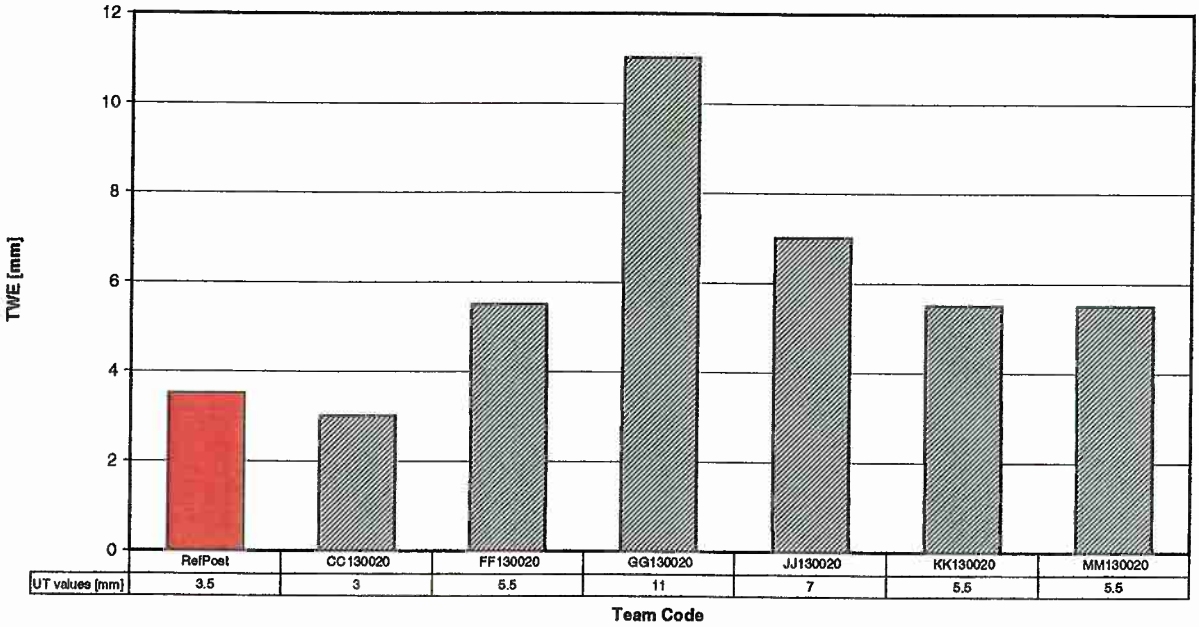
C28

TWE sizing for all post test teams inspecting defect L
(PISC A defect, L = 17 mm, D = 2.5 mm)



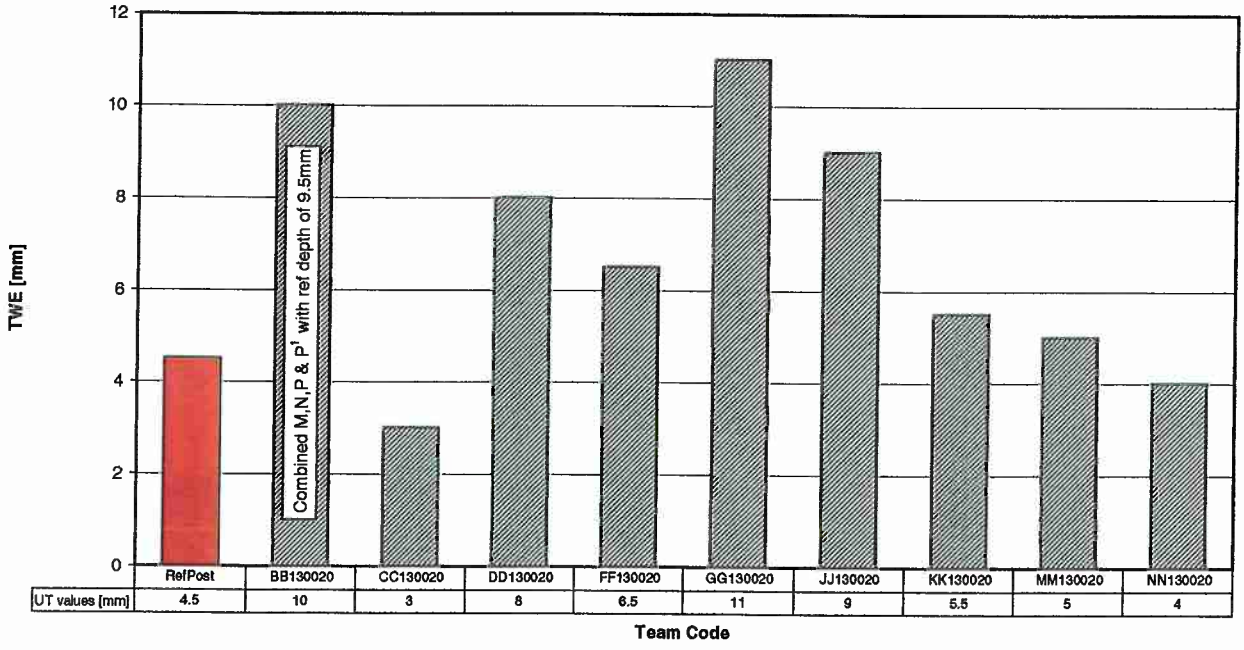
C29

TWE sizing for all post test teams inspecting defect M
(local brittle zone, L = 25 mm, D = 3.5 mm)



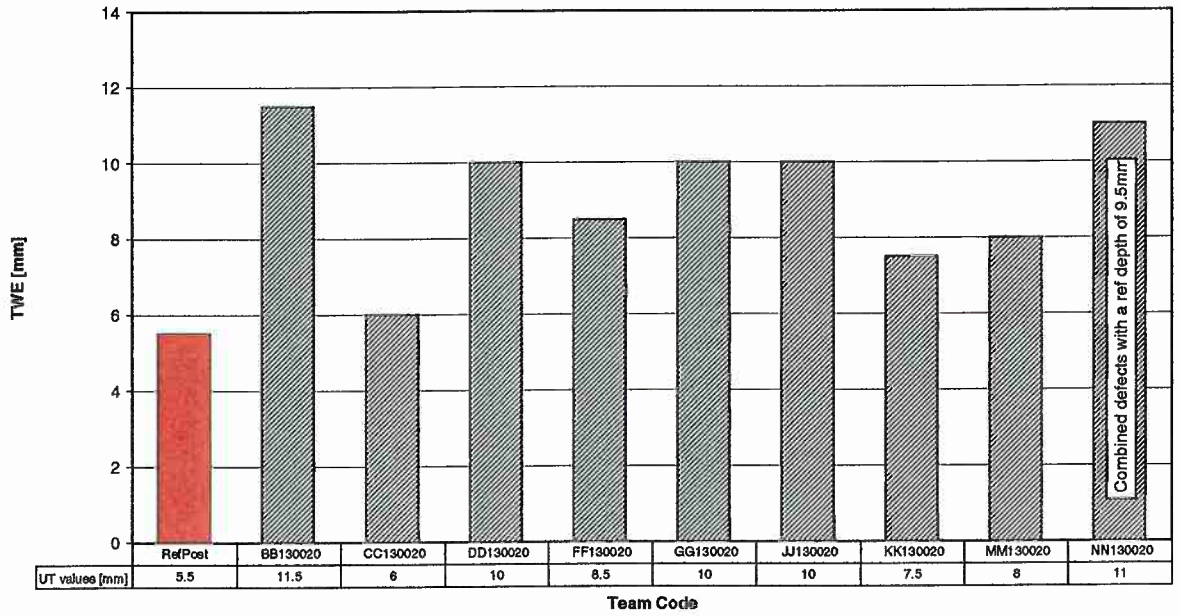
C30

TWE sizing for all post test teams inspecting defect N
(local brittle zone, L = 27 mm, D = 4.5 mm)



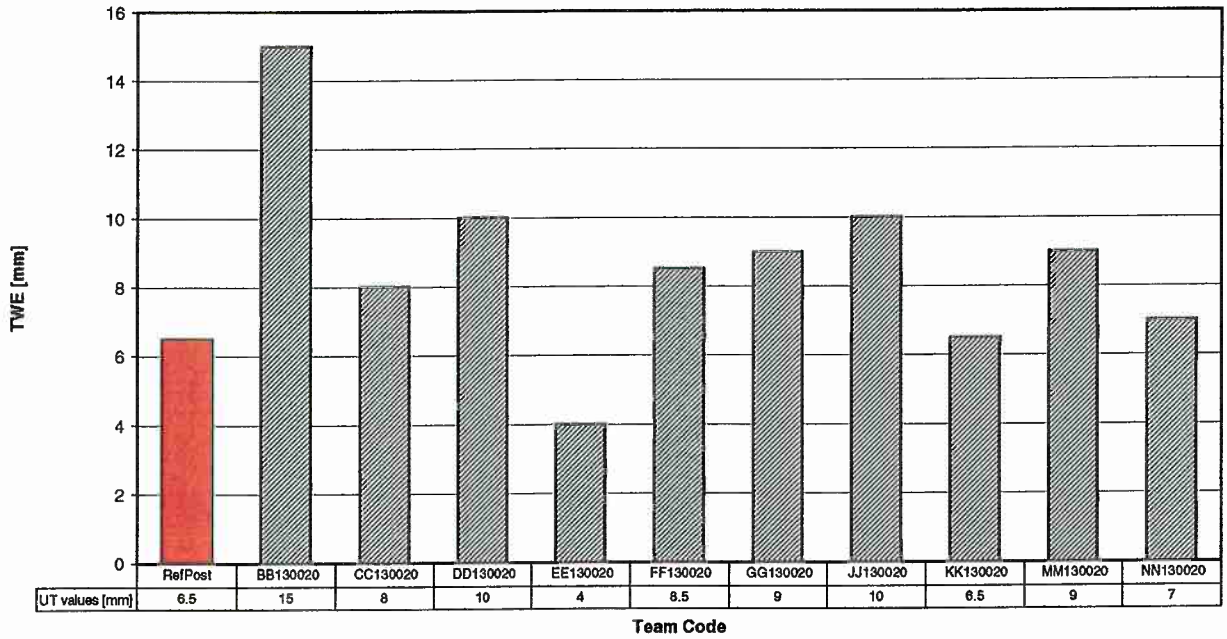
C31

TWE sizing for all post test teams inspecting defect O
(local brittle zone, L = 25 mm, D = 5.5 mm)



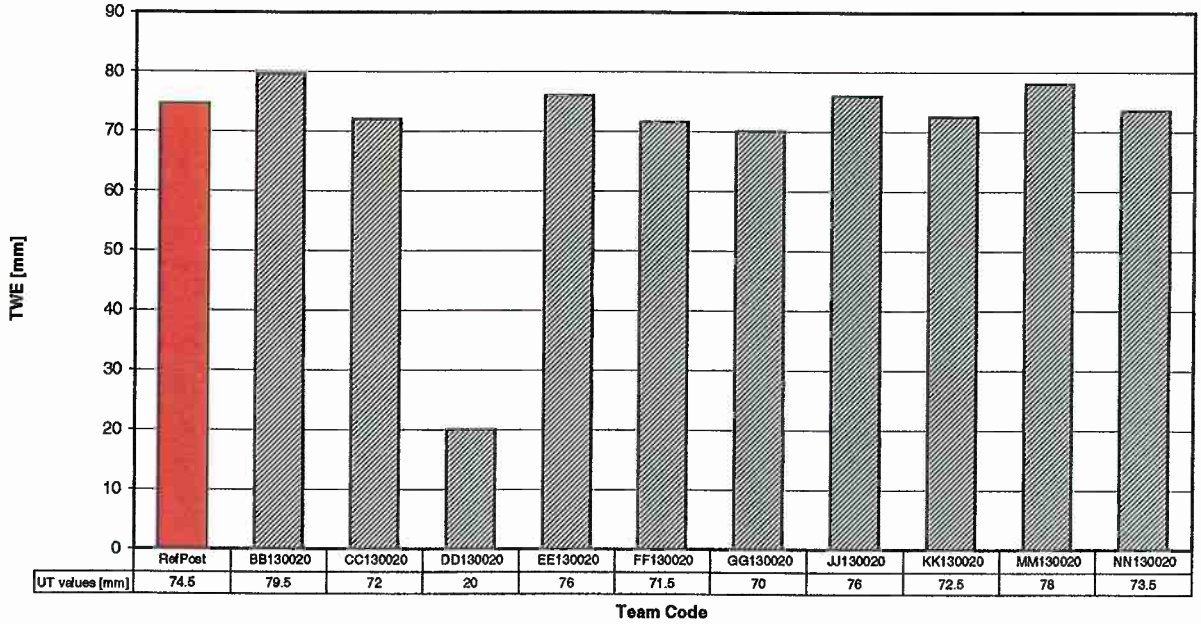
C32

TWE sizing for all post test teams inspecting defect Q
(PISC A defect, L = 37 mm, D = 6.5 mm)



C34

TWE sizing for all post test teams inspecting defect RL
(PISC A defect, L = 224 mm, D = 74.5 mm)



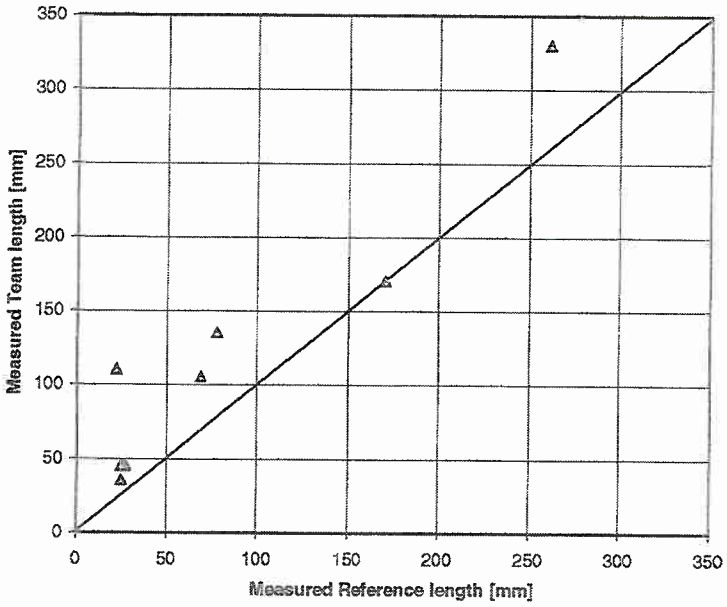
	RefPost	BB130020	CC130020	DD130020	EE130020	FF130020	GG130020	JJ130020	KK130020	MM130020	NN130020
UT values [mm]	74.5	79.5	72	20	76	71.5	70	76	72.5	78	73.5

C35

Appendix 9

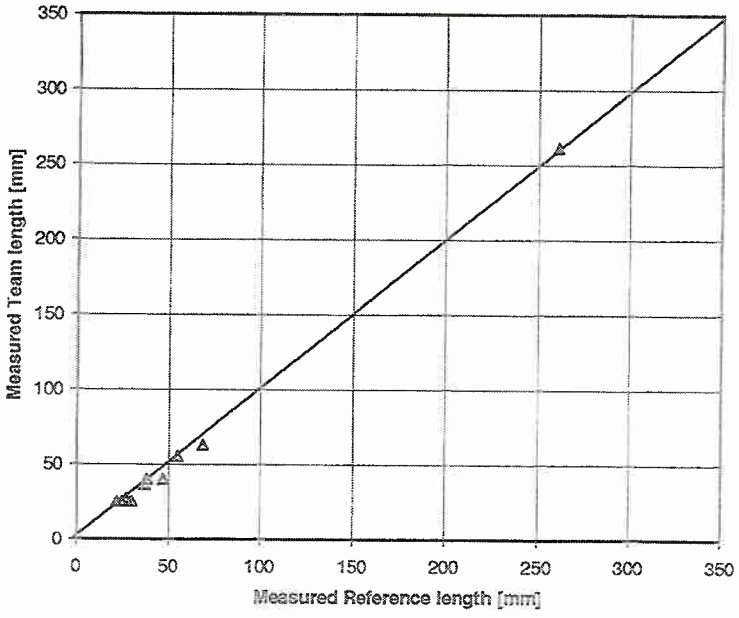
Length sizing for pre test inspection teams.

Sizing performance in length for pre test inspection team BB



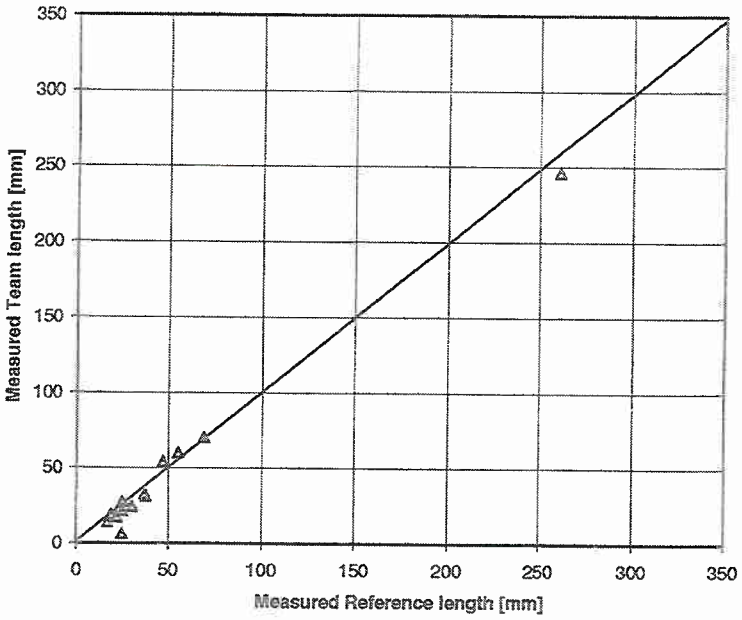
H5

Sizing performance in length for pre test inspection team CC



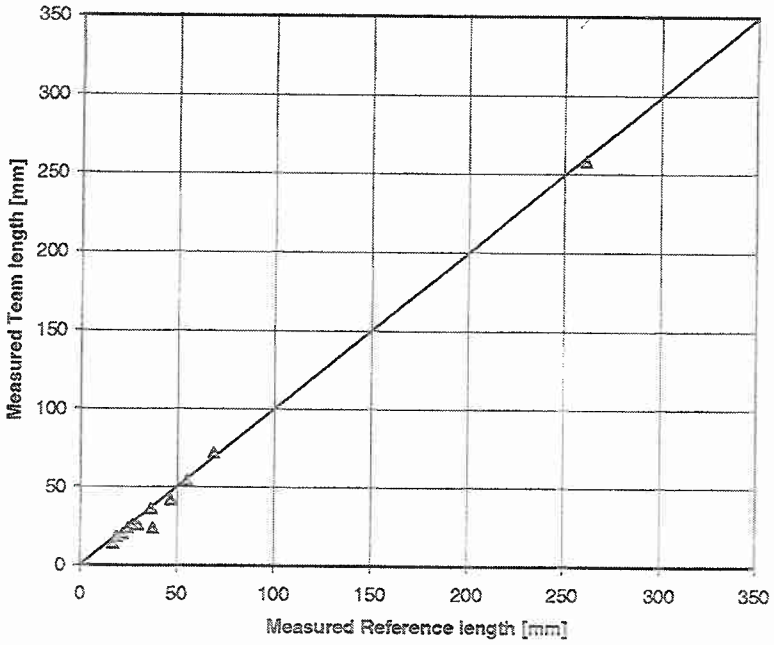
H6

Sizing performance in length for pre test inspection team DD



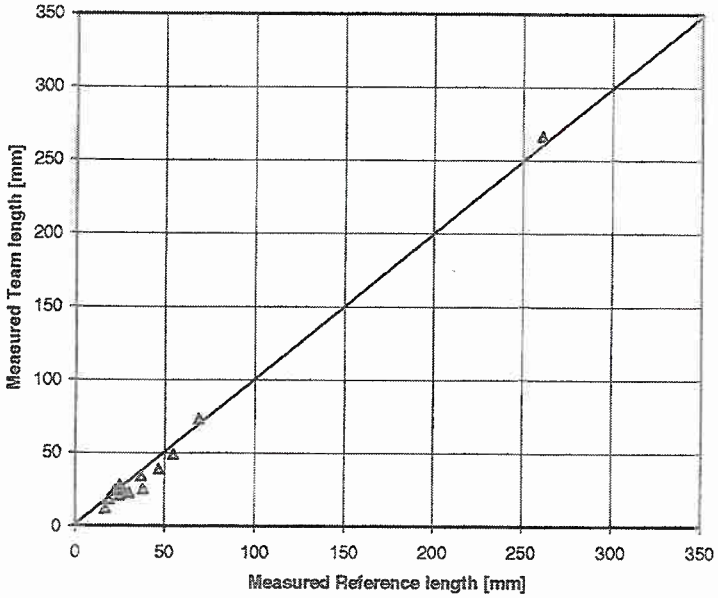
H7

Sizing performance in length for pre test inspection team KK



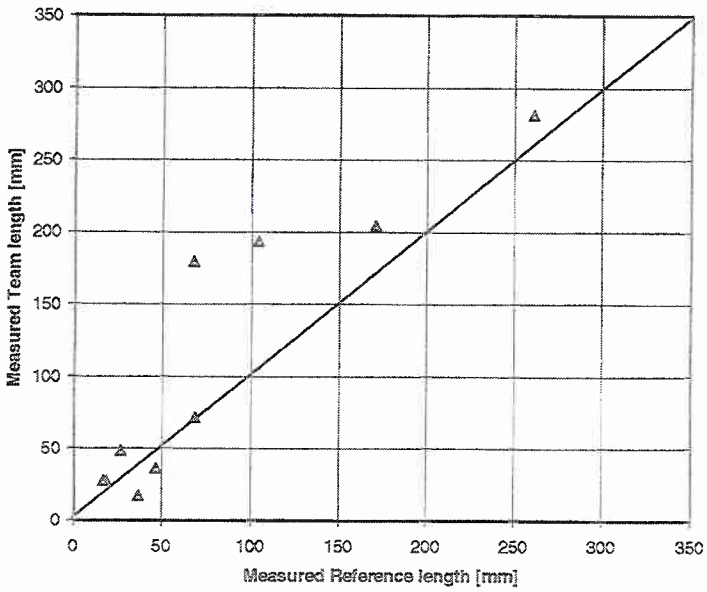
H8

Sizing performance in length for pre test inspection team MM



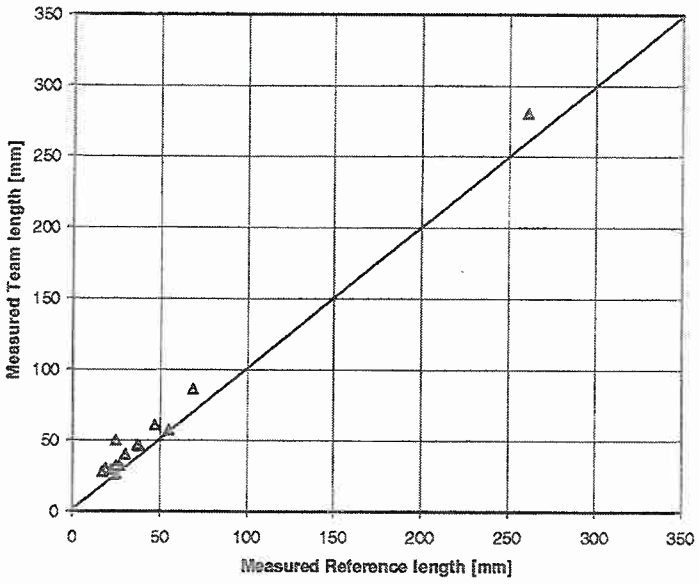
H9

Sizing performance in length for pre test inspection team NN



H10

Sizing performance in length for pre test inspection team TT

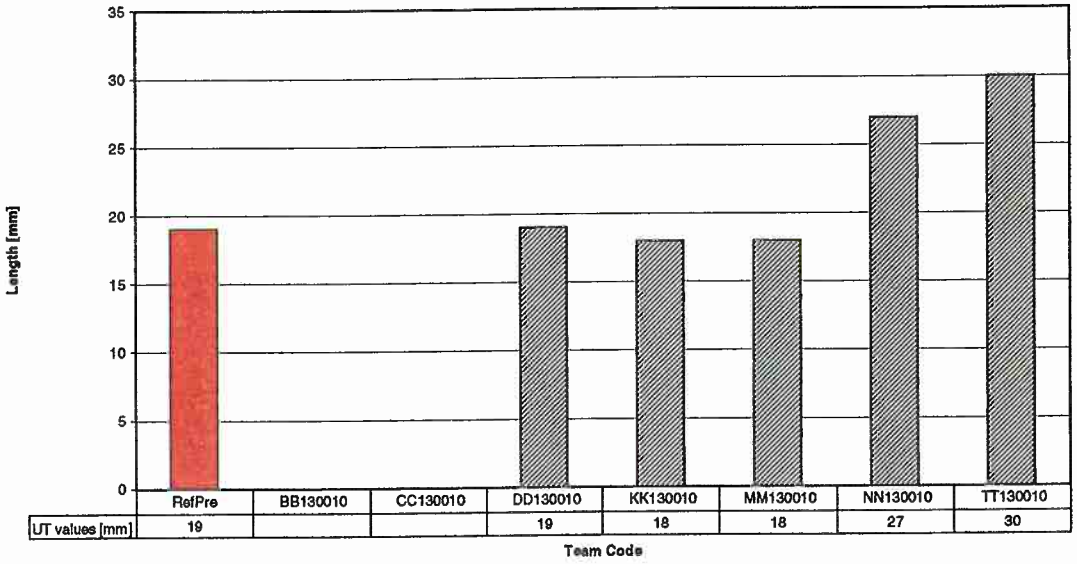


H11

Appendix 10

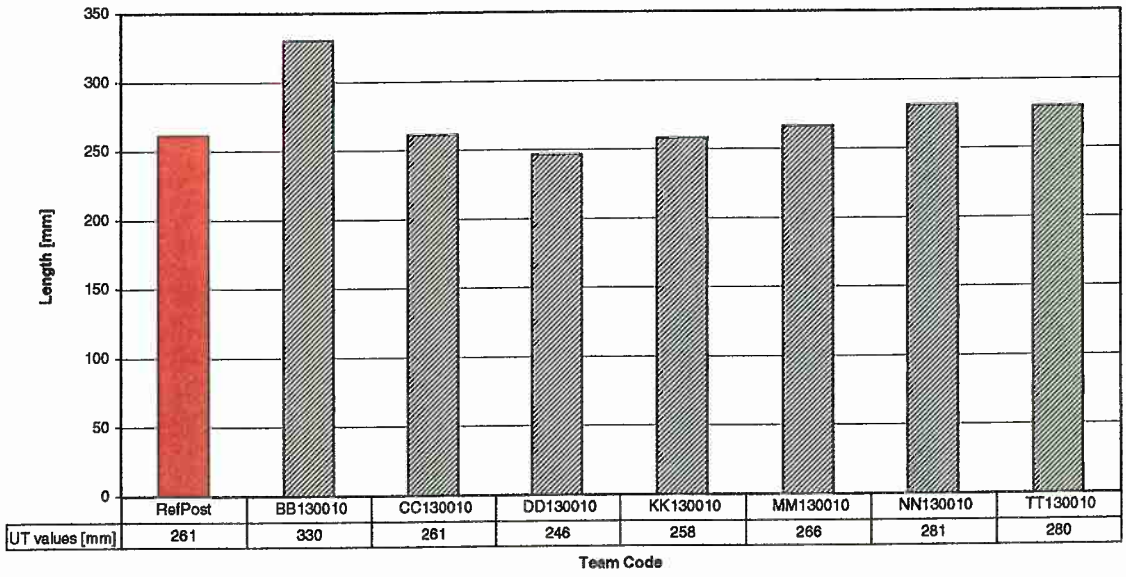
Length sizing for individual flaws for pre test inspection teams.

Length sizing for all pre test teams inspecting defect A
(PISC A defect, L = 19 mm, D = 5.5 mm)



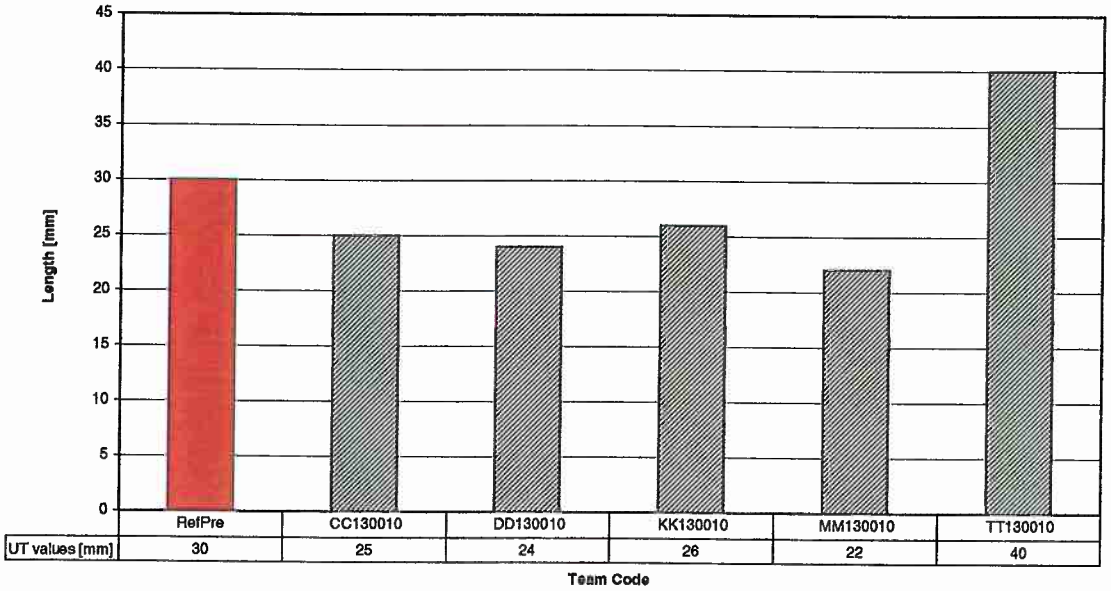
B1

Length sizing for all pre test teams inspecting defect B
(Large underclad fatigue defect, L = 261 mm, D = 76.5 mm)



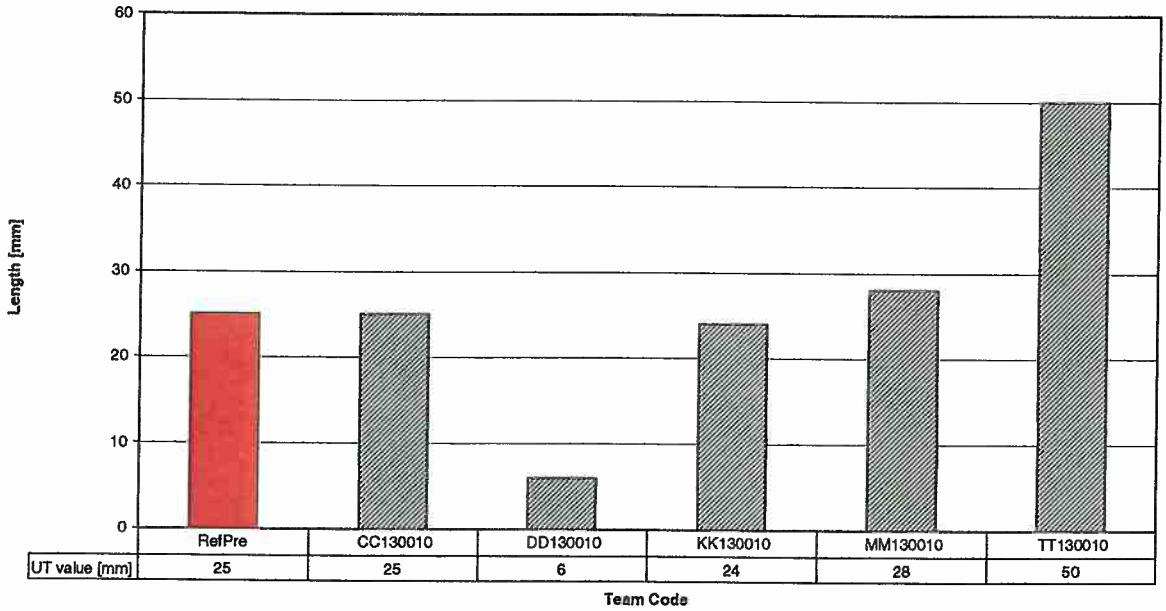
B2

Length sizing for all pre test teams inspecting defect C
(local brittle zone, L = 30 mm, D = 5.5 mm)



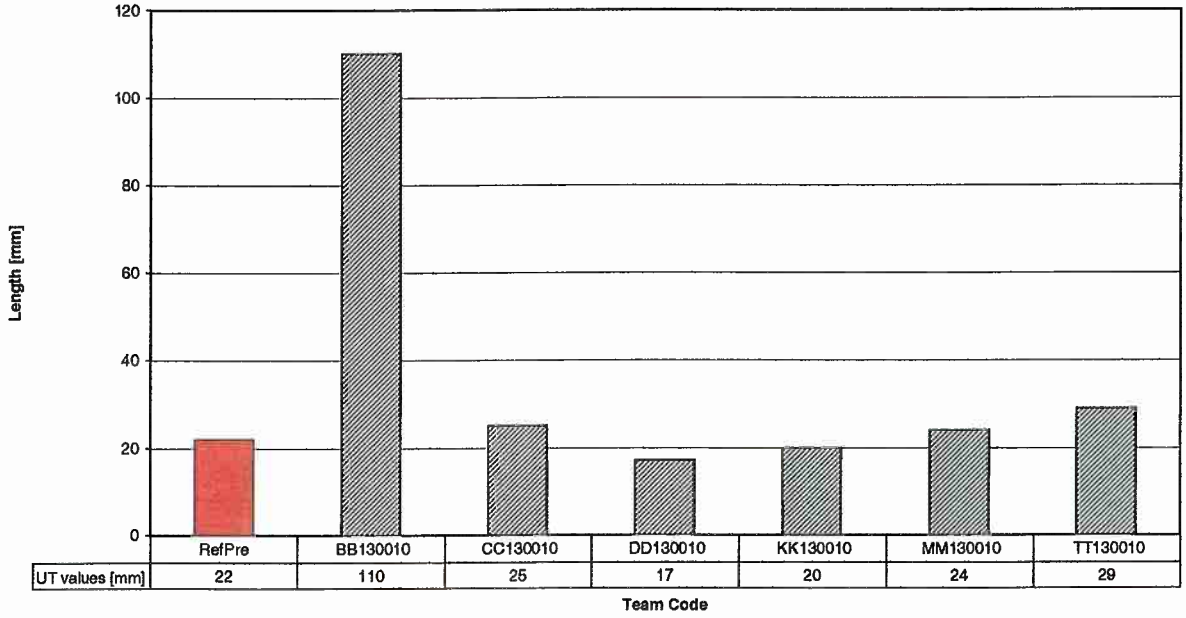
B3

Length sizing for all pre test teams inspecting defect D
(local brittle zone, L = 25 mm, D = 7.5 mm)



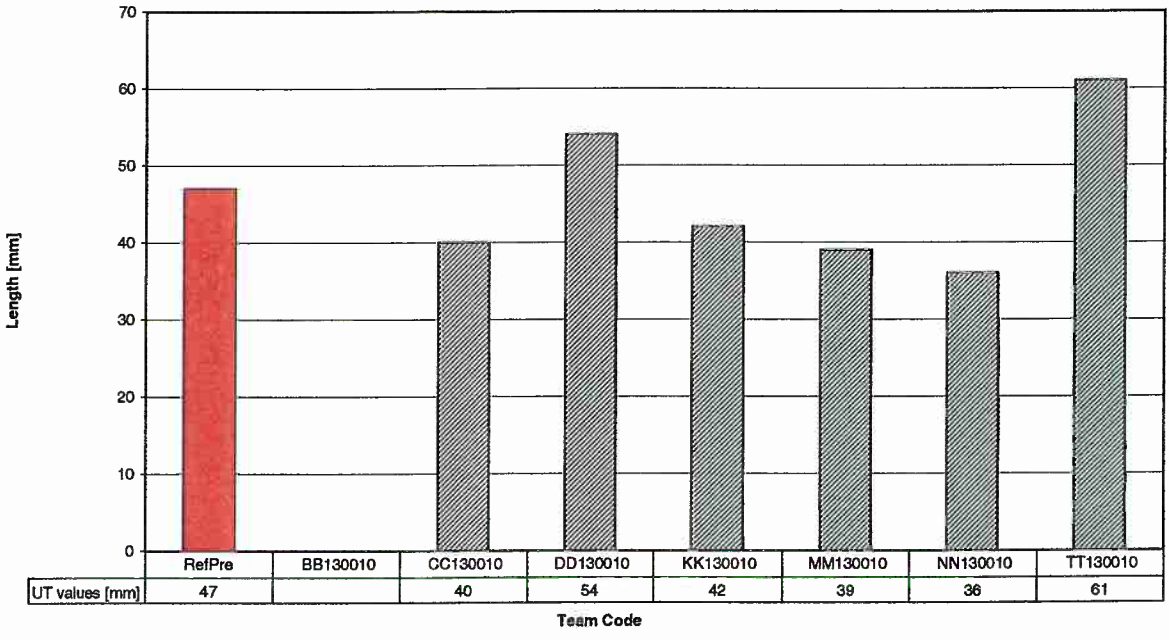
B4

Length sizing for all pre test teams inspecting defect E
(local brittle zone, L = 22 mm, D = 6.5 mm)



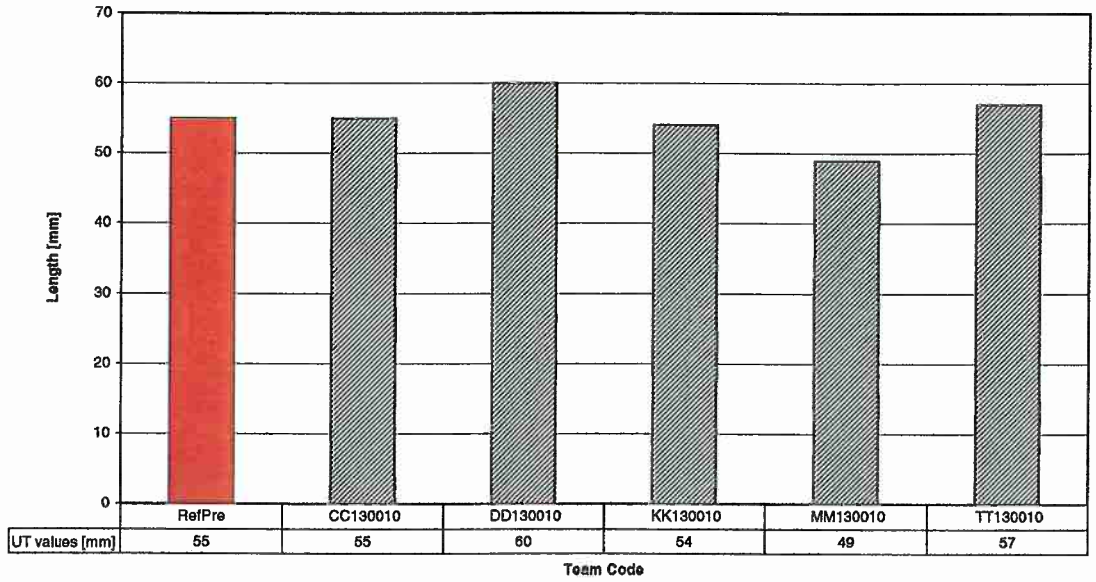
B5

Length sizing for all pre test teams inspecting defect G
(PISC A defect, L = 47 mm, D = 13.5 mm)



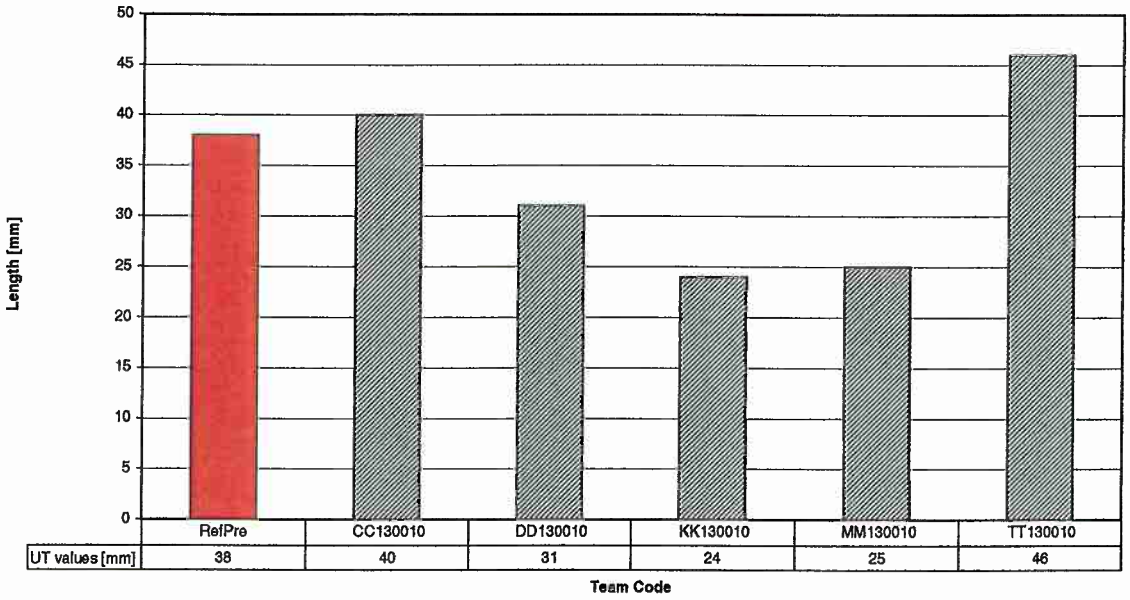
B7

Length sizing for all pre test teams inspecting defect I
(cold cracking defect, L = 55 mm, D = 21.5 mm)



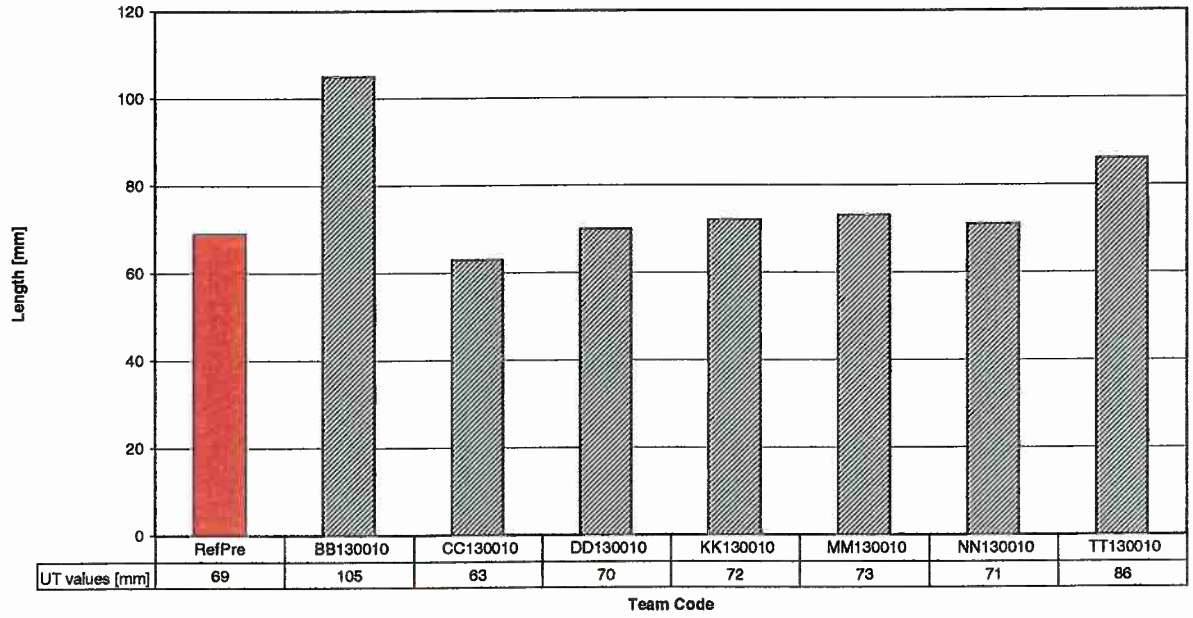
B9

Length sizing for all pre test teams inspecting defect J
(cold cracking defect, L = 38 mm, D = 19.5 mm)



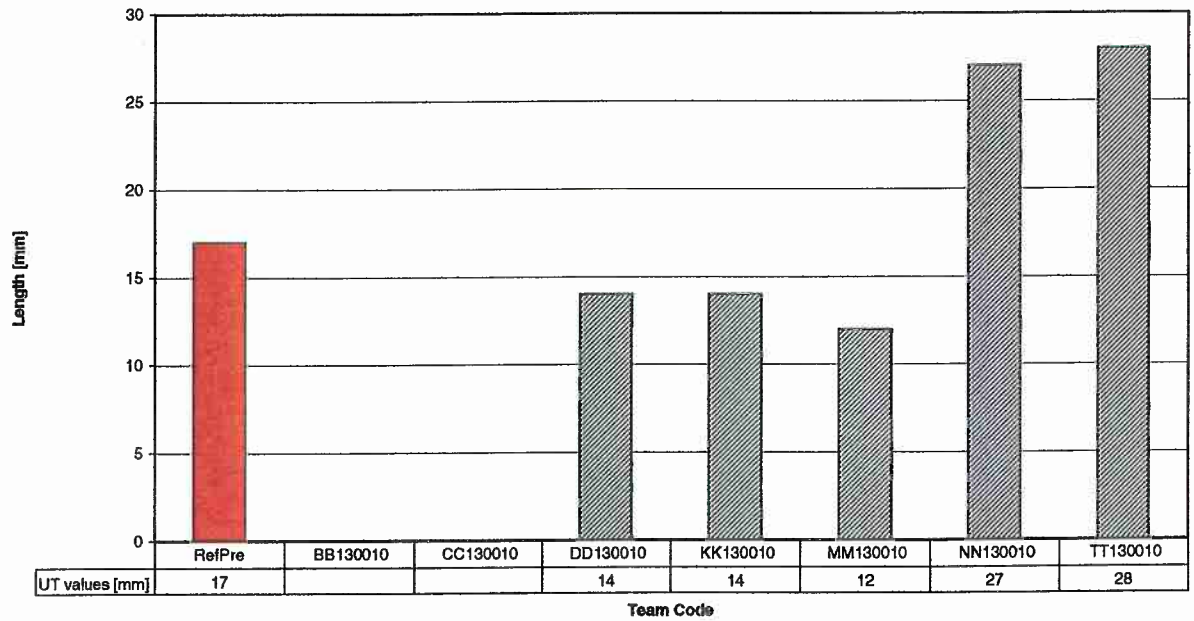
B10

Length sizing for all pre test teams inspecting defect K
(PISC A defect, L = 69 mm, D = 24.5 mm)



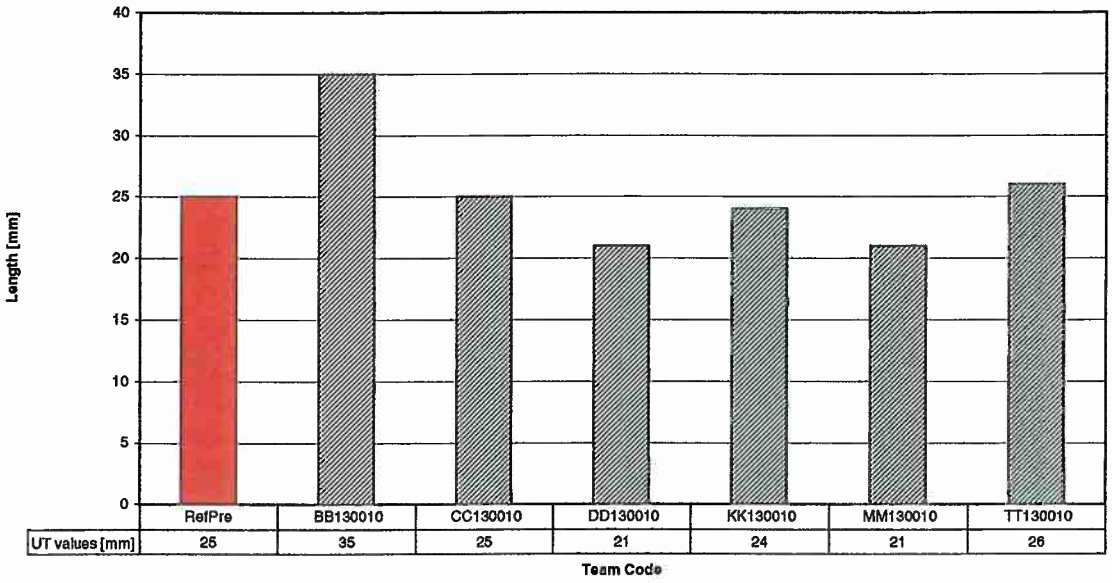
B11

Length sizing for all pre test teams inspecting defect L
(PISC A defect, L = 17 mm, D = 2.5 mm)



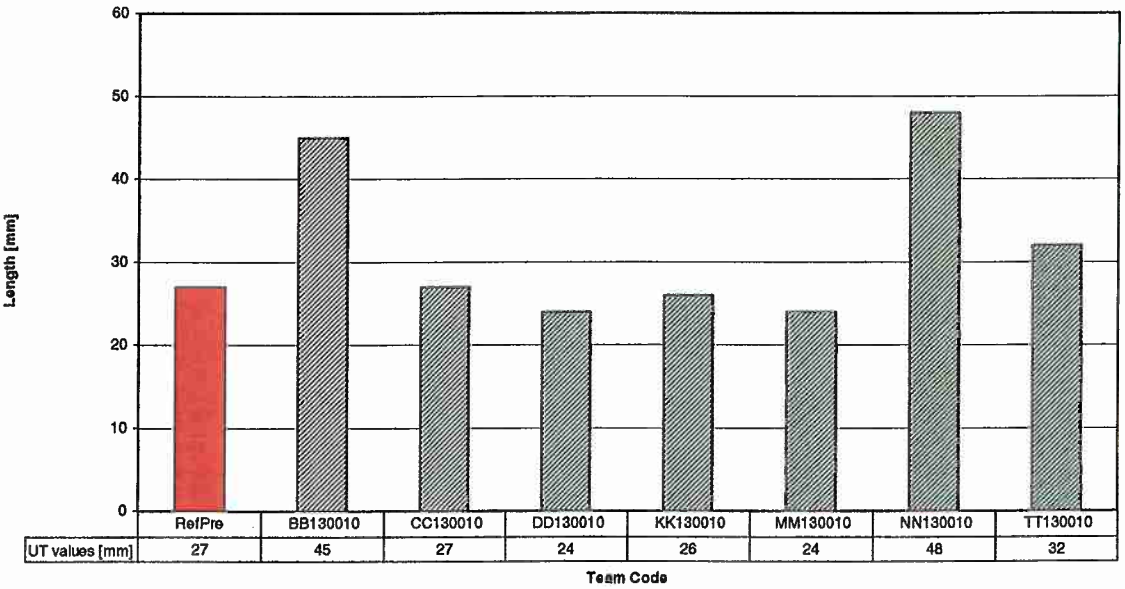
B12

Length sizing for all pre test teams inspecting defect M
(local brittle zone, L = 25 mm, D = 3.5 mm)



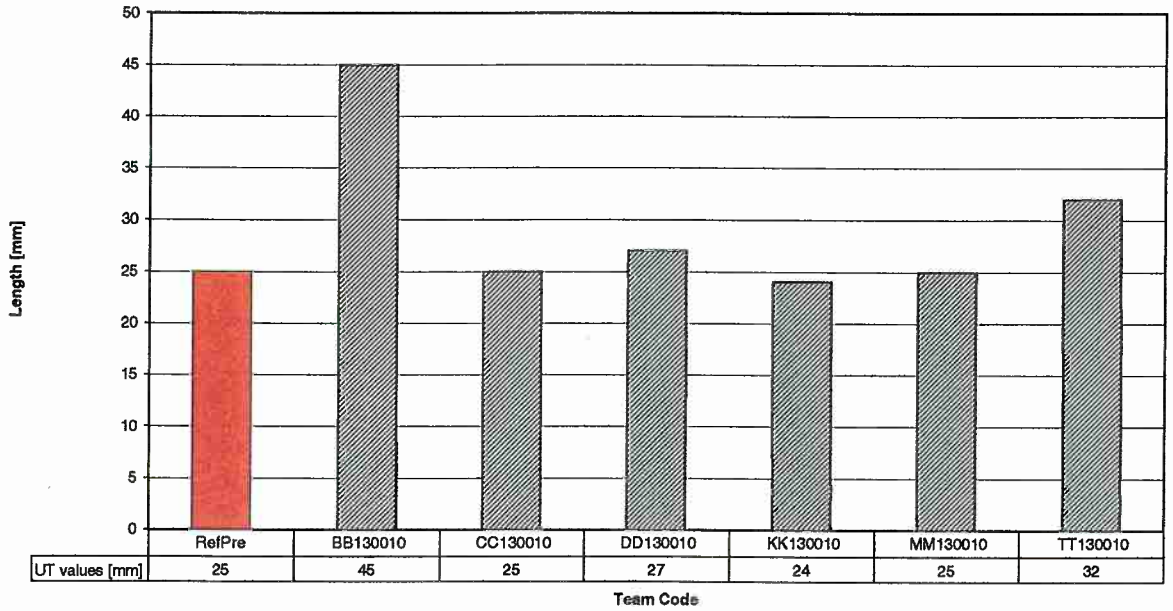
B13

Length sizing for all pre test teams inspecting defect N
(local brittle zone, L = 27 mm, D = 4.5 mm)



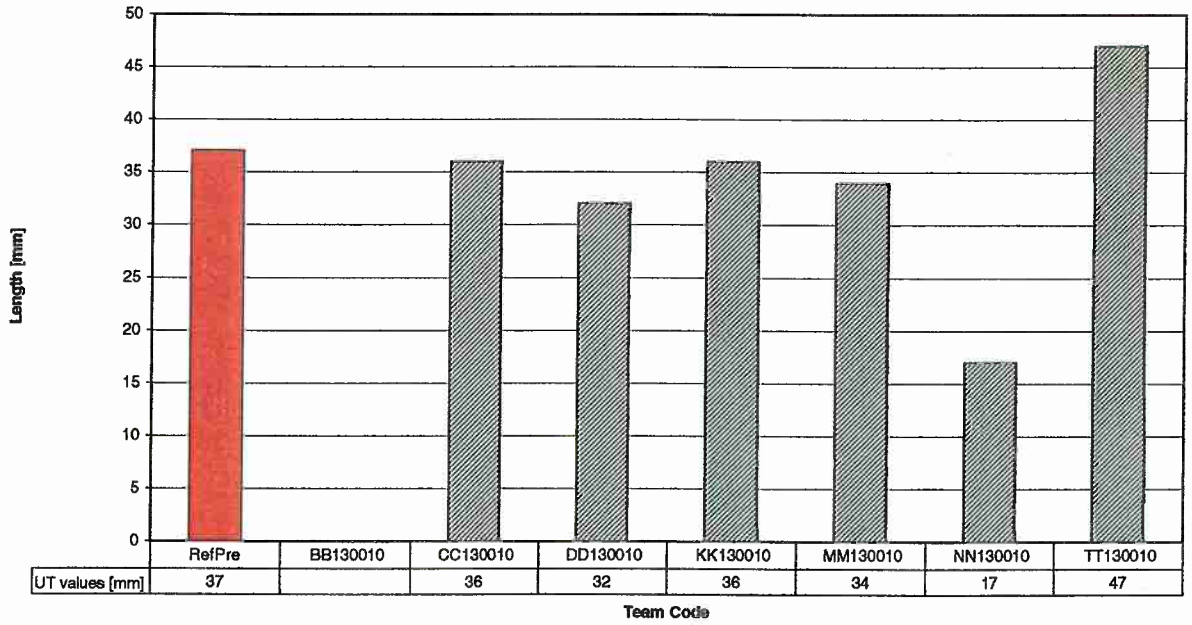
B14

Length sizing for all pre test teams inspecting defect O
(local brittle zone, L = 25 mm, D = 5.5 mm)



B15

Length sizing for all pre test teams inspecting defect Q
(PISC A defect, L = 37 mm, D = 6.5 mm)

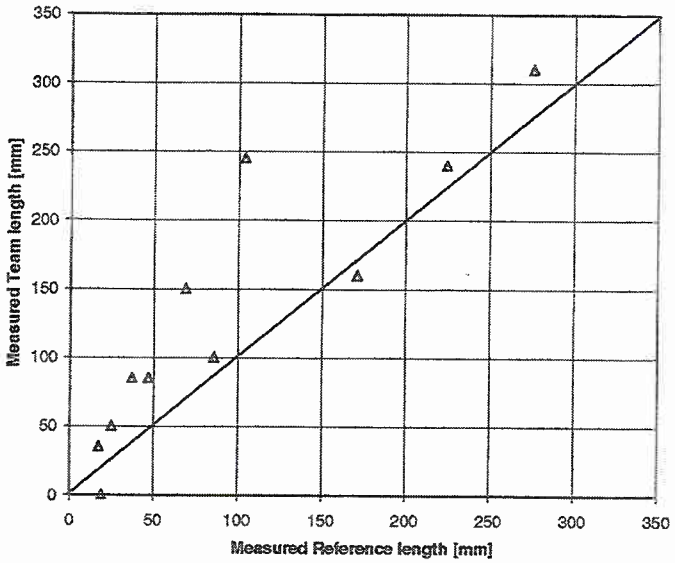


B17

Appendix 11

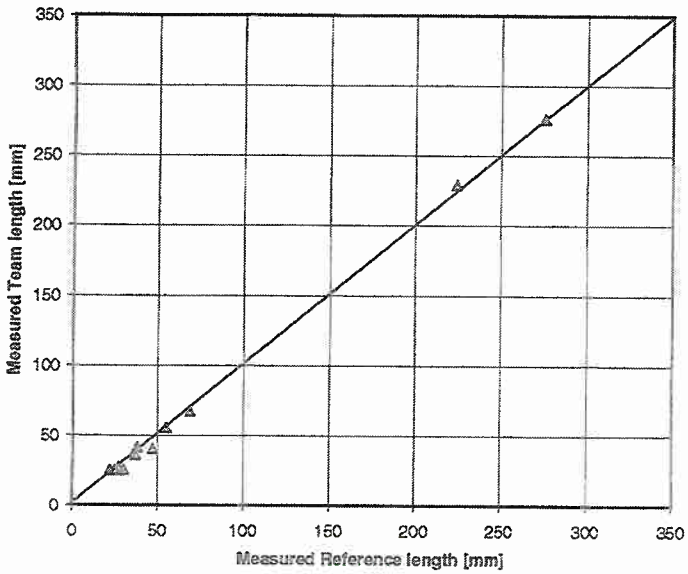
Length sizing for post test inspection teams.

Sizing performance in length for post test inspection team BB



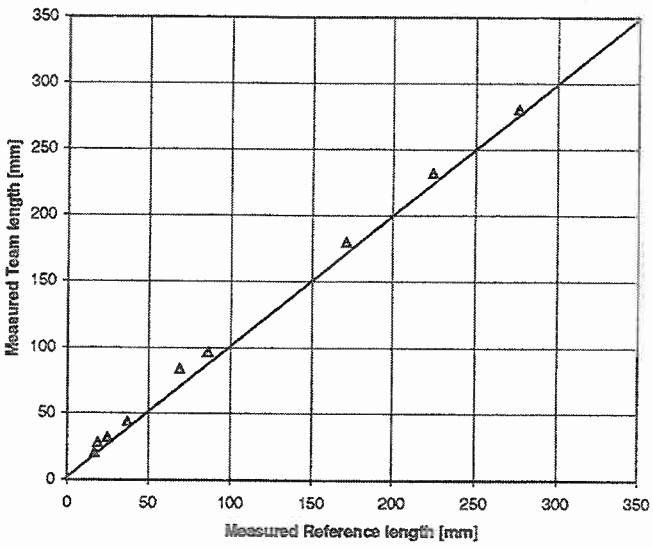
H12

Sizing performance in length for post test inspection team CC



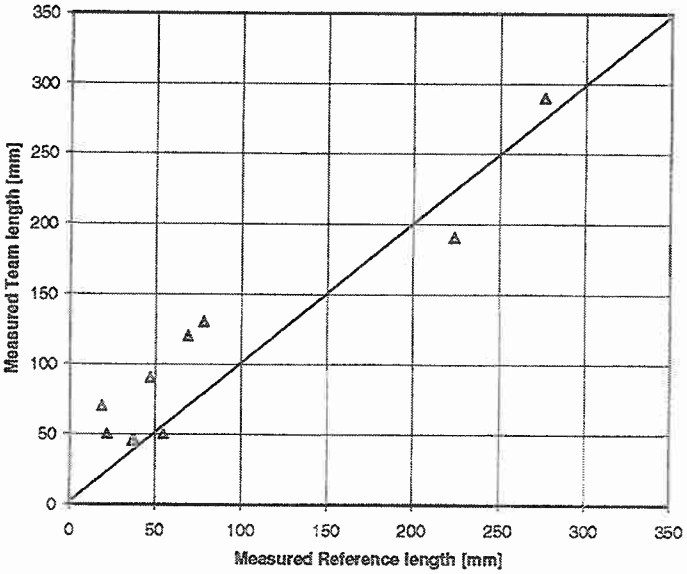
H13

Sizing performance in length for post test inspection team DD



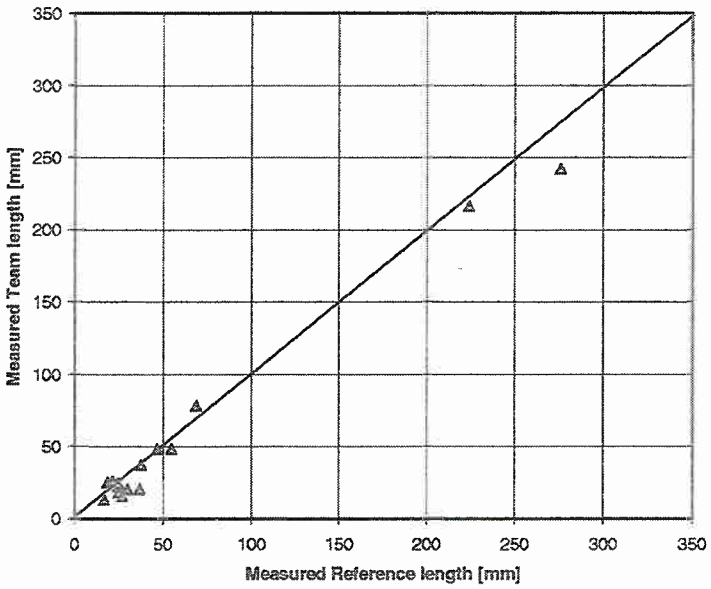
H14

Sizing performance in length for post test inspection team EE



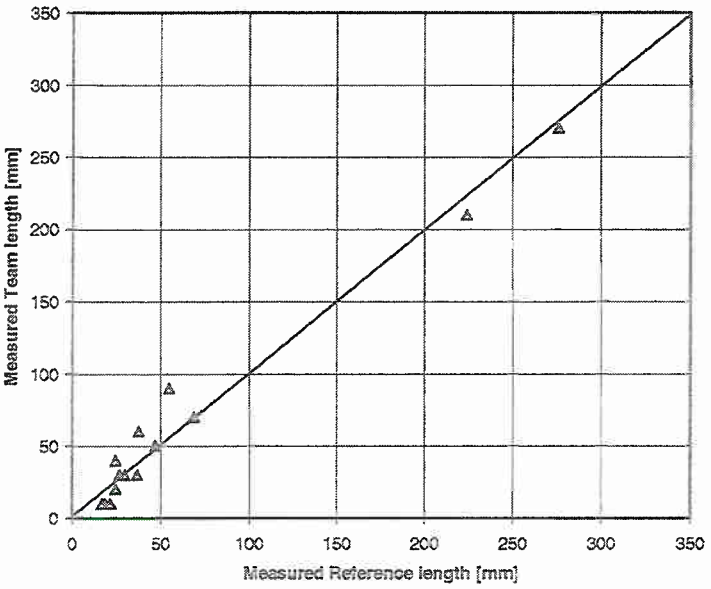
H15

Sizing performance in length for post test inspection team FF



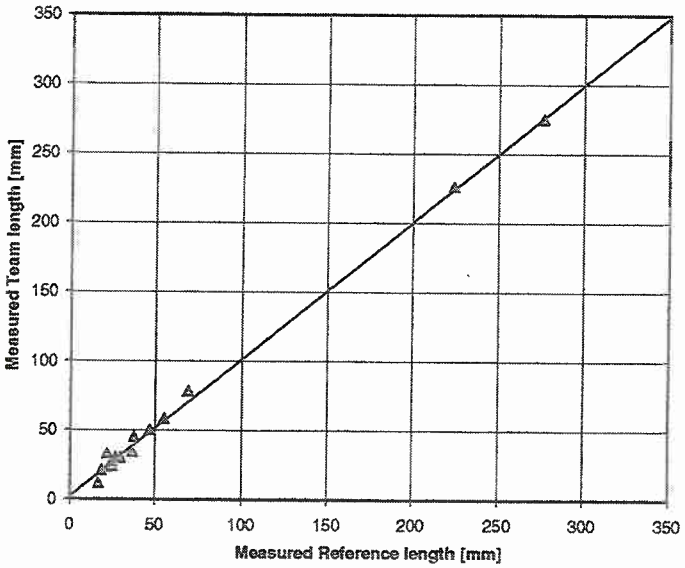
H16

Sizing performance in length for post test inspection team GG



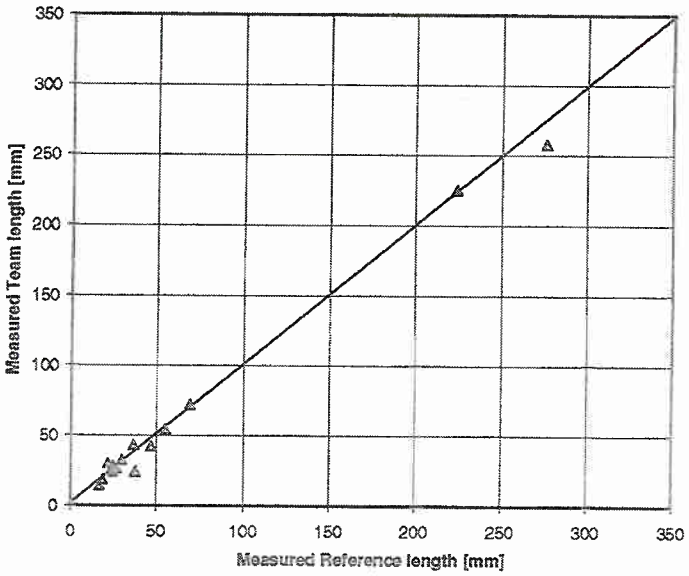
H17

Sizing performance in length for post test inspection team JJ



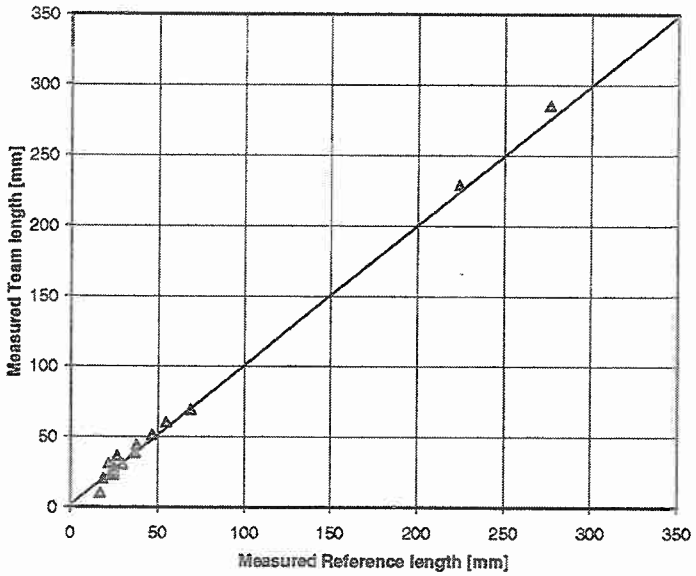
H18

Sizing performance in length for post test inspection team KK



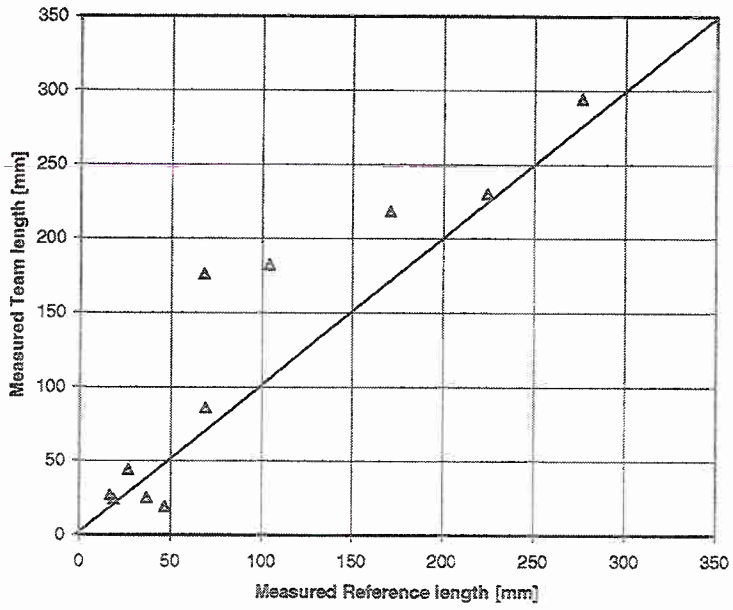
H19

Sizing performance in length for post test inspection team MM

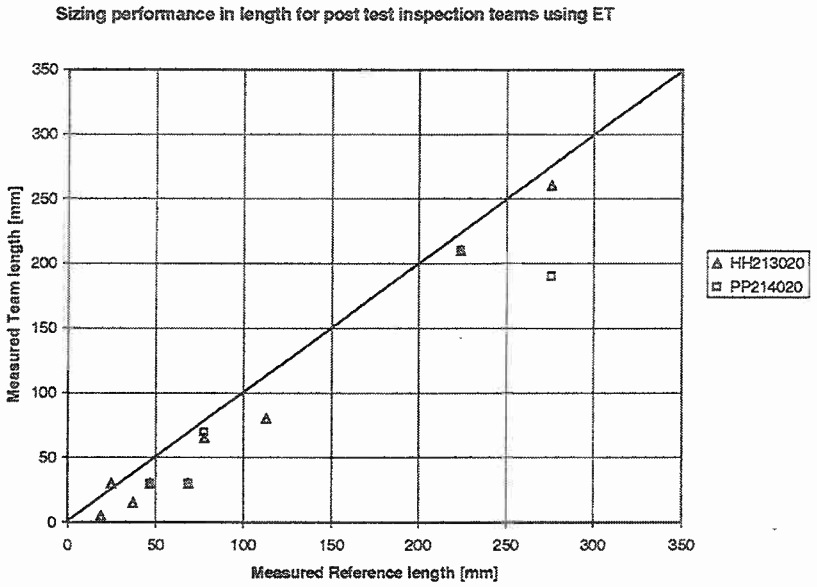


H20

Sizing performance in length for post test inspection team NN



H21

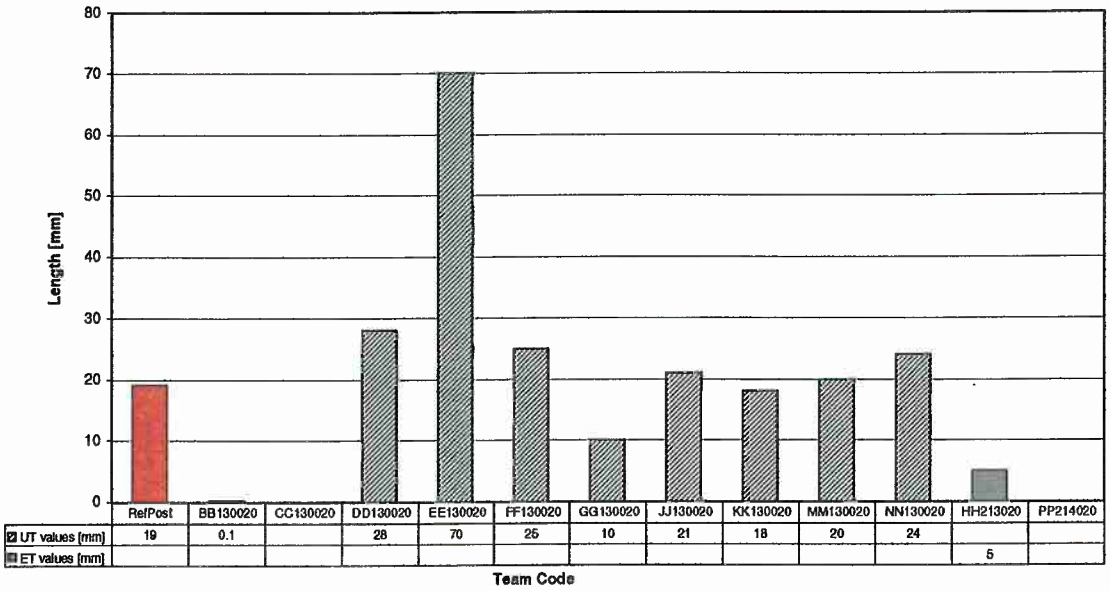

Sizing performance in length for post test inspection teams using ET
Measured Team length [mm]
Measured Reference length [mm]
0
50
100
150
200
250
300
350
HH213020
PP214020

H22

Appendix 12

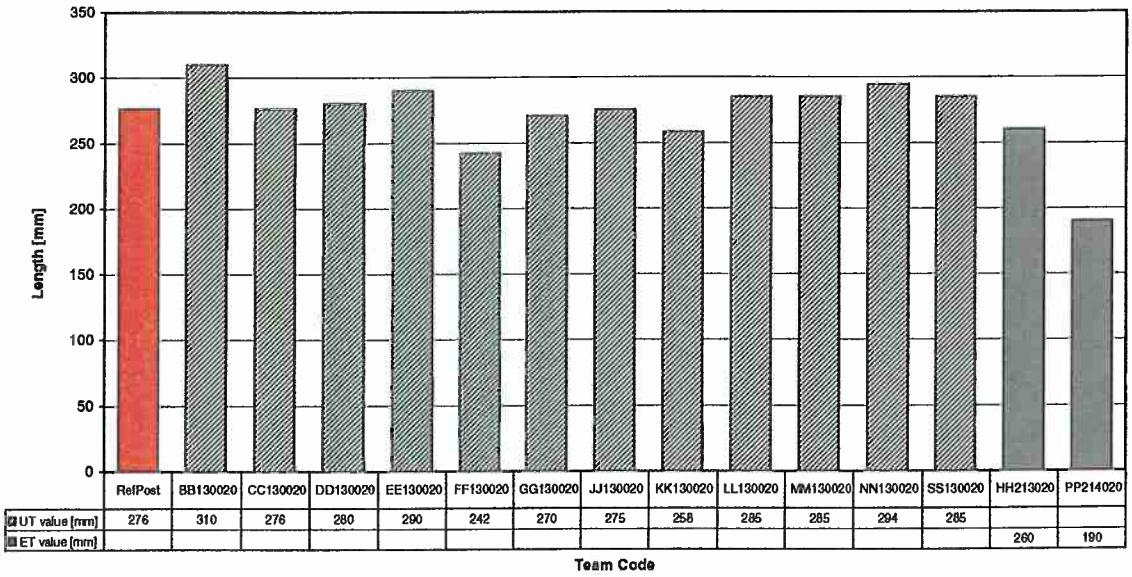
Length sizing for individual flaws for post test inspection teams.

Length sizing for all post test teams inspecting defect A
(PISC A defect, L = 19 mm, D = 5.5 mm)



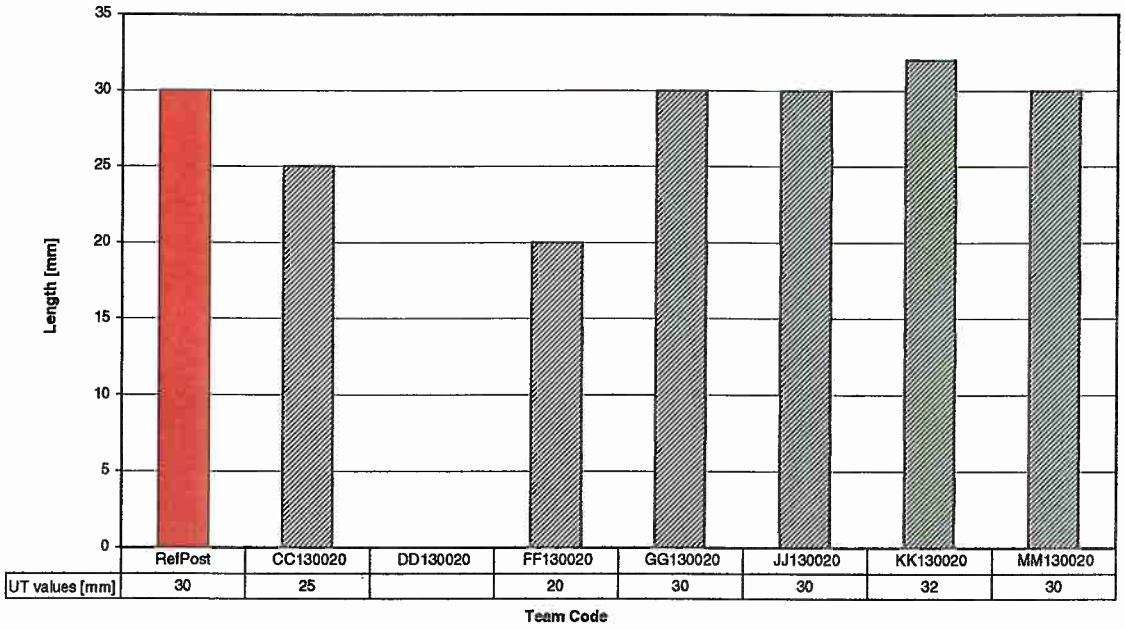
B18

Length sizing for all post test teams inspecting defect B
(Large underclad fatigue defect, L = 276 mm, D = 81.5 mm)



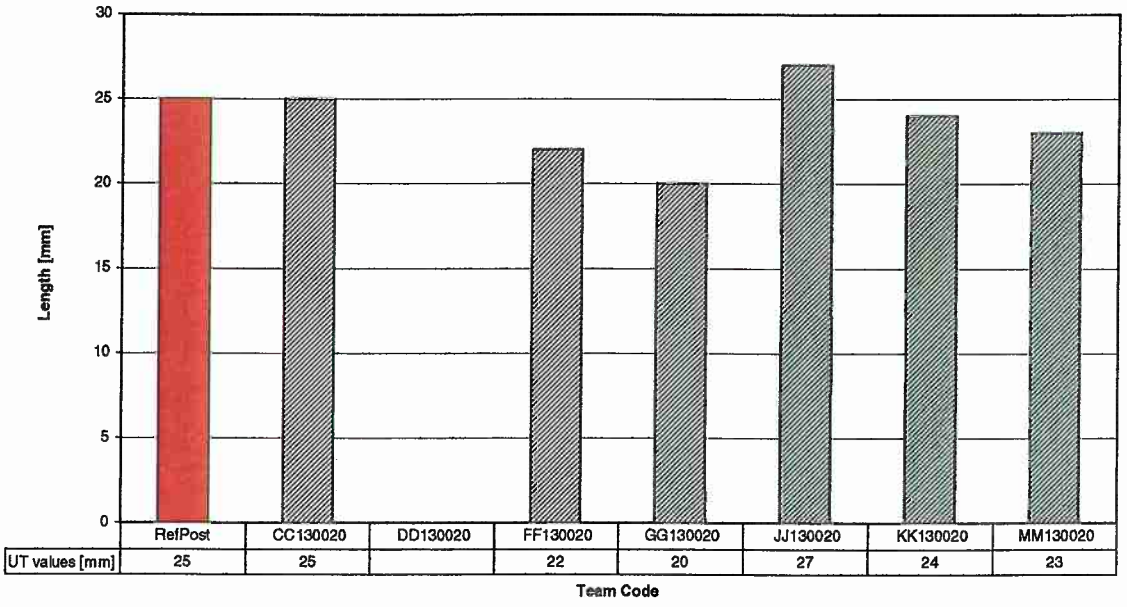
B19

Length sizing for all post test teams inspecting defect C
(local brittle zone L = 30 mm, D = 5.5 mm)



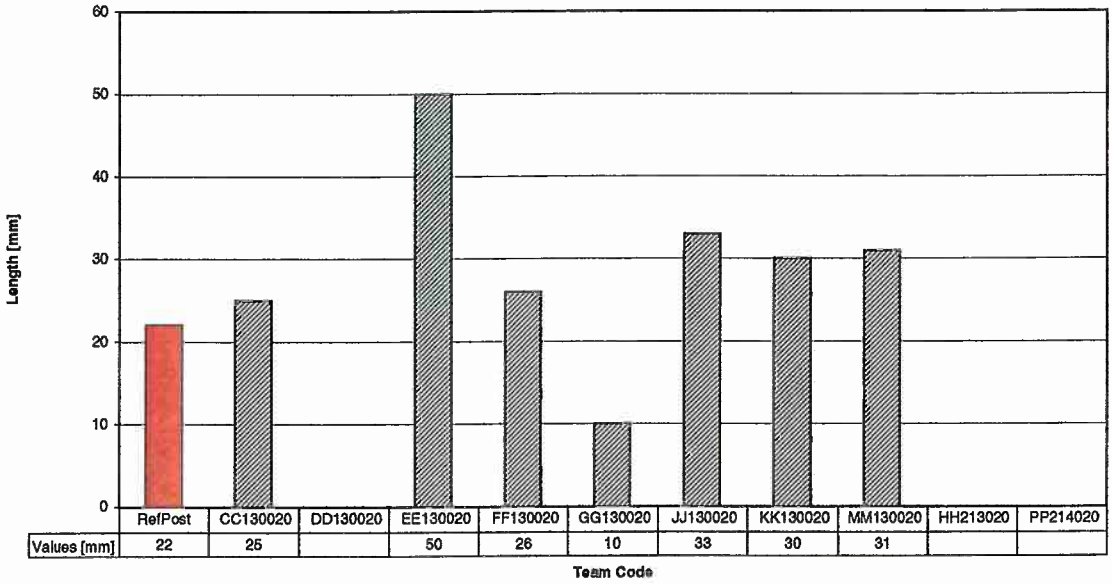
B20

Length sizing for all post test teams inspecting defect D
(local brittle zone, L = 25 mm, D = 7.5 mm)



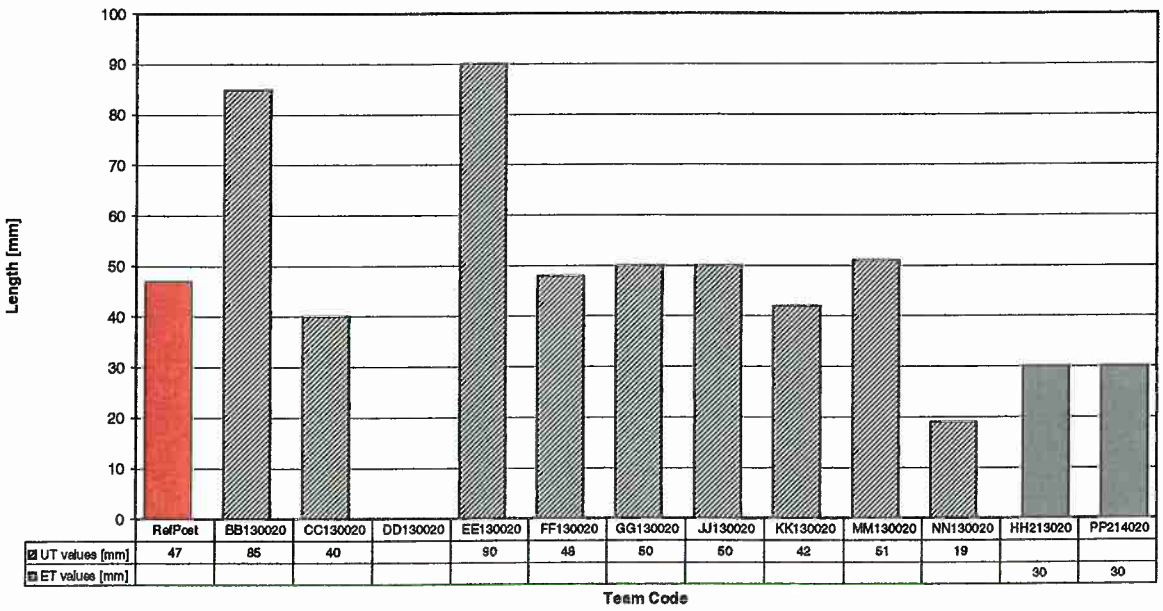
B21

Length sizing for all post test teams inspecting defect E
(local brittle zone, L = 22 mm, D = 6.5 mm)



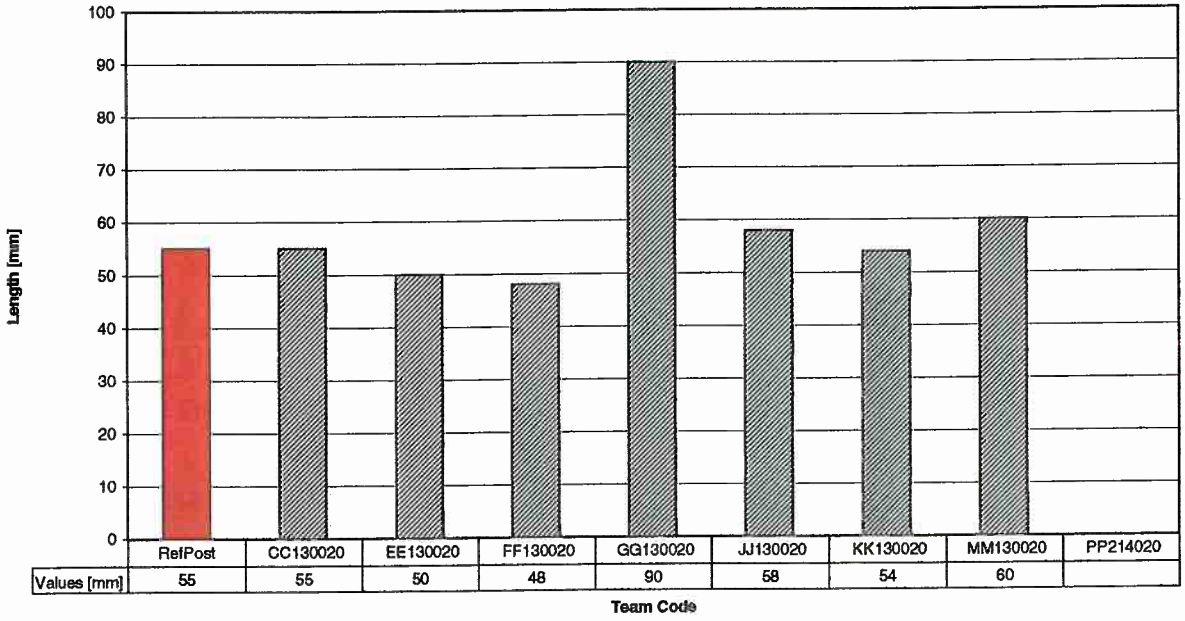
B22

Length sizing for all post test teams inspecting defect G
(PISC A defect, L = 47 mm, D = 13.5 mm)



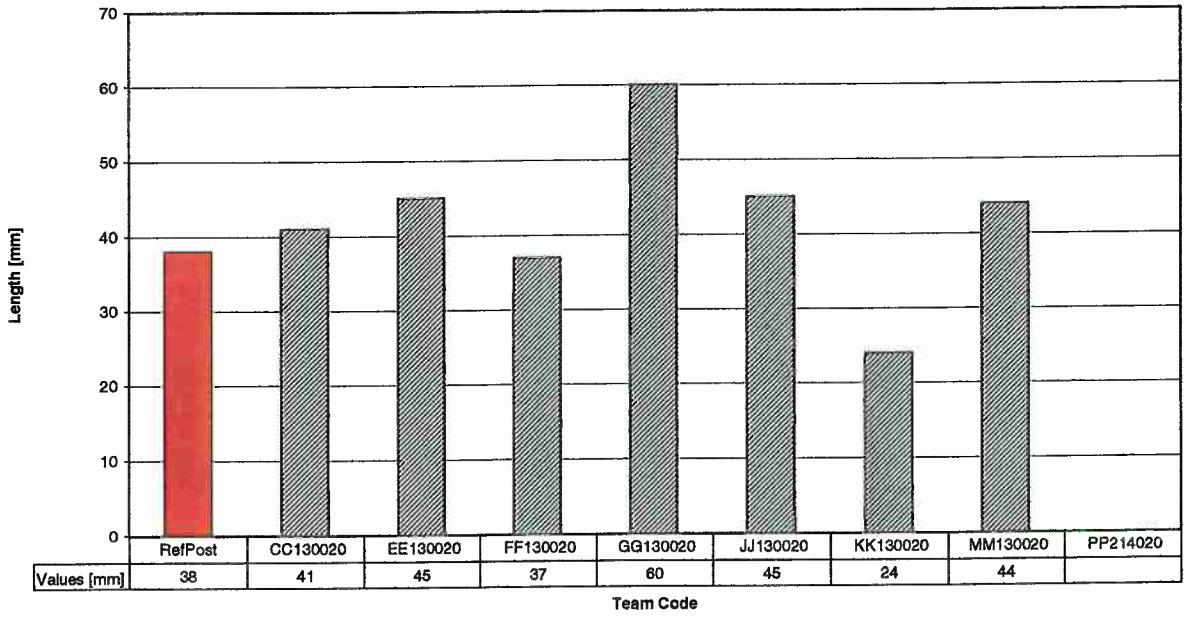
B24

Length sizing for all post test teams inspecting defect I
(cold cracking defect, L = 55 mm, D = 21.5 mm)



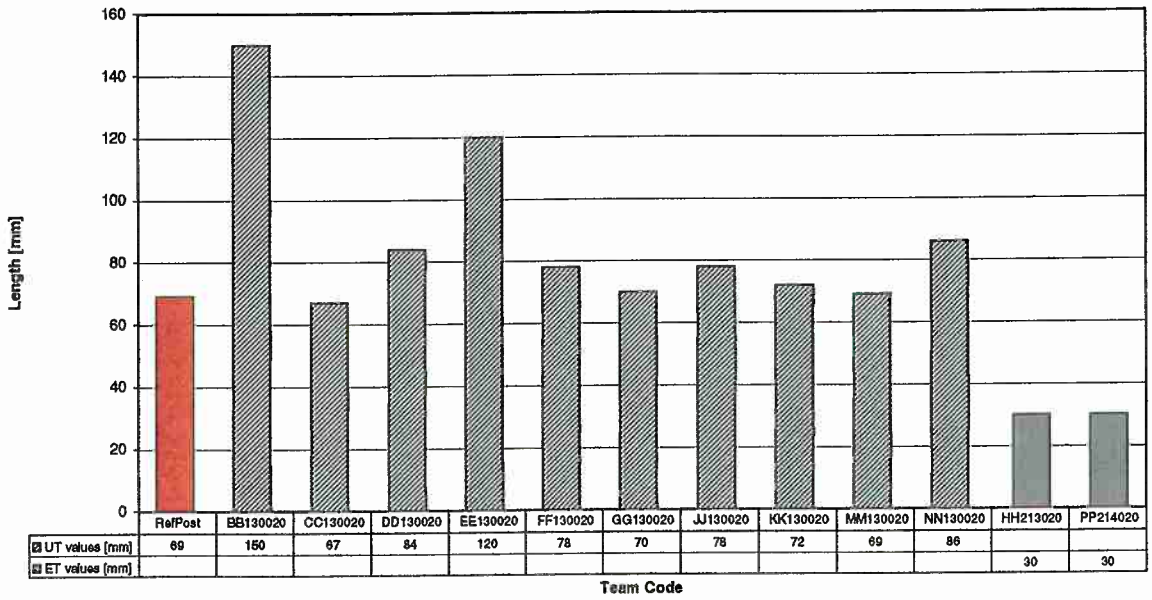
B26

Length sizing for all post test teams inspecting defect J
(cold cracking defect, L = 38 mm, D = 19.5 mm)



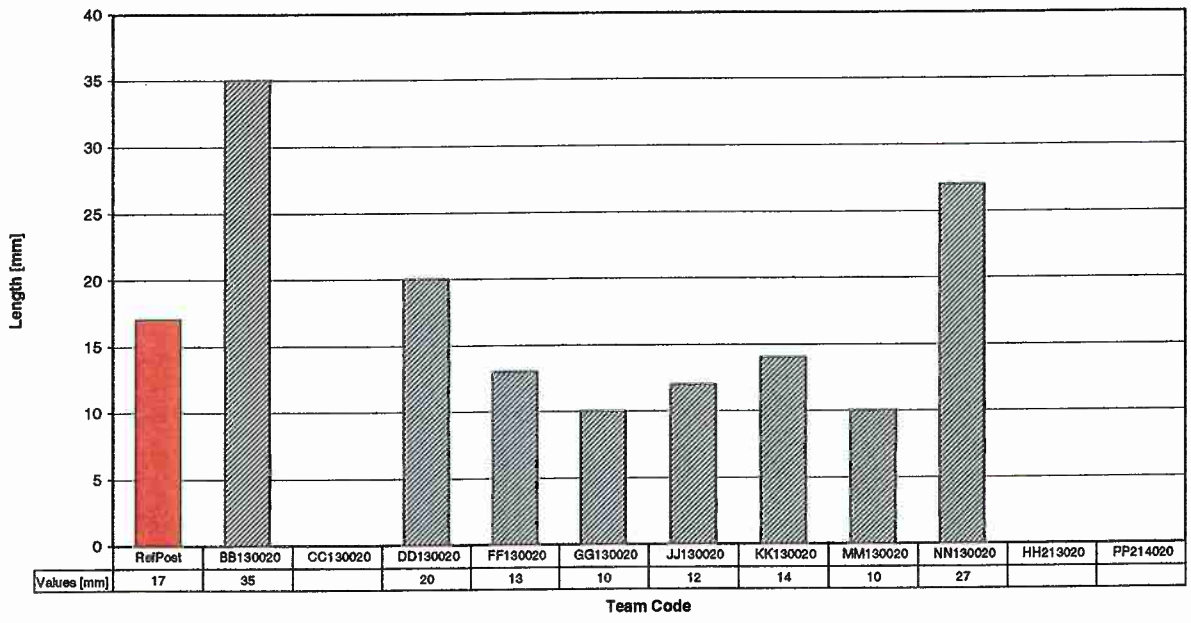
B27

Length sizing for all post test teams inspecting defect K
(PISC A defect, L = 69 mm, D = 25.5 mm)



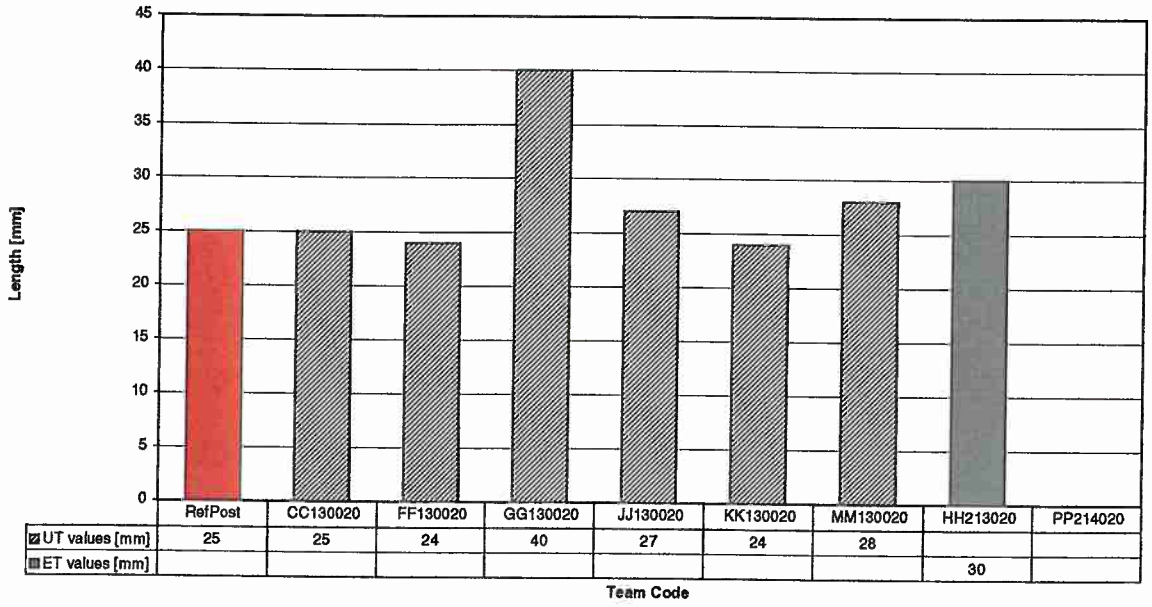
B28

Length sizing for all post test teams inspecting defect L
(PISC A defect, L = 17 mm, D = 2.5 mm)



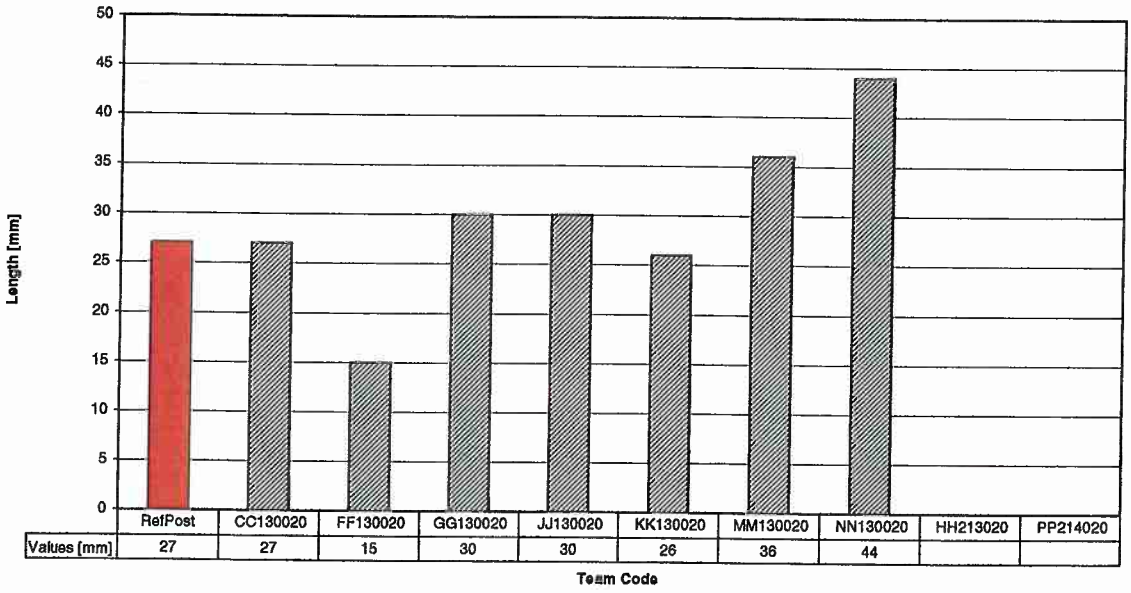
B29

Length sizing for all post test teams inspecting defect M
(local brittle zone, L = 25 mm, D = 3.5 mm)



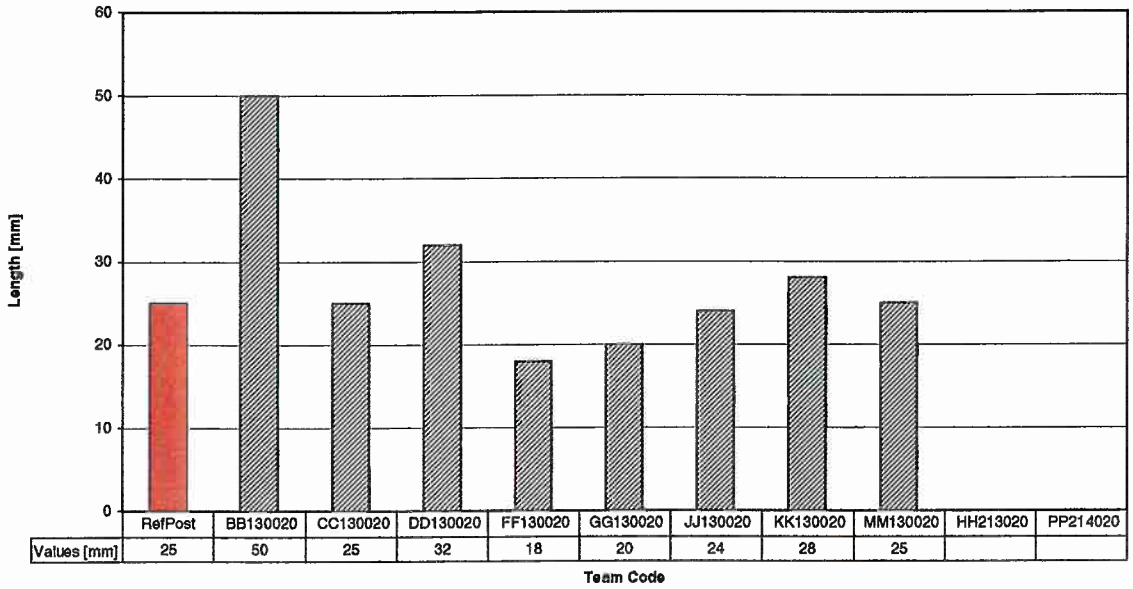
B30

Length sizing for all post test teams inspecting defect N
(local brittle zone, L = 27 mm, D = 4.5 mm)



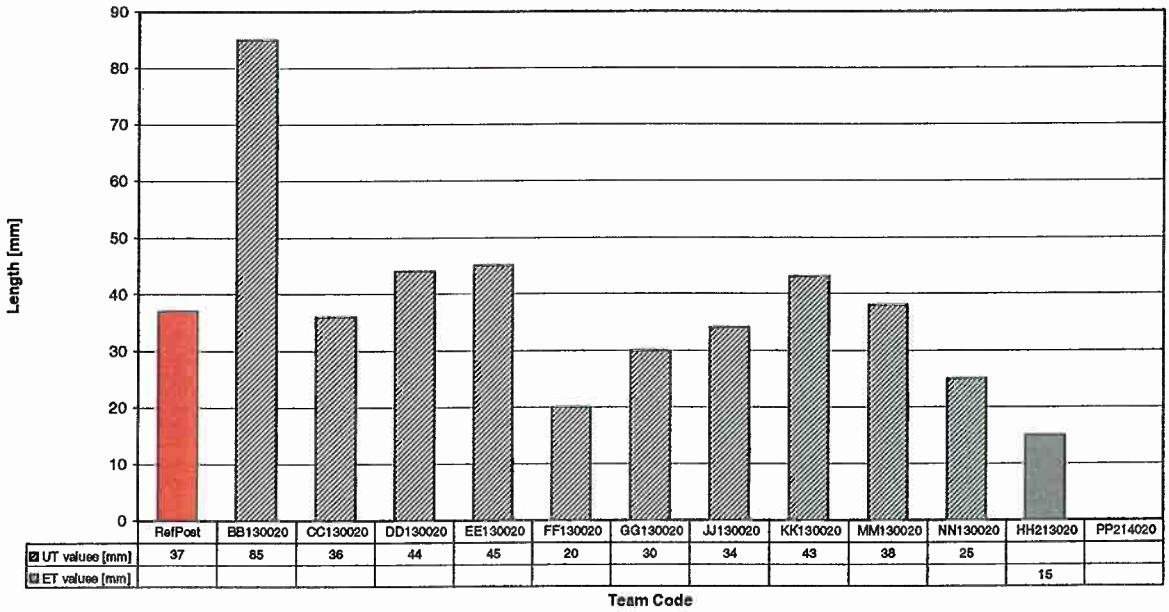
B31

Length sizing for all post test teams inspecting defect O
(local brittle zone, L = 25 mm, D = 5.5 mm)



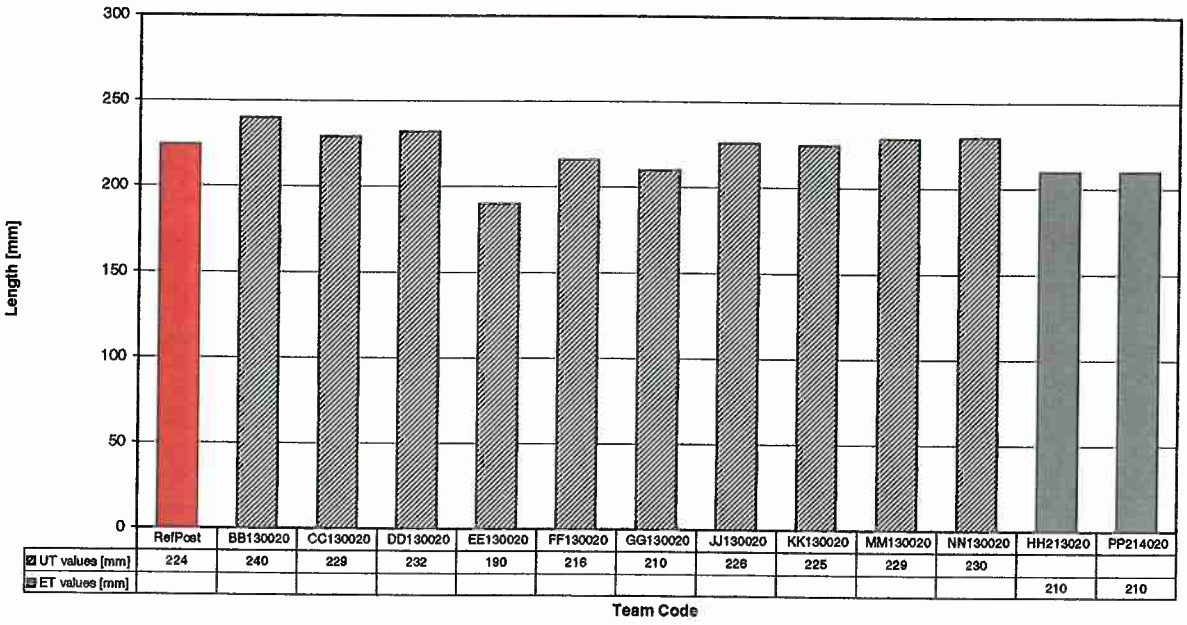
B32

Length sizing for all post test teams inspecting defect Q
(PISC A defect, L = 37 mm, D = 6.5 mm)



B34

Length sizing for all post test teams inspecting defect RL
(large fatigue sharpened PISC A defect, L = 224 mm, D = 74.5 mm)

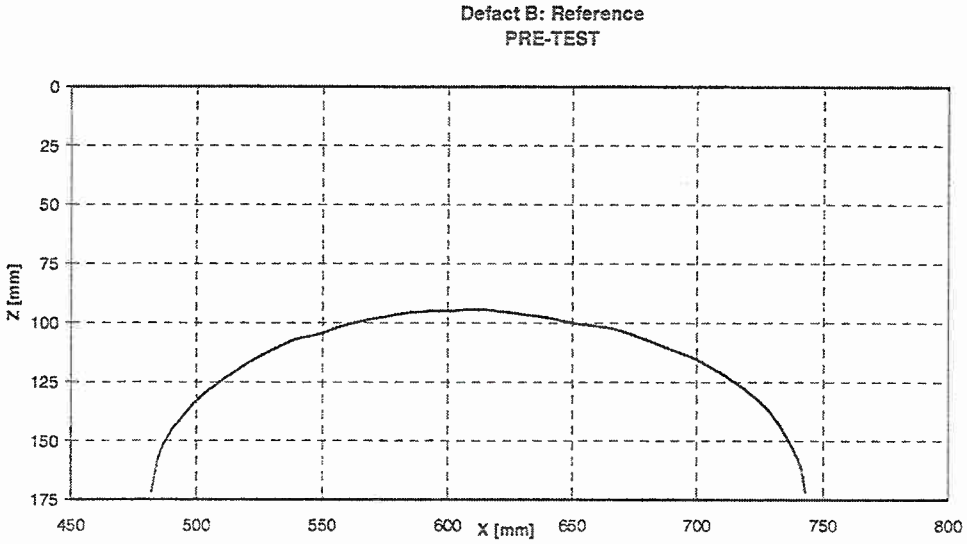


	RefPost	BB130020	CC130020	DD130020	EE130020	FF130020	GG130020	JJ130020	KK130020	MM130020	NN130020	HH213020	PP214020
UT values [mm]	224	240	229	232	190	216	210	226	225	229	230		
ET values [mm]												210	210

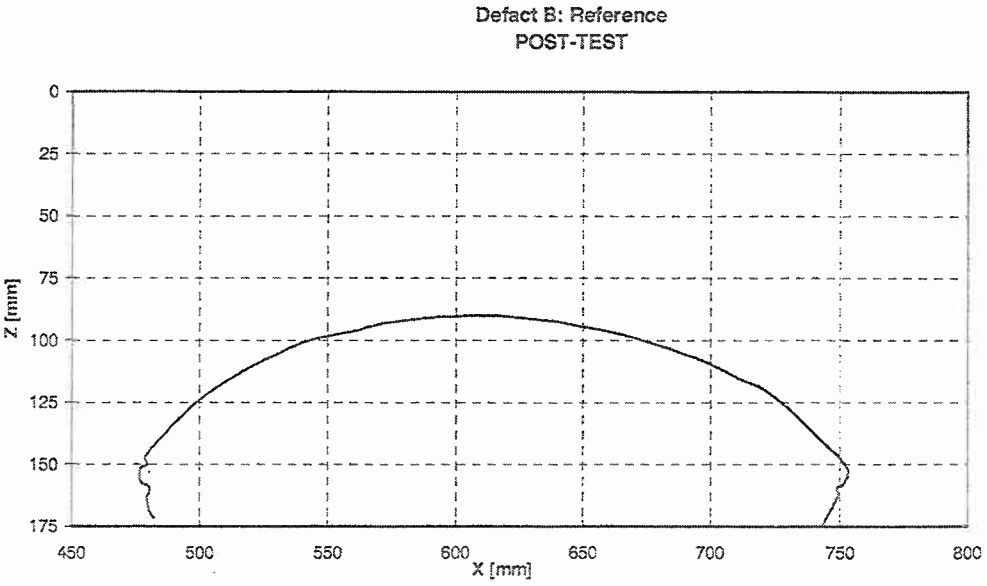
B35

Appendix 13

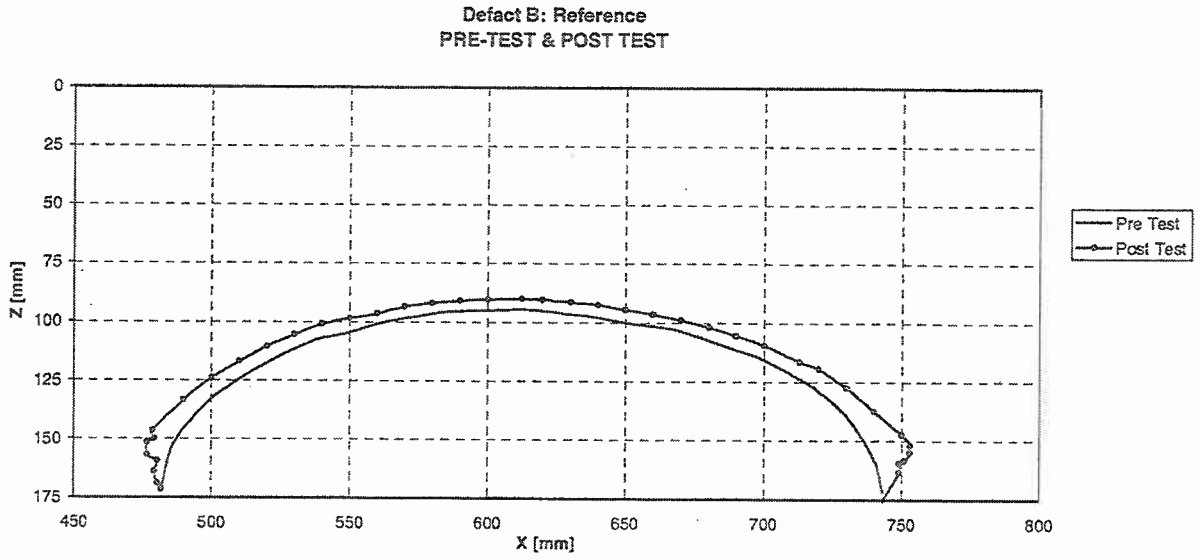
Profiles of defects B and RL for pre test and post test inspections as reported by the teams.


Defact B: Reference
PRE-TEST
Z [mm]
0
25
50
75
100
125
150
175
450
500
550
600
X [mm]
650
700
750
800

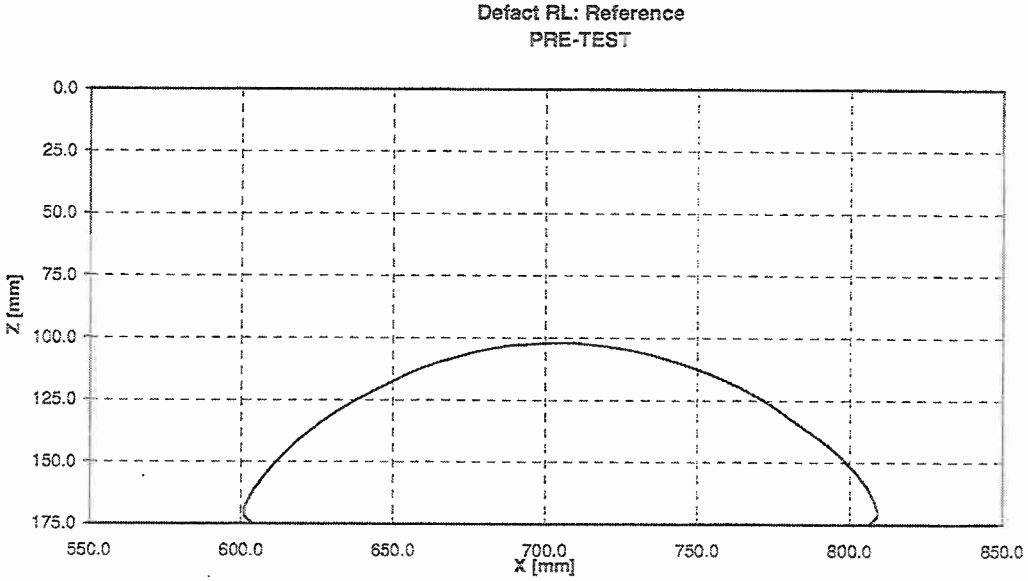
K1


Defact B: Reference
POST-TEST
Z [mm]
0
25
50
75
100
125
150
175
450
500
550
600
X [mm]
650
700
750
800

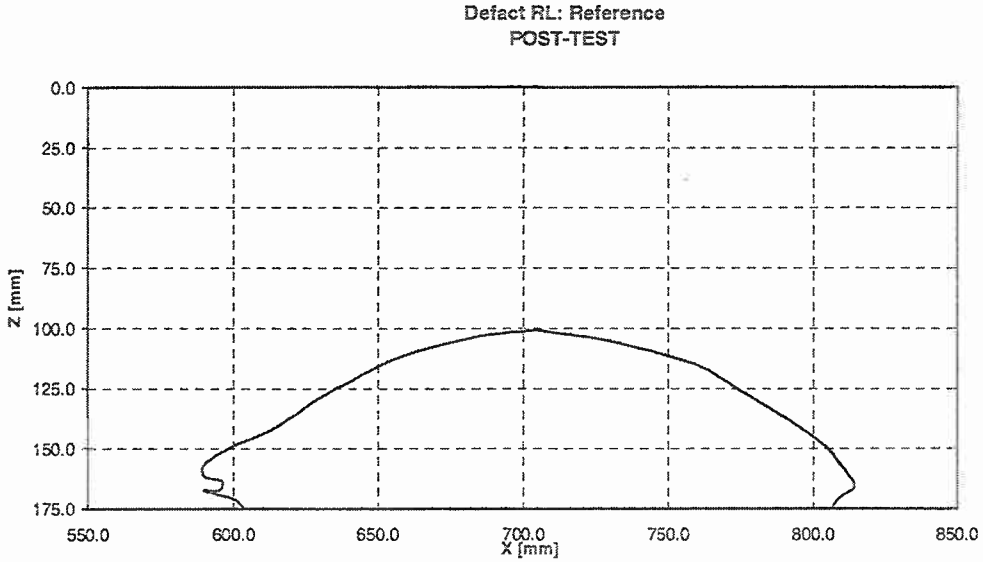
K2


Defact B: Reference
PRE-TEST & POST TEST
Z [mm]
X [mm]
Pre Test
Post Test

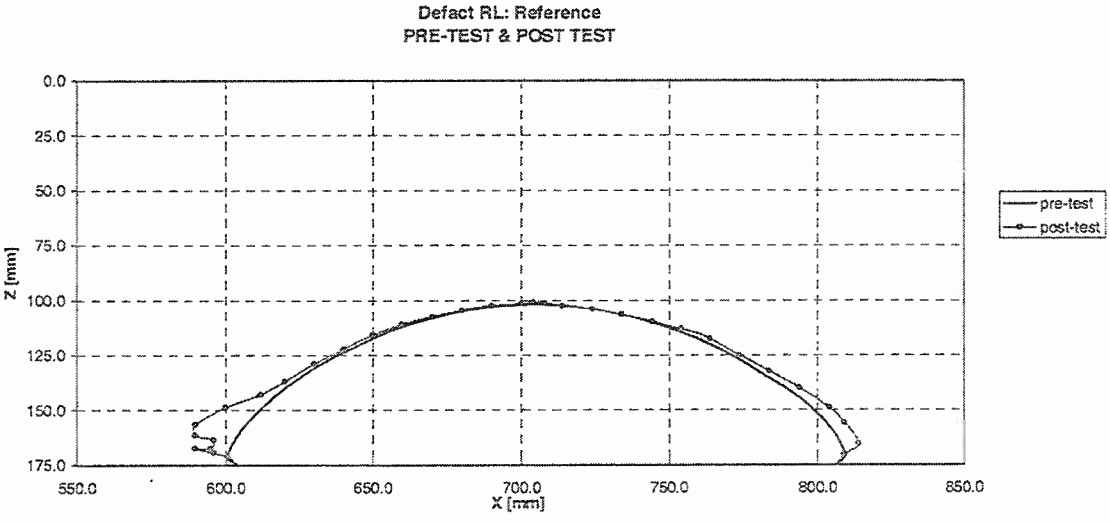
K3


Defact RL: Reference
PRE-TEST
Z [mm]
X [mm]

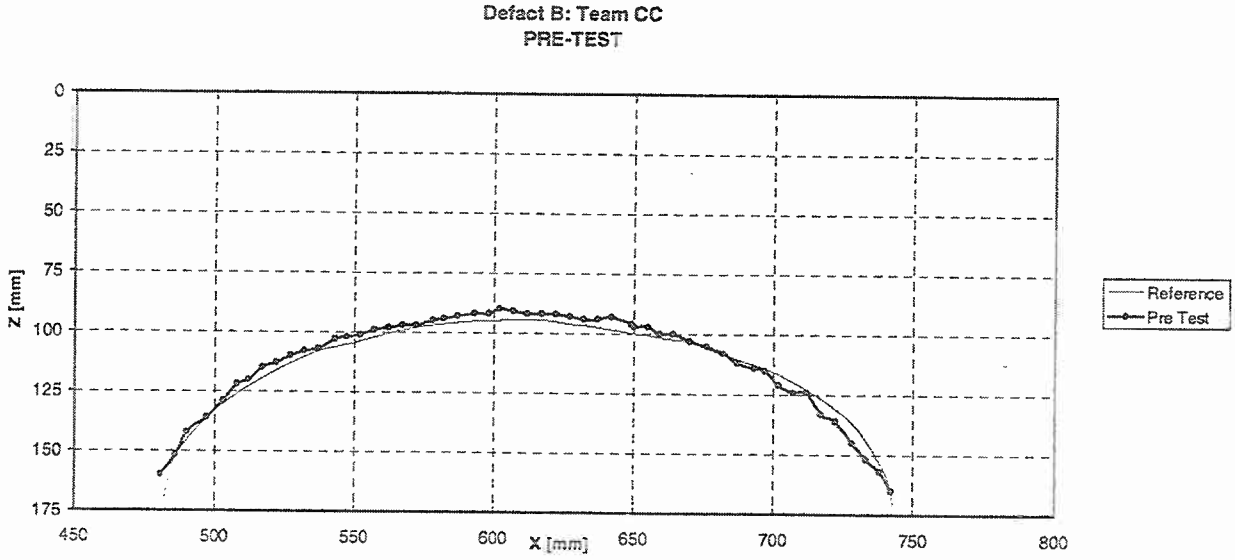
K4


Defact RL: Reference
POST-TEST
0.0
25.0
50.0
75.0
100.0
125.0
150.0
175.0
Z [mm]
550.0
600.0
650.0
700.0
750.0
800.0
850.0
X [mm]

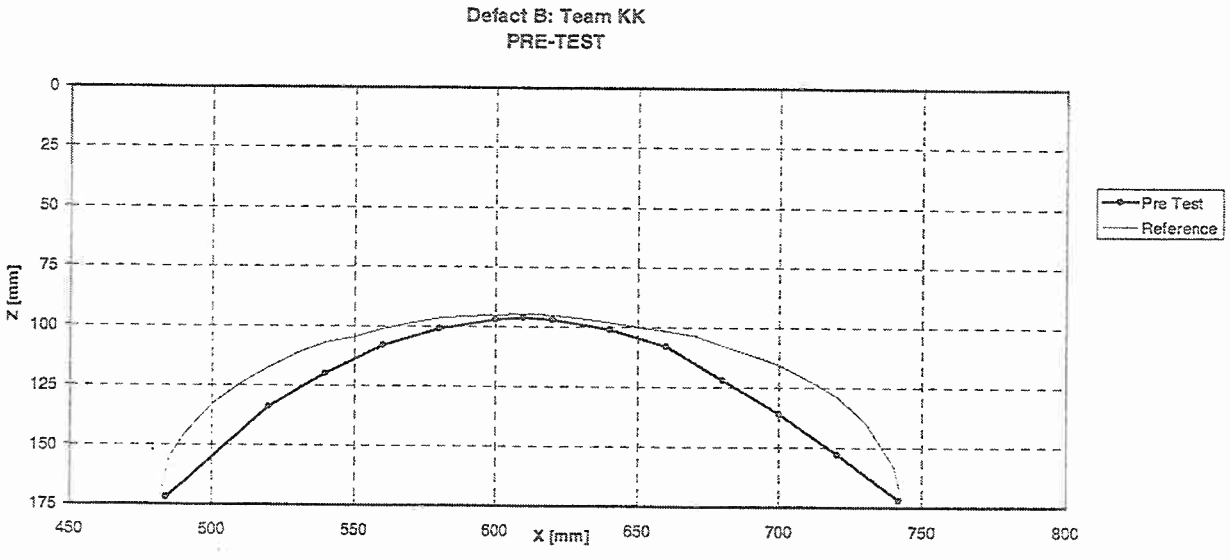
K5


Defact RL: Reference
PRE-TEST & POST TEST
0.0
25.0
50.0
75.0
100.0
125.0
150.0
175.0
Z [mm]
550.0
600.0
650.0
700.0
750.0
800.0
850.0
X [mm]
pre-test
post-test

K6


Defact B: Team CC
PRE-TEST
Z [mm]
X [mm]
0
25
50
75
100
125
150
175
450
500
550
600
650
700
750
800
Reference
Pre Test

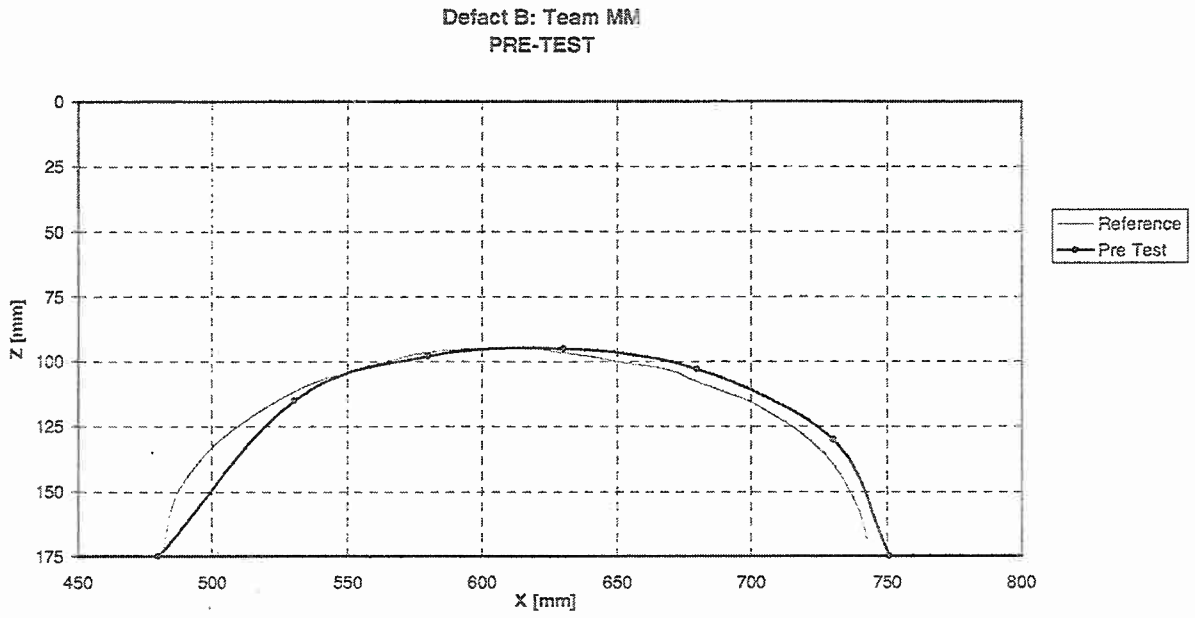
K7


Defact B: Team KK
PRE-TEST
Z [mm]
X [mm]
0
25
50
75
100
125
150
175
450
500
550
600
650
700
750
800
Pre Test
Reference

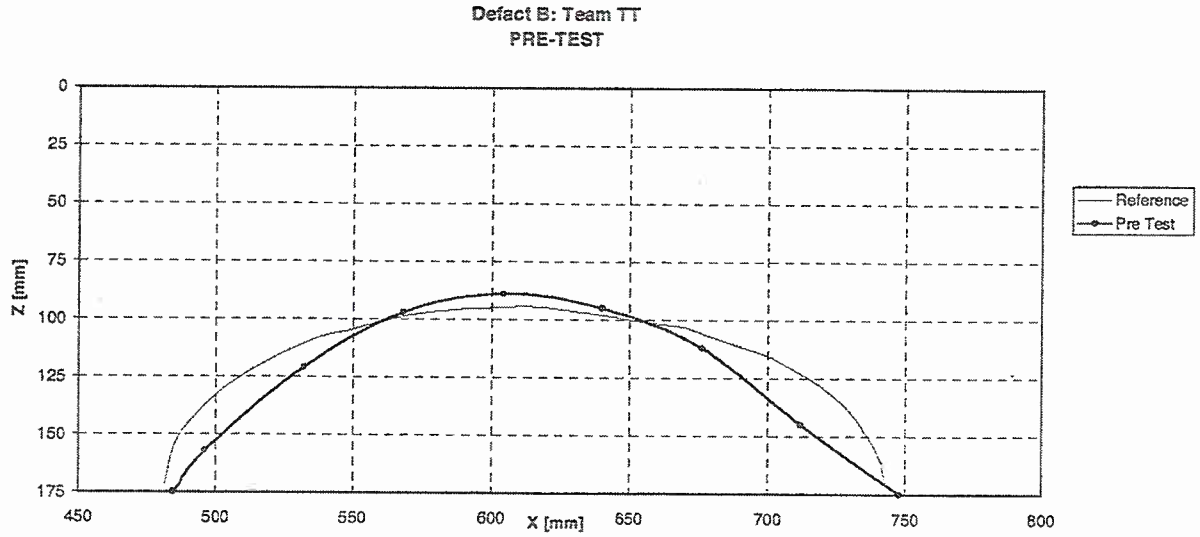
K8


Defact B: Team NN
PRE-TEST
Z [mm]
X [mm]
0
25
50
75
100
125
150
175
450
500
550
600
650
700
750
800
Reference
Pre Test

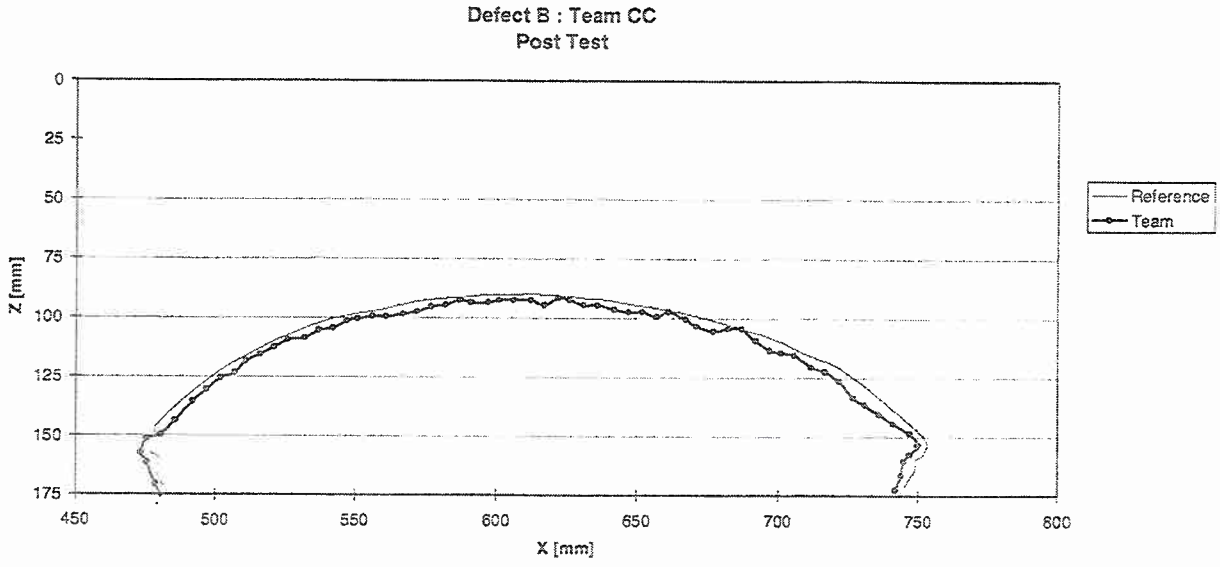
K9


Defact B: Team MM
PRE-TEST
Z [mm]
X [mm]
0
25
50
75
100
125
150
175
450
500
550
600
650
700
750
800
Reference
Pre Test

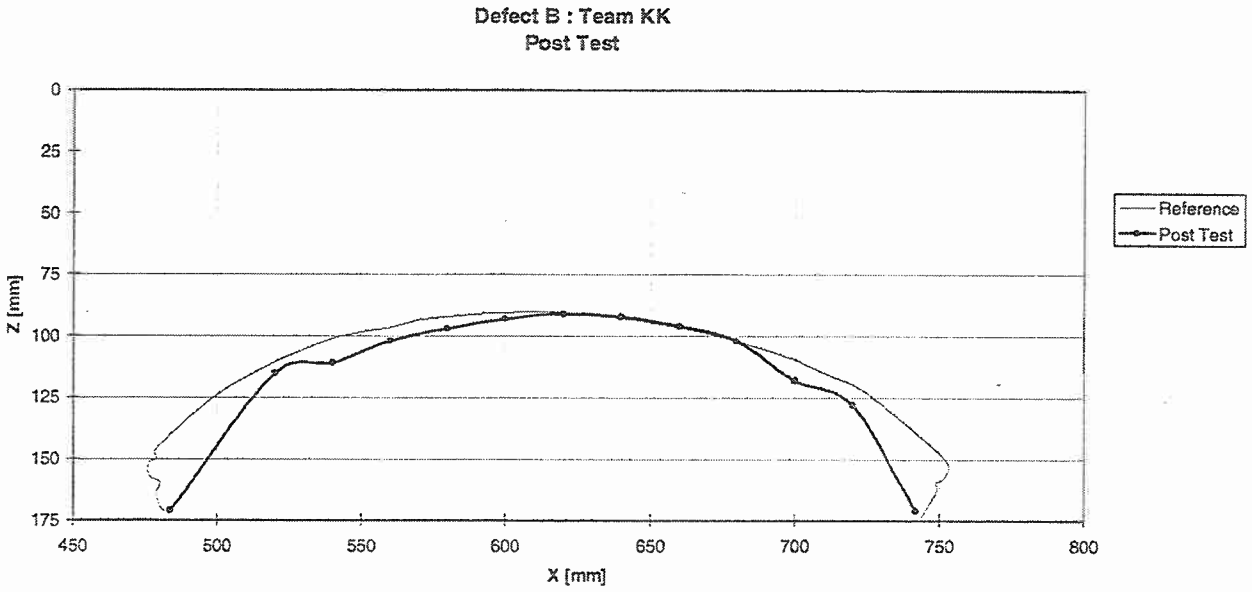
K10


Defact B: Team TT
PRE-TEST
Z [mm]
X [mm]
Reference
Pre Test

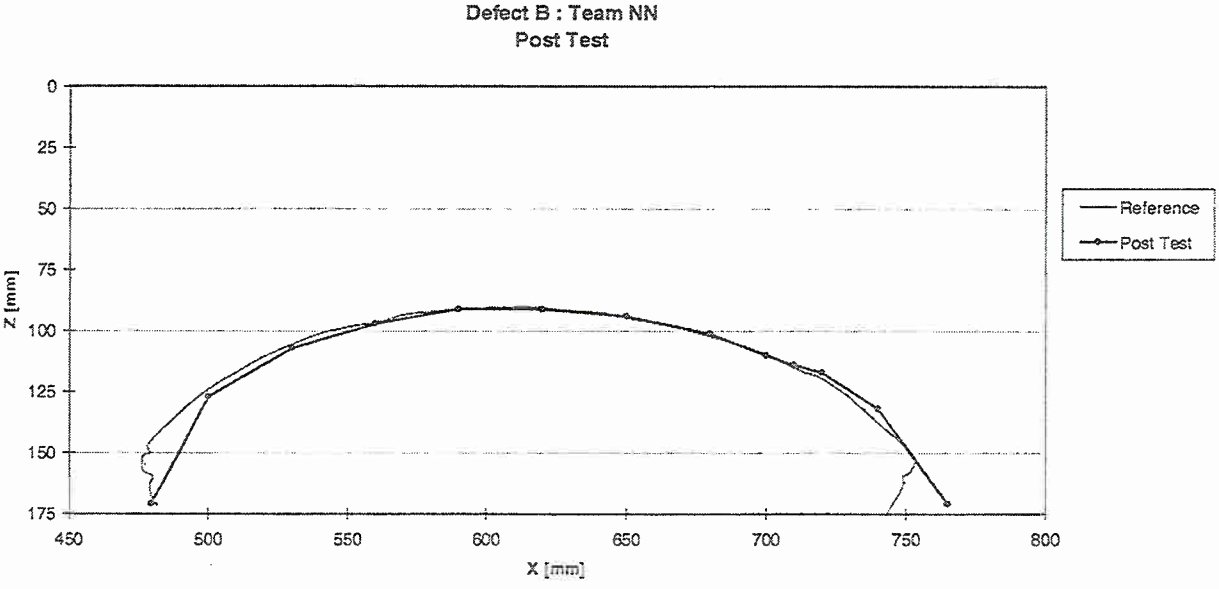
K11


Defect B : Team CC
Post Test
Z [mm]
X [mm]
Reference
Team

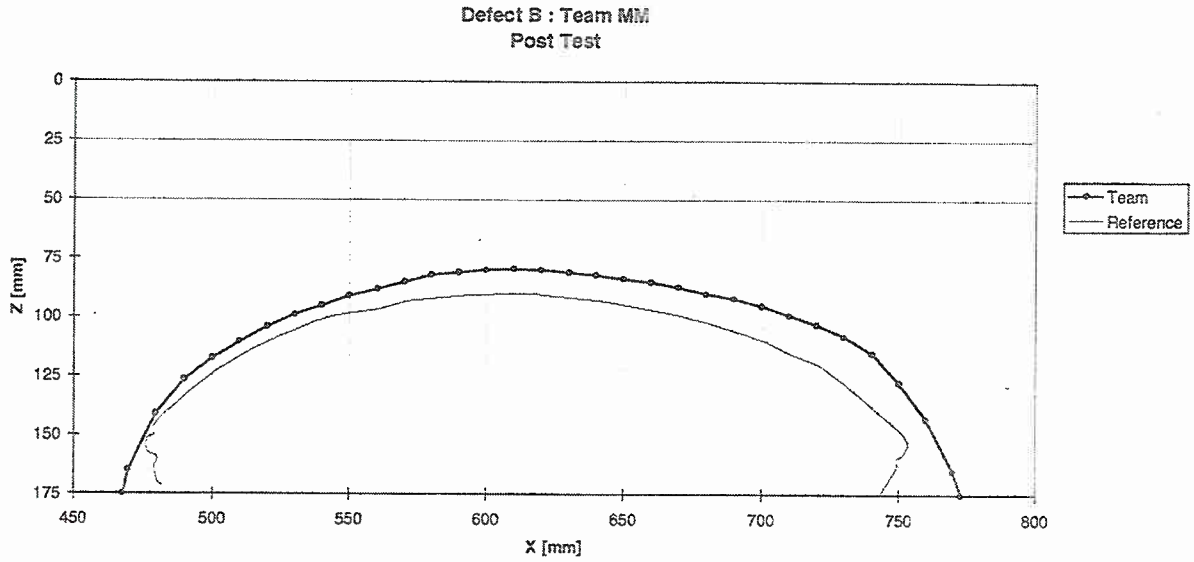
K12


Defect B : Team KK
Post Test
Z [mm]
X [mm]
Reference
Post Test
0
25
50
75
100
125
150
175
450
500
550
600
650
700
750
800

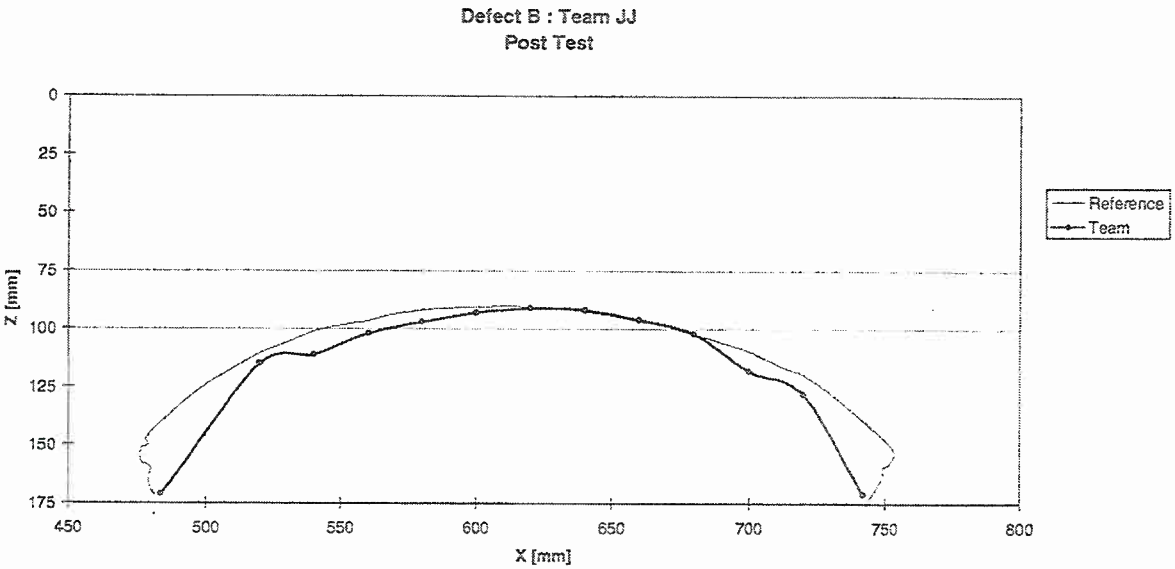
K13


Defect B : Team NN
Post Test
Z [mm]
X [mm]
Reference
Post Test
0
25
50
75
100
125
150
175
450
500
550
600
650
700
750
800

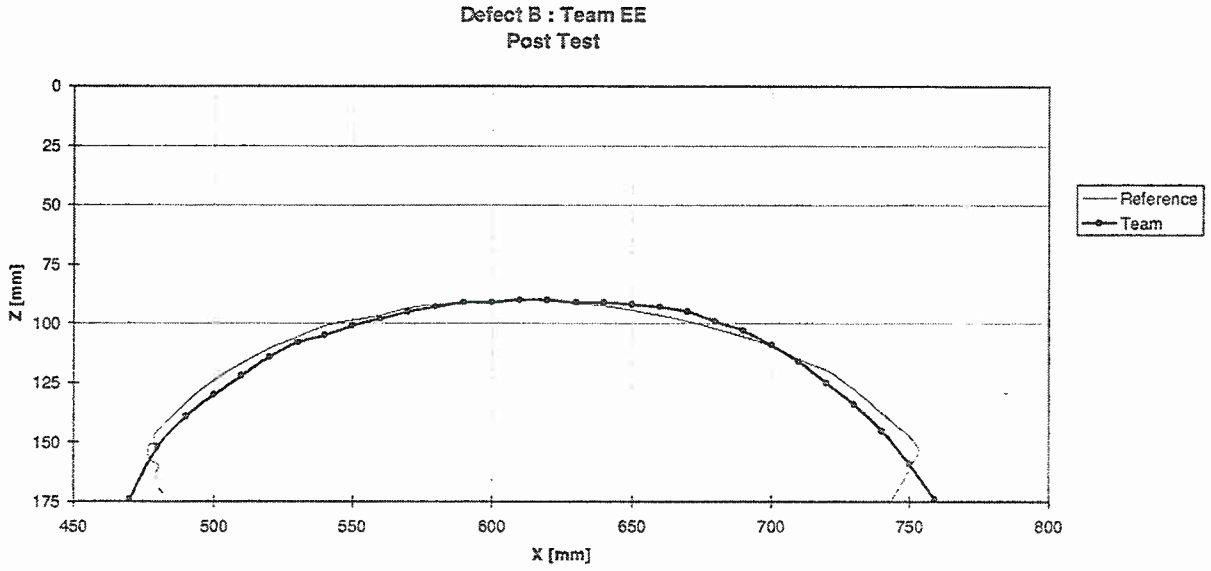
K14


Defect B : Team MM
Post Test
Z [mm]
X [mm]
Team
Reference

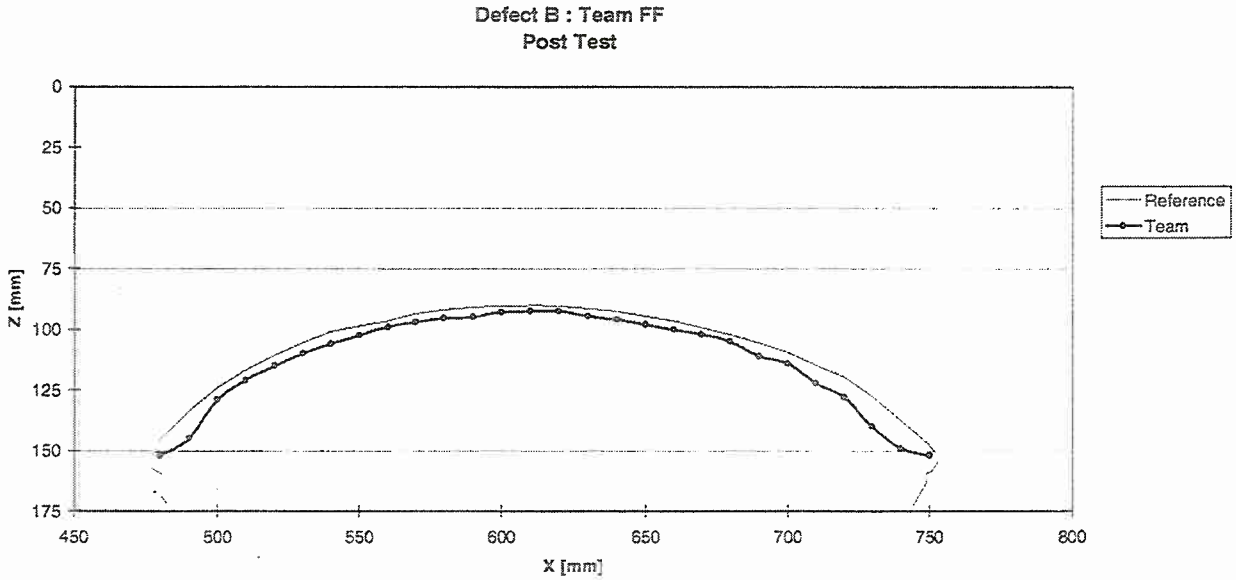
K15


Defect B : Team JJ
Post Test
Z [mm]
X [mm]
Reference
Team

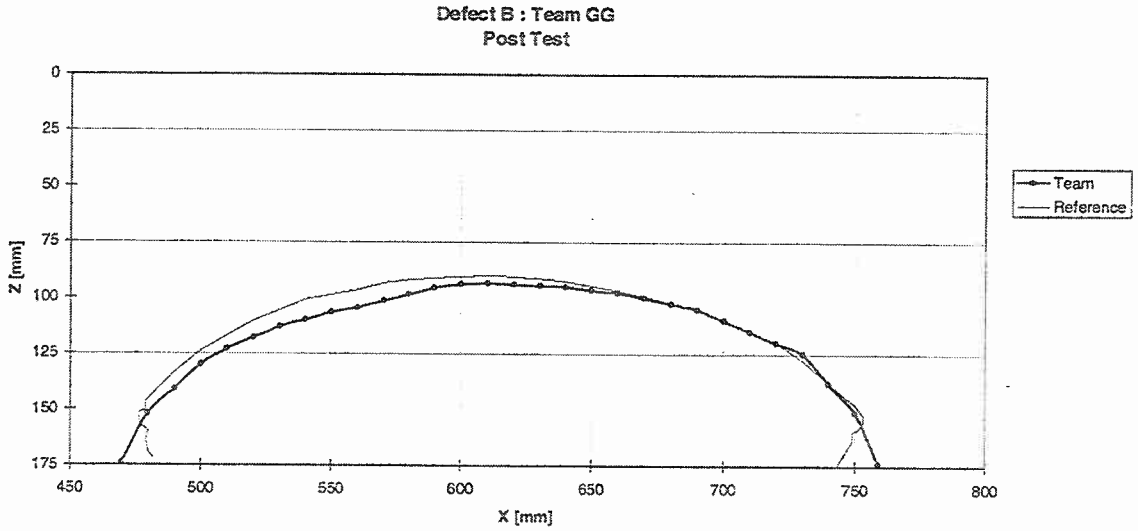
K16


Defect B : Team EE
Post Test
Z [mm]
X [mm]
Reference
Team
0
25
50
75
100
125
150
175
450
500
550
600
650
700
750
800

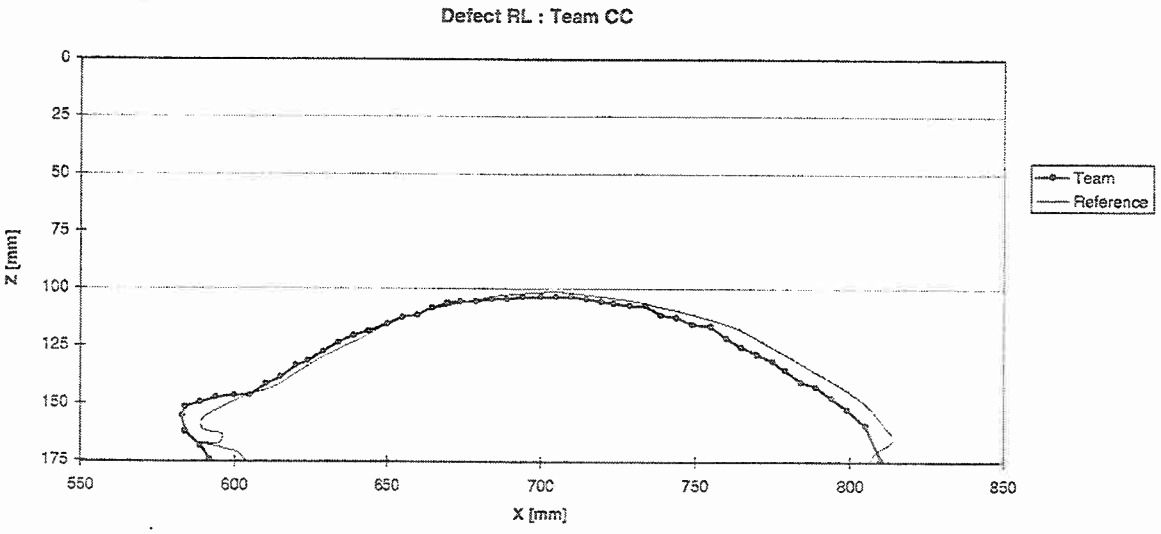
K17


Defect B : Team FF
Post Test
Z [mm]
X [mm]
Reference
Team
0
25
50
75
100
125
150
175
450
500
550
600
650
700
750
800

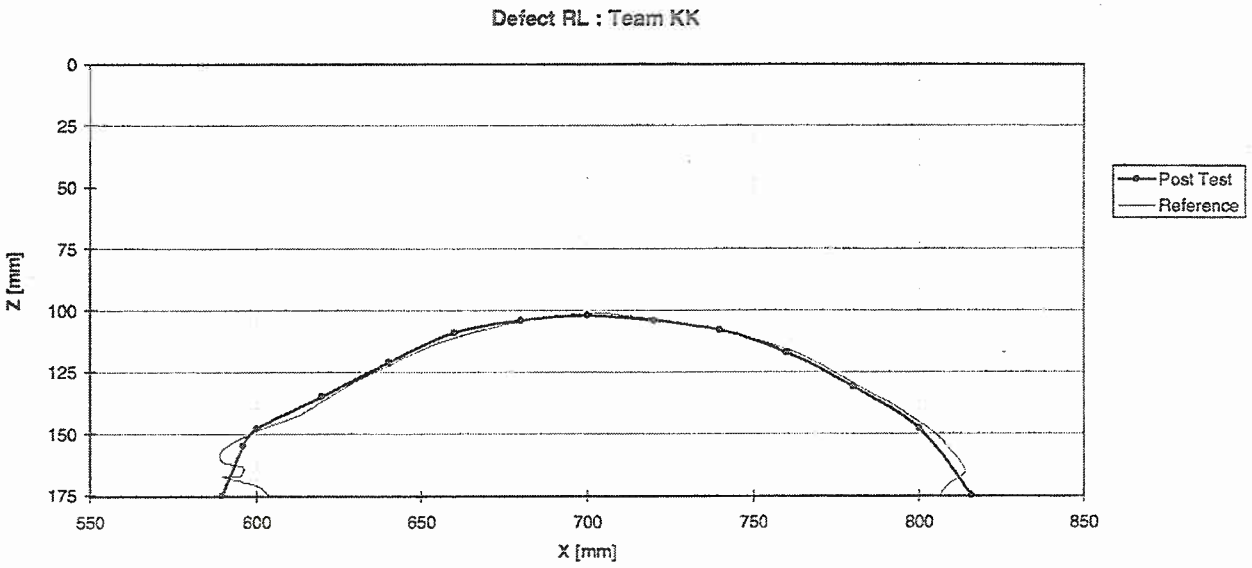
K18


Defect B : Team GG
Post Test
Z [mm]
X [mm]
Team
Reference

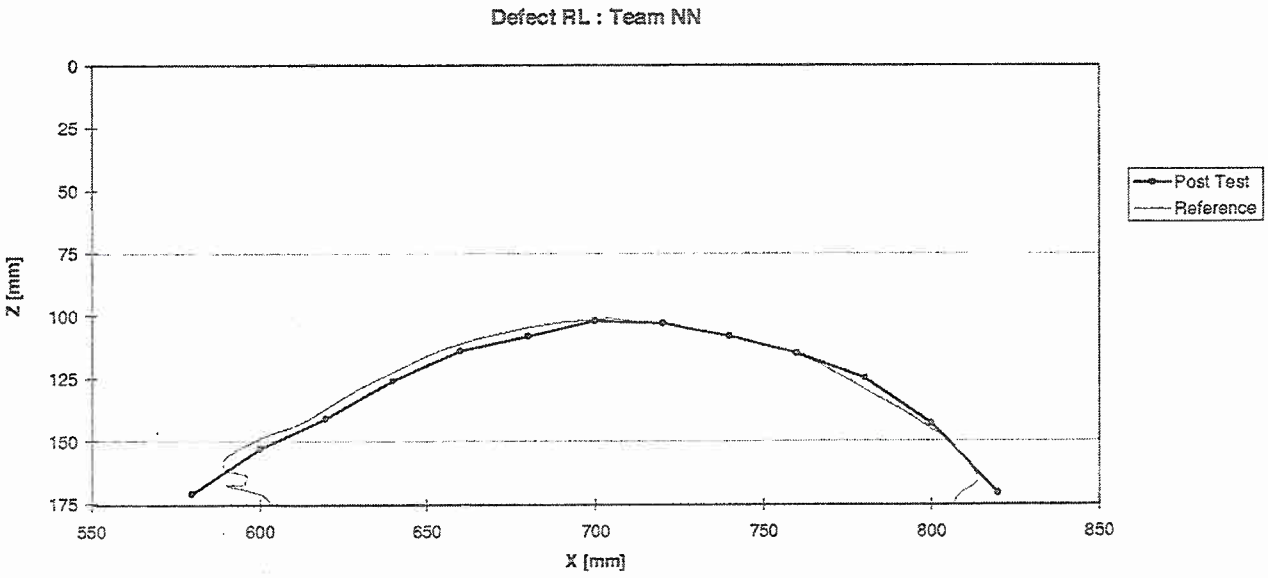
K19


Defect RL : Team CC
Z [mm]
X [mm]
Team
Reference

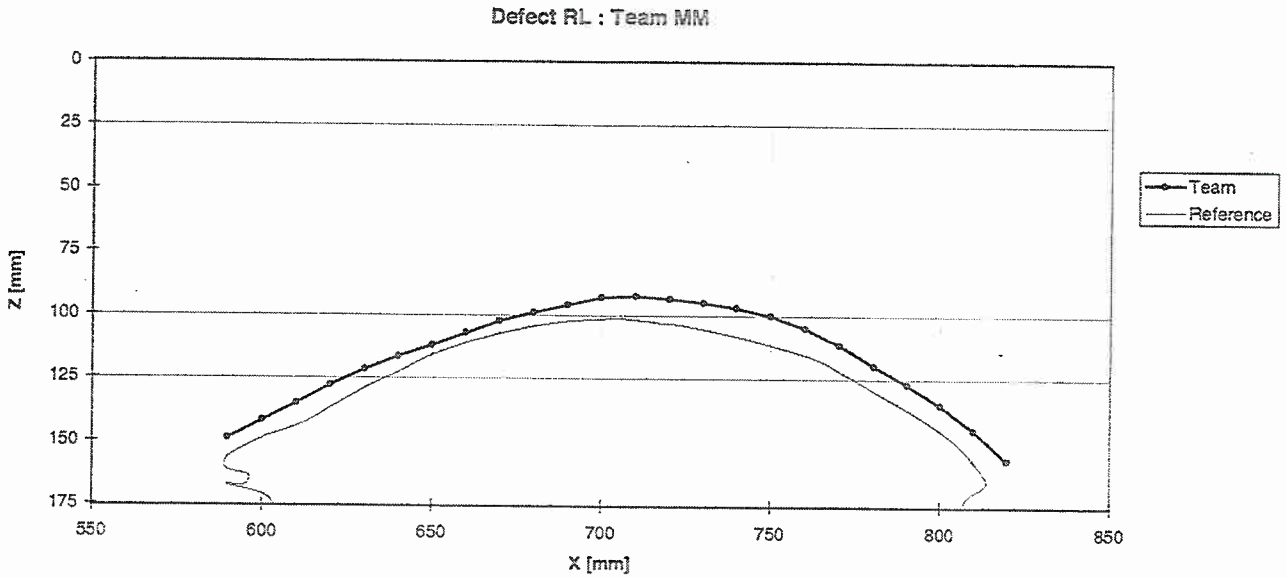
K20


Defect RL : Team KK
0
25
50
75
100
125
150
175
Z [mm]
550
600
650
700
750
800
850
X [mm]
Post Test
Reference

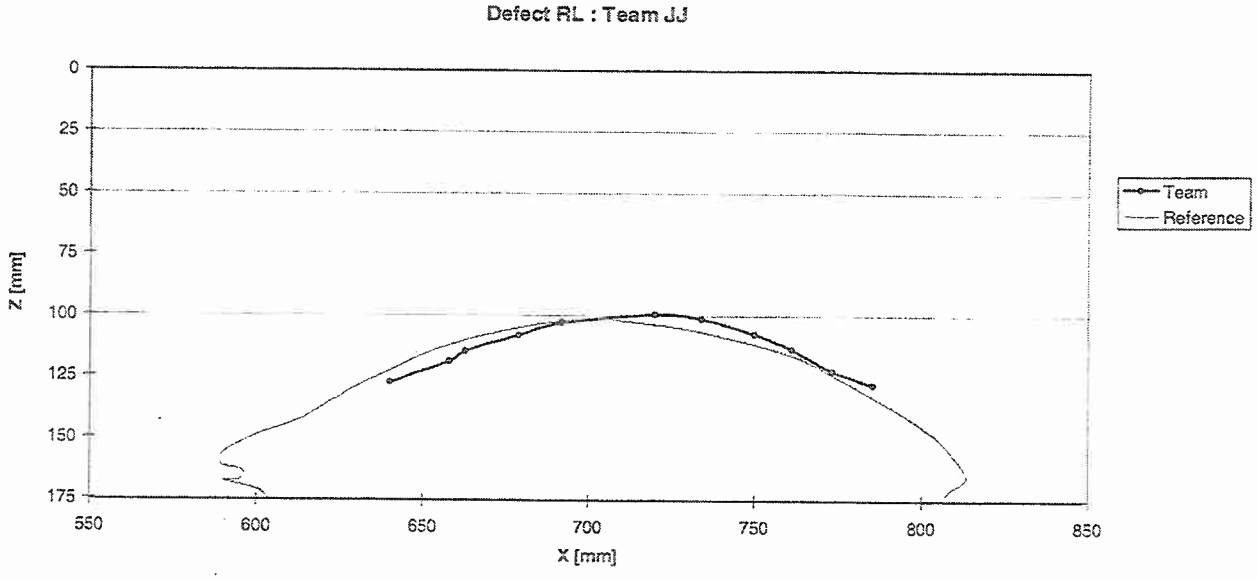
K21


Defect RL : Team NN
0
25
50
75
100
125
150
175
Z [mm]
550
600
650
700
750
800
850
X [mm]
Post Test
Reference

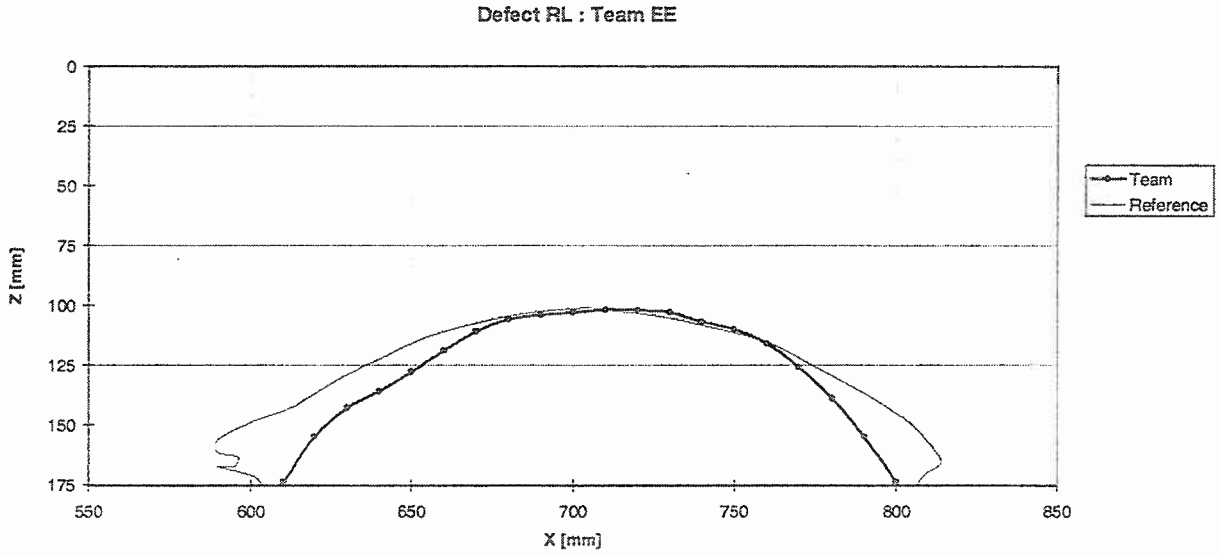
K22


Defect RL : Team MM
0
25
50
75
100
125
150
175
Z [mm]
550
600
650
700
750
800
850
X [mm]
Team
Reference

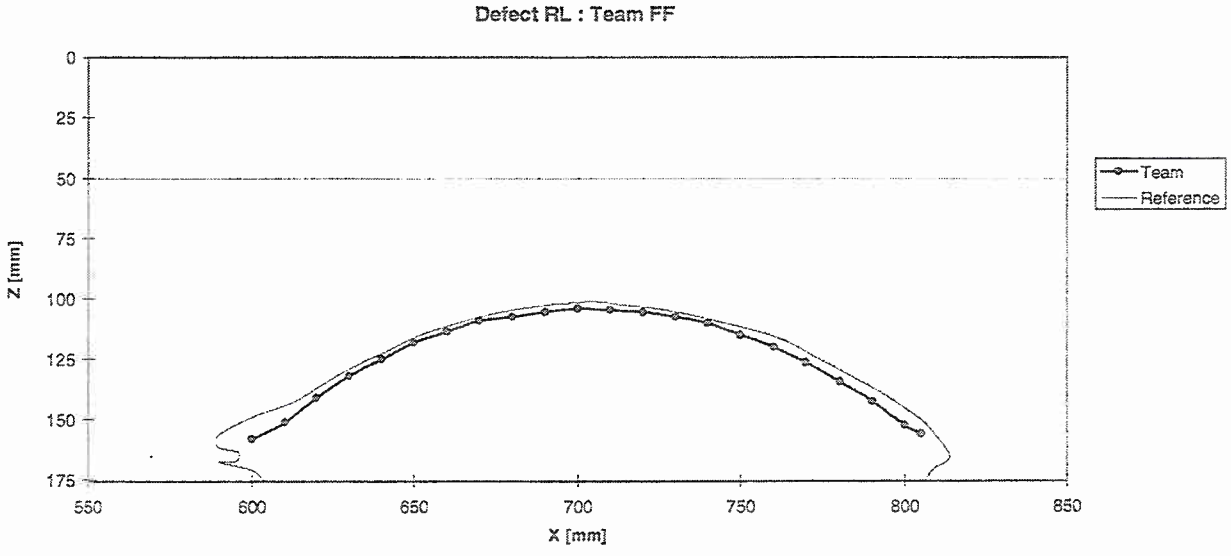
K23


Defect RL : Team JJ
0
25
50
75
100
125
150
175
Z [mm]
550
600
650
700
750
800
850
X [mm]
Team
Reference

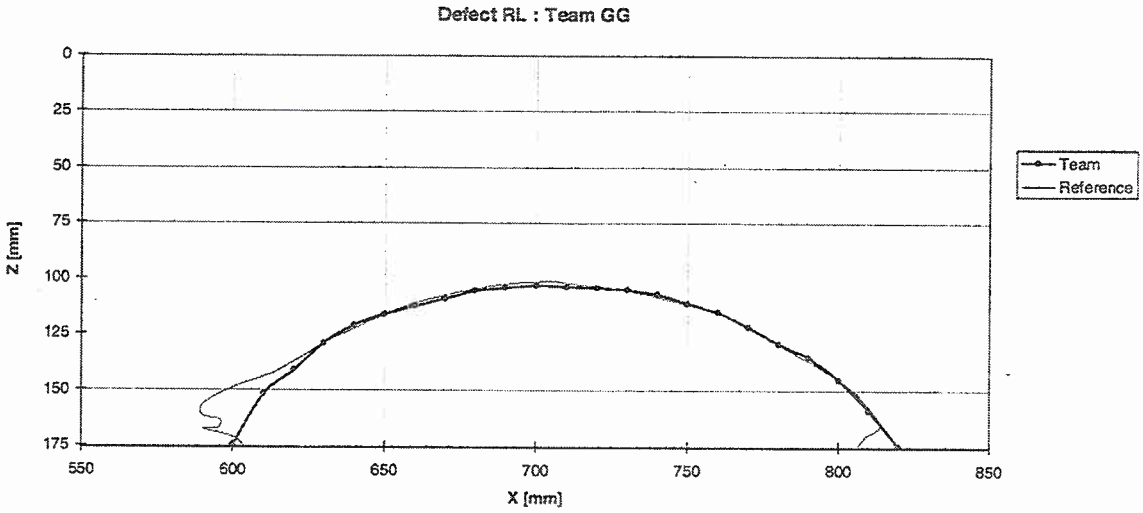
K24


Defect RL : Team EE
0
25
50
75
100
125
150
175
Z [mm]
550
600
650
700
750
800
850
X [mm]
Team
Reference

K25


Defect RL : Team FF
0
25
50
75
100
125
150
175
Z [mm]
550
600
650
700
750
800
850
X [mm]
Team
Reference

K26


Defect RL : Team GG
0
25
50
75
100
125
150
175
Z [mm]
550
600
650
700
750
800
850
X [mm]
Team
Reference

K27

Appendix 14

Tables of techniques used by each team.

Techniques used for DETECTION in NESC 1

TVAM CODE NUMBER	TEST OF INSPECTION (pre / post)	INSPECTION METHOD	CRYSTAL TYPE (sing e / dual)	WAVE MODE (shear / long)	MANUFACTURER OF PROBE	MANUFACTURER PROBE	CRYSTAL SIZE [mm]	HOUSING SIZE [mm]	FREQUENCY [MHz]	BEAM ANGLE [deg]	THRESHOLD FOR RECORDING	THRESHOLD FOR DETECTION	COUPLANT (water, gel, oil)	ACQUISITION RATE IN X [mm]	ACQUISITION RATE IN Y [mm]	SCANNING SURFACE (in / out)	SCAN TYPE (auto / manu)	COMMENT
11	pre	SC-PE-L	single	long	Phoenix ISL	AOS01	ø 10 mm	-	2	0	5% DAC, FSH= ø8 SDH + 4 dB	10% DAC, FSH= ø8 SDH + 4 dB	water in cylinder	2 (String = 1.0)	4 (String = 1.6)	in	auto	
11	pre	DC-PE-L	dual	long	RTD	-	8 x 10	-	2	0	5% DAC, FSH= ø8 SDH + 4 dB	10% DAC, FSH= ø8 SDH + 4 dB	water in cylinder	2 (String = 1.0)	4 (String = 1.6)	in	auto	FD = 13 mm
11	pre	SC-PE-T	single	shear	Kraukrämer	WB45-2	20 x 22	29 x 54	2	45	5% DAC, FSH= ø8 SDH + 4 dB	10% DAC, FSH= ø8 SDH + 4 dB	water in cylinder	2 (String = 1.0)	4 (String = 1.6)	in	auto	
11	pre	SC-PE-T	single	shear	Kraukrämer	WS45-2	20 x 22	29 x 54	2	45	5% DAC, FSH= ø8 SDH + 4 dB	10% DAC, FSH= ø8 SDH + 4 dB	water in cylinder	2 (String = 1.0)	4 (String = 1.6)	in	auto	
11	pre	SC-PE-T	single	shear	Kraukrämer	WB60-2	20 x 22	29 x 54	2	60	5% DAC, FSH= ø8 SDH + 4 dB	10% DAC, FSH= ø8 SDH + 4 dB	water in cylinder	2 (String = 1.0)	4 (String = 1.6)	in	auto	
11	pre	DC-PE-L	dual	long	RTD	70TRL-2	2 x (½ ø 18 mm)	40 x 40	2	70	5% DAC, FSH= ø8 SDH + 4 dB	10% DAC, FSH= ø8 SDH + 4 dB	water in cylinder	2 (String = 1.0)	4 (String = 1.6)	in	auto	FD = 5 mm
11	pre	SC-PE-L	single	long	RTD	VSY70-4	-	-	4	70	5% DAC, FSH= ø8 SDH + 4 dB	10% DAC, FSH= ø8 SDH + 4 dB	water in cylinder	2 (String = 1.0)	4 (String = 1.6)	in	auto	
21	pre	SC-PE-T	single	shear	KB-Arotech	KB-A-57172	ø 9.5 mm	-	3.5	45	noise level	TF cracks in B-2289-1-1000	gel	-	-	out	manual	Used for confirmation only
21	pre	DC-PE-L (SAFT)	dual	long	RTD	70TRL-2	-	-	2	70	noise level	TF cracks in B-2289-1-1000	oil	3	1.5	in	auto	SAFT
21	post	SC-PE-T	single	shear	KB-Arotech	KB-A-57172	ø 9.5 mm	-	3.5	45	noise level	TF cracks in B-2289-1-1000	gel	-	-	out	manual	Used for confirmation only
21	post	DC-PE-L (SAFT)	dual	long	RTD	70TRL-2	-	-	2	70	noise level	TF cracks in B-2289-1-1000	oil	3	1.5	in	auto	SAFT
22	pre	SC-PE-T	single	shear	RTD	38T-1	24 x 24	40 x 40	1	38	noise level	ø8 SDH	water	10	3.6	out	auto	
22	pre	SC-PE-T	single	shear	Special	-	25 x 33	40 x 40	1	45	noise level	ø8 SDH	water	10	3.6	out	auto	
22	pre	DC-PE-L	dual	long	RTD	70TRL-2	2 x (½ ø 18 mm)	40 x 40	2	70	noise level	ø2 SDH	water	5	2.4	in	auto	FD = 10mm
22	pre	TOFD	2 x single	long	Panametrics	Type V, Br.Band	ø 12.6 mm	N/A	2.25	35	noise level	NESC notches	water	10	3.6	out	auto	PCS = 367 mm
22	pre	TOFD	2 x single	long	Panametrics	Type V, Br.Band	ø 12.6 mm	N/A	2.25	45	noise level	NESC notches	water	10	3.6	out	auto	PCS = 367 mm
22	pre	TOFD	2 x single	long	Panametrics	Type V, Br.Band	ø 6.3 mm	N/A	5	35	noise level	NESC notches	water	10	3.6	out	auto	
22	pre	TOFD	2 x single	long	Panametrics	Type V, Br.Band	ø 6.3 mm	N/A	5	45	noise level	NESC notches	water	10	3.6	out	auto	
22	post	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	No post test detection	Only detection in pre-test

TEAM CODE NUMBER	TIME OF INSPECTION (pre / post)	INSPECTION METHOD	CRYSTAL TYPE (single / dual)	WAVE MODE (shear / long)	MANUFACTURER OF PROBE	MANUFACTURER CODE	CRYSTAL SIZE (mm)	HOUSING SIZE (mm)	FREQUENCY (MHz)	BEAM ANGLE (deg)	THRESHOLD FOR RECORDING	THRESHOLD FOR DETECTION	COUPLANT (water, gel, oil)	ACQUISITION RATE IN X (mm)	ACQUISITION RATE IN Y (mm)	SCANNING SURFACE (in / out)	SCAN TYPE (auto / man)	COMMENT
23	pre	DC-PE-L	dual	long	Special	-	-	40 x 40	2	70	noise level	ø2 SDH + 3 dB	water	1	2	in	auto	
23	pre	Phased array	16 elements	shear + long	Special	-	-	34 x 55	1.3	T = 35 - 70 deg L = 45 - 70 deg	noise level	ø8 SDH + 12 dB	water	1	2	in	auto	Phased array angles in step of 5 degrees
23	post	DC-PE-L	dual	long	Special	-	-	40 x 40	2	70	noise level	10 mm notch (TK1) + 6 dB	water	1	2	in	auto	
23	post	Phased array	16 elements	long	Special	-	-	34 x 55	1.3	L = 43 - 83 deg	noise level	ø3 SDH (TK1) +12 dB	water	1	2	in	auto	Phased array angles in step of 5 degrees
24	pre	SC-PE-L	single	long	Imasonic	1751	-	-	5	55	-	ø2 SDH	immersion	-	-	in	auto	Immersion (FD = 8 mm)
24	post	SC-PE-L	single	long	Imasonic	1751	-	-	5	55	-	ø2 SDH	immersion	-	-	in	auto	Immersion (FD = 8 mm)
25	pre	SC-PE-T	single	shear	Special	-	-	-	2.5	40	FBH (A=5 mm²)	FBH (A=20 mm²)	gel	-	-	out	man	T = 3 - 175 mm
25	pre	SC-PE-T	single	shear	Special	-	-	-	2.5	50	FBH (A=5 mm²)	FBH (A=20 mm²)	gel	-	-	out	man	T = 3 - 175 mm
25	pre	SC-PE-L	single	long	Special	-	-	-	2.5	0	FBH (A=5 mm²)	FBH (A=20 mm²)	gel	-	-	out	man	T = 30 - 175 mm
25	pre	DC-PE-L	dual	long	Special	-	-	-	2.5	0 [7]	FBH (A=5 mm²)	FBH (A=20 mm²)	gel	-	-	in + out	man	T = 2 - 50 mm
25	pre	Creeping Wave	dual	creep	Special	-	-	-	1.8	-	-	ø2 SDH	gel	-	-	in	man	T = 2 - 8 mm
25	post	SC-PE-T	single	shear	Special	-	-	-	2.5	40	FBH (A=5 mm²)	FBH (A=20 mm²)	-	-	-	out	man	T = 3 - 175 mm
25	post	SC-PE-T	single	shear	Special	-	-	-	2.5	50	FBH (A=5 mm²)	FBH (A=20 mm²)	-	-	-	out	man	T = 3 - 175 mm
25	post	SC-PE-L	single	long	Special	-	-	-	2.5	0	FBH (A=5 mm²)	FBH (A=20 mm²)	-	-	-	out	man	T = 30 - 175 mm
25	post	DC-PE-L	dual	long	Special	-	-	-	2.5	0 [7]7	FBH (A=5 mm²)	FBH (A=20 mm²)	-	-	-	in + out	man	T = 2 - 50 mm
25	post	Creeping Wave	dual	creep	Special	-	-	-	1.8	-	-	ø2 SDH	-	-	-	in	man	T = 2 - 8 mm
26	pre	SC-PE-T	single	shear/ long	RTD	-	16 x 20	-	1.5	31/70	noise level	noise level	water	1	4	out	auto	
26	pre	SC-PE-T	single	shear	RTD	-	16 x 20	-	1.5	41	noise level	noise level	water	1	4	out	auto	
26	post	SC-PE-T	single	shear	tZFP	-	16 x 20	-	1.5	22	noise level	noise level	water	2	4	out	auto	
26	post	SC-PE-T	single	shear	RTD	-	16 x 20	-	1.5	31	noise level	noise level	water	2	4	out	auto	
26	post	SC-PE-T	single	shear	RTD	-	16 x 20	-	1.5	41	noise level	noise level	water	2	4	out	auto	

TEAM CODE NUMBER	TIME OF INSPECTION (WE / post)	INSPECTION METHOD	CRYSTAL TYPE (single / dual)	WAVE MODE (shear / long)	MANUFACTURER OF PROBE	MANUFACTURER CODE	CRYSTAL SIZE [mm]	HOUSING SIZE [mm]	FREQUENCY [MHz]	BEAM ANGLE [deg]	THRESHOLD FOR RECORDING	THRESHOLD FOR DETECTION	COUPLANT (water, gel, oil)	ACQUISITION RATE IN X [mm]	ACQUISITION RATE IN Y [mm]	SCANNING SURFACE (in / out)	SCAN TYPE (auto / man)	COMMENT
31	post	SC-PE-T	single	shear	RTD	39ET-1	23 x 25	40 x40	1	39	noise level	20 x 3 mm notch	water	-	-	out	auto	Probe shoes contoured to surface
31	post	SC-PE-T	single	shear	RTD	35ET-2	23 x 25	40 x40	2	35	noise level	20 x 3 mm notch	water	-	-	out	auto	Probe shoes contoured to surface
31	post	SC-PE-L	single	long	RTD	28EL-2	25 x 30	40 x40	2	28	noise level	20 x 3 mm notch	water	-	-	out	auto	Probe shoes contoured to surface
31	post	SC-PE-L	single	long	RTD	30EL-2	27 x 30	40 x40	2	30	noise level	20 x 3 mm notch	water	-	-	out	auto	Probe shoes contoured to surface
32	post	DC-PE-L	dual	long	RTD	70TRL-2 (JCC)	2 x (½ ø 18 mm)	40 x 40	2	70	noise level	N/A	water in cylinder	1	1	in	auto	FS = 18 mm
32	post	Creeping Wave	dual	long	Phoenix ISL	TR-Creep	2 x (15 x 25)	40 x 40	2.5	-	noise level	N/A	water in cylinder	1	1	in	auto	FS = 20 mm
32	post	SC-PE-T	single	shear	Kraukrämer	MAP	ø 10 mm	12 x 20	2	45	noise level	N/A	water in cylinder	1	1	in	auto	
33	post	SC-PE-T	single	shear	RTD	45ET-1	25 x 23	40 x 40	1	45	noise level	51 x 7 NESC D (ASME) + 13 dB	water	10	1	in	auto	
33	post	DC-PE-L	dual	long	RTD	70TRL-2	2 x (8 x 14)	25 x 25	2	70	noise level	51 x 7 NESC D (ASME) + 15 dB	water	10	1	in	auto	
33	post	DC-PE-T	2 x single	shear	RTD	45TRT-1	2 x (12 x 23))	40 x 40	1	45	noise level	51 x 7 NESC D (ASME) + 13 dB	water	10	1	in	auto	TOFD probe configuration
33	post	Tandem tech.	single	shear	Kraukrämer	MWB45-E2	8 x 9	13 x23	2	45	noise level	51 x 7 NESC D (ASME) + 35 dB	water	10	1	in	auto	Probe(s) also used in normal mode
33	post	Tandem tech.	single	shear	RTD	45T-2	25 x 23	40 x 40	2	45	noise level	51 x 7 NESC D (ASME) + 35 dB	water	10	1	in	auto	Probe(s) also used in normal mode
34	post	DC-PE-T	dual	shear	RTD	45ET-1	25 x 23	40 x 40	1	45	noise level	51 x 7 NESC D (ASME) + 35 dB	water	2-dim saft = 10, 3-dim saft = 1	0.3	in	auto	SAFT
34	post	SC-PE-T	single	shear	Kraukrämer	MWB45-N2	8 x 9	13 x23	2	45	noise level	51 x 7 NESC D (ASME) + 35 dB	water	2-dim saft = 5, 3-dim saft = 0.5	0.3	in	auto	SAFT
35	post	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	Only sizing of 2 defects
36	post	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	No detection	Only sizing of 2 defects

TEAM CODE NUMBER	TIME OF INSPECTION (pre / post)	INSPECTION METHOD	CRYSTAL TYPE (single / dual)	WAVE MODE (shear / long)	MANUFACTURER OF PROBE	MANUFACTURER CODE	CRYSTAL SIZE (mm)	HOUSING SIZE (mm)	FREQUENCY (MHz)	BEAM ANGLE (deg)	THRESHOLD FOR RECORDING	THRESHOLD FOR DETECTION	COUPLANT (water, gel, oil)	ACQUISITION RATE IN X (mm)	ACQUISITION RATE IN Y (mm)	SCANNING SURFACE (in / out)	SCAN TYPE (manual / auto)	COMMENT
41	Post	ET-HF			mtx				40 / 50 / 75 / 100 kHz									
42	Post	ET-LF	-	-	LF diff + abs	-	-	-	0.51 / 2.6 / 5.0 kHz	-	-	-	N/A	-	-	in	auto	
42	Post	ET-LF	-	-	LF Remote Far Field (T/R)	-	-	-	0.51 / 2.6 / 5.0 kHz	-	-	-	N/A	-	-	in	auto	
42	Post	ET-HF	-	-	HF absolute	-	-	-	50 / 200 / 600 kHz	-	-	-	N/A	-	-	in	auto	
43																		

Techniques used for LENGTH SIZING in NESC 1

TEAM CODE NUMBER	TIME OF INSPECTION (pre / post)	SIGNAL TO NOISE	INSPECTION METHOD	MANUFACTURER OF PROBE	MANUFACTURER CODE	CRYSTAL SIZE (mm)	HOUSING SIZE (mm)	CRYSTAL (single / dual)	WAVE MODE (shear / long)	FREQUENCY (MHz)	PROBE ANGLE (deg)	ACQUISITION RATE IN X (mm)	ACQUISITION RATE IN Y (mm)	SCANNING SURFACE (in / out)	SCAN TYPE (manual / auto)	COMMENT
11	pre	6 db drop	SC-PE-L	Proprietary	AO501	ø 10 mm	ø 12 mm	single	long	2	0	2 (Sizing = 1.0)	4 (Sizing = 1.6)	in	auto	
11	pre	6 db drop	DC-PE-L	RTD		8 x 10		dual	long	2	0	2 (Sizing = 1.0)	4 (Sizing = 1.6)	in	auto	FD = 13 mm
11	pre	6 db drop	DC-PE-L	RTD	70TRL-2	2 x (½ ø 18 mm)	40 x 40	dual	long	2	70	2 (Sizing = 1.0)	4 (Sizing = 1.6)	in	auto	FD = 5 mm
21	pre	Loss of signal	SC-PE-T	KB-Aretech	KB-A-57172	ø 9.5 mm	-	single	shear	3.5	45	-	-	out	manual	Used for confirmation only
21	pre	Loss of signal	DC-PE-L (SAFT)	RTD	70TRL-2	-	-	dual	long	2	70			in	auto	
21	pre	Loss of signal	DC-PE-L (SAFT)	RTD	60TRL-2	-	-	dual	long	2	60			in	auto	Only 4 big defects
21	pre	Loss of signal	SC-PE-T (SAFT)	KB-Aretech	-	ø 9.5 mm	-	single	shear	1.5	45			out	auto	
21	pre	Loss of signal	Tandem Saft	KB-Aretech	-	ø 9.5 mm	-	2 x single	shear	1.5	45			out	auto	Same probe also used for PE
21	post	Loss of signal	SC-PE-T	KB-Aretech	KB-A-57172	ø 9.5 mm	-	single	shear	3.5	45	3	1.5	out	manual	Used for confirmation only
21	post	Loss of signal	DC-PE-L (SAFT)	RTD	70TRL-2	-	-	dual	long	2	70			in	auto	
21	post	Loss of signal	DC-PE-L (SAFT)	RTD	60TRL-2	-	-	dual	long	2	60			in	auto	Only 4 big defects
21	post	Loss of signal	SC-PE-T (SAFT)	KB-Aretech	-	ø 9.5 mm	-	single	shear	1.5	45	-	-	out	auto	
21	post	Loss of signal	Tandem Saft	KB-Aretech	-	ø 9.5 mm	-	2 x single	shear	1.5	45	3	1.5	out	auto	Same probe also used for PE
22	pre	6 db drop	SC-PE-T	RTD	38T-1	24 x 24	40 x 40	single	shear	1	38	DETECTION:		out	auto	
22	pre	6 db drop	SC-PE-T	-	45T-1	25 x 33	40 x 40	single	shear	1	45	PE from Outside 10 mm (D-sizing = 2 mm)	3.6 mm (1.2 mm)	out	auto	
22	pre	6 db drop	DC-PE-L	RTD	70TRL-2	2 x (½ ø 18 mm)	40 x 40	dual	long	2	70			in	auto	FD = 10 mm
22	pre	6 db drop	TOFD	Panametrics	Type V, Br Band	ø 12.6 mm	N/A	2 x single	long	2.25	35	PE from inside 5 mm (L-sizing = 2 mm)	2.4 mm (1.7 mm)	out	auto	
22	pre	6 db drop	TOFD	Panametrics	Type V, Br Band	ø 12.6 mm	N/A	2 x single	long	2.25	45			out	auto	
22	pre	6 db drop	TOFD	Panametrics	Type V, Br Band	ø 6.3 mm	N/A	2 x single	long	5	35	TOFD outside 10 mm (D-sizing = 2 mm)	3.6 mm (1.2 mm)	out	auto	
22	pre	6 db drop	TOFD	Panametrics	Type V, Br Band	ø 6.3 mm	N/A	2 x single	long	5	45			out	auto	
22	post	6 db drop	TOFD	Panametrics	Type V, Br Band	ø 12.6 mm	N/A	2 x single	long	2.25	35			out	auto	
22	post	6 db drop	TOFD	Panametrics	Type V, Br Band	ø 12.6 mm	N/A	2 x single	long	2.25	45			out	auto	
22	post	6 db drop	TOFD	Panametrics	Type V, Br Band	ø 6.3 mm	N/A	2 x single	long	5	35	No post test detection	No post test detection	out	auto	
22	post	6 db drop	TOFD	Panametrics	Type V, Br Band	ø 6.3 mm	N/A	2 x single	long	5	45			out	auto	

ITEM CODE NUMBER	INSPECTION (pre/post)	DETECTABILITY	INSPECTION NOTES	MANUFACTURER CODE	MANUFACTURER TUNER CODE	CRYSTAL SIZE (mm)	HOUSING SIZE (mm)	CRYSTAL (single/dual)	WAVE MODE (shear/long)	TRIGGER FREQ (MHz)	BEAM ANGLE (deg)	ACQUISITION RATE IN (mm)	ACQUISITION RATE IN (kHz)	SCANNING COVERAGE (in/out)	SCAN TYPE (auto/man)		COMMENT
23	pre	6 db drop	DC-PE-I	-	-	-	-	dual	long	2	70	1	2	in	auto		
23	pre	6 db drop	Phased array	-	-	-	-	-	shear + long	1 3	L = 35 - 70 deg L = 45 - 70 deg	1	2	in	auto		Phased array angles in step of 5 degrees
23	post	6 db drop	DC-PE-L	-	-	-	-	dual	long	2	70	1	2	in	auto		
23	post	6 db drop	Phased array	-	-	-	-	-	long	1 3	L = 43 - 83 deg	1	2	in	auto		Phased array angles in step of 5 degrees
24	pre	6 db drop	SC-PE-L	Matoscan	950608-15	-	-	single	long	6	55			in	auto		Immersion (FD = 5 mm)
24	pre	6 db drop	SC-PE-T	Imasonic	1719	-	-	single	shear	3	45			out	auto		Only for sizing of larger defects Immersion (FD = 110 mm)
24	pre	6 db drop	SC-PE-T	Imasonic	1720	-	-	single	shear	3	32			out	auto		Immersion (FD = 170 mm)
24	post	6 db drop	SC-PE-L	Imasonic	1721	-	-	single	long	6	55	-	-	in	auto		Immersion (FD = 5 mm)
24	post	6 db drop	SC-PE-T	Imasonic	1719	-	-	single	shear	3	45			out	auto		Only for sizing of larger defects Immersion (FD = 110 mm)
24	post	6 db drop	SC-PE-T	Imasonic	1720	-	-	single	shear	3	32	-	-	out	auto		Immersion (FD = 170 mm)
25	pre	6 db drop	SC-PE-T	-	-	-	-	single	shear	2 5	40	-	-	out	man		T = 3 - 175 mm
25	pre	6 db drop	SC-PE-T	-	-	-	-	single	shear	2 5	50	-	-	out	man		T = 3 - 175 mm
25	pre	6 db drop	SC-PE-L	-	-	-	-	single	long	2 5	0	-	-	out	man		T = 30 - 175 mm
25	pre	6 db drop	DC-PE-L	-	-	-	-	dual	long	2 5	0 [?]	-	-	in + out	man		T = 2 - 50 mm
25	pre	6 db drop	Creeping Wave	-	-	-	-	dual	creep	1 8	-	-	-	in	man		T = 2 - 8 mm
25	post	6 db drop	SC-PE-T	-	-	-	-	single	shear	2 5	40	-	-	out	man		T = 3 - 175 mm
25	post	6 db drop	SC-PE-T	-	-	-	-	single	shear	2 5	50	-	-	out	man		T = 3 - 175 mm
25	post	6 db drop	SC-PE-L	-	-	-	-	single	long	2 5	0	-	-	out	man		T = 30 - 175 mm
25	post	6 db drop	DC-PE-L	-	-	-	-	dual	long	2 5	0 [?]?	-	-	in + out	man		T = 7 - 50 mm
25	post	6 db drop	Creeping Wave	-	-	-	-	dual	creep	1 8	-	-	-	in	man		T = 2 - 8 mm
26	pre	Loss of signal	SC-PE-T	RTD	Broad band	ø 10 mm	-	single	long	5	0	1	4	out			
26	pre	Loss of signal	SC-PE-T	RTD	Broad band	ø 25.4 mm	-	single	long	5	0	1	4	out	auto		
26	pre	Loss of signal	SC-PE-T	RTD	-	16 x 20	-	single	shear/long	1 5	31/70			out	auto		
26	pre	Loss of signal	SC-PE-T	RTD	-	16 x 20	-	single	shear	1 5	41	2	4	out	auto		
26	post	Loss of signal	SC-PE-T	RTD	Broad band	ø 10 mm	-		long	5	0			out			
26	post	Loss of signal	SC-PE-T	IZFP	-	16 x 20	-	single	shear	1 5	22			out	auto		
26	post	Loss of signal	SC-PE-T	RTD	-	16 x 20	-	single	shear	1 5	41	2	4	out	auto		
26	post	Loss of signal	DC-PE-L	RTD	-	16 x 20	-	single	long	1 5	70	2	4	out	auto		

TEAM CODE NUMBER	TIME OF INSPECTION (PRE/POST)	SIZING TECHNIQUES	DETECTION METHOD	MANUFACTURER OF PROBE	MANUFACTURER CODE	CRYSTAL SIZE [mm]	HOUSING SIZE [mm]	CRYSTAL (single/dual)	WAVE MODE (long/shear)	FREQUENCY [MHz]	REFR. ANGLE [deg]	ACQUISITION RATE IN X [mm]	ACQUISITION RATE IN Y [mm]	SCANNING SURFACE (in/out)	SCAN TYPE (auto/man)	COMMENT
31	post	6 db drop,	SC-PE-T	RTD	39ET-1	39ET-1	23 x 25	single	shear	1	39	-	-	out	auto	
31	post	6 db drop	SC-PE-T	RTD	35ET-2	35ET-2	23 x 25	single	shear	2	35	-	-	out	auto	
31	post	6 db drop	SC-PE-L	RTD	28EL-2	28EL-2	25 x 30	single	long	2	28			out	auto	
31	post	6 db drop	SC-PE-L	RTD	30EL-2	30EL-2	27 x 30	single	long	2	30			out	auto	
31	post	6 db drop	Phased array	RD-TECH	RD-TECH	16 elements	16 (10 x 16)	N/A	long	5	10 & 30			out	auto	
31	post	6 db drop	SC-PE-T	Krautkramer	WB35 4	20 x 22	29 x 54	single	shear	4	35	-	-	out	auto	
31	post	6 db drop	DC-PE L	RTD	0SEL-2	2 x (½ ø 25 mm)	ø 39 mm	dual	long	2	0	-	-	out	auto	
32	post	6 db drop / max amplitude	DC-PE-L	RTD	70TRL-2 (UCC)	2 x (½ ø 18 mm)	40 x 40	dual	long	2	70	1	1	in	auto	FS = 18 mm
32	post	6 db drop / max amplitude	Creeping Wave	Phoenix ISL	TR-Creep	2 x (15 x 25)	40 x 40	dual	long	2.5	-	1	1	in	auto	FS = 20 mm
32	post	6 db drop / max amplitude	SC-PE-T	Krautkramer	MAP	ø 10 mm	12 x 20	single	shear	2	45	1	1	in	auto	
33	post	6 db drop	DC-PE L	RTD	70TRL-2	2 x (8 x 14)	25 x 25	dual	long	2	70	10	1	in	auto	
33	post	6 db drop	DC-PE-T	RTD	45TRT-1	2 x (12 x 23))	40 x 40	dual	shear	1	45	10	1	in	auto	
33	post	6 db drop	Tandem tech	Krautkramer	MWB45-E2	8 x9	13 x23	2 x dual	shear	2	45	10	1	in	auto	
33	post	6 db drop	Tandem tech	RTD	45T-2	25 x 23	40 x 40	2 x dual	shear	2	45	10	1	in	auto	
												10	1			
34	post	6 db drop	DC-PE-T	RTD	45ET-1	25 x 23	40 x 40	dual	shear	1	45	2-dim saft = 10, 3 dim saft = 1	0.3	in	auto	SAFT
34	post	6 db drop	SC-PE-T	Krautkramer	MWB45 N2	8 x 9	13 x23	single	shear	2	45	2-dim saft = 5, 3 dim saft = 0.5	0.3	in	auto	SAFT
35	post	6 db drop	DC-PE-L	-	-	-	-	dual	long	2	70	No detection	No detection	in	auto	Data recorded by team DD Sizing only performed on defect B + RL
35	post	6 db drop	Phased array	-	-	-	-	N/A	long	1.5	t = 43 - 63 deg			in	auto	Data recorded by team DD Sizing only performed on defect B + RL Phased array angles in step of 5 degrees
36	post	6 db drop	DC-PE-L	-	-	-	-	dual	long	2	70	No detection	No detection	in	auto	Data recorded by team DD Sizing only performed on defect B + RL
36	post	6 db drop	Phased array	-	-	-	-	N/A	long	1.5	t = 43 - 63 deg			in	auto	Data recorded by team DD Sizing only performed on defect B + RL Phased array angles in step of 5 degrees

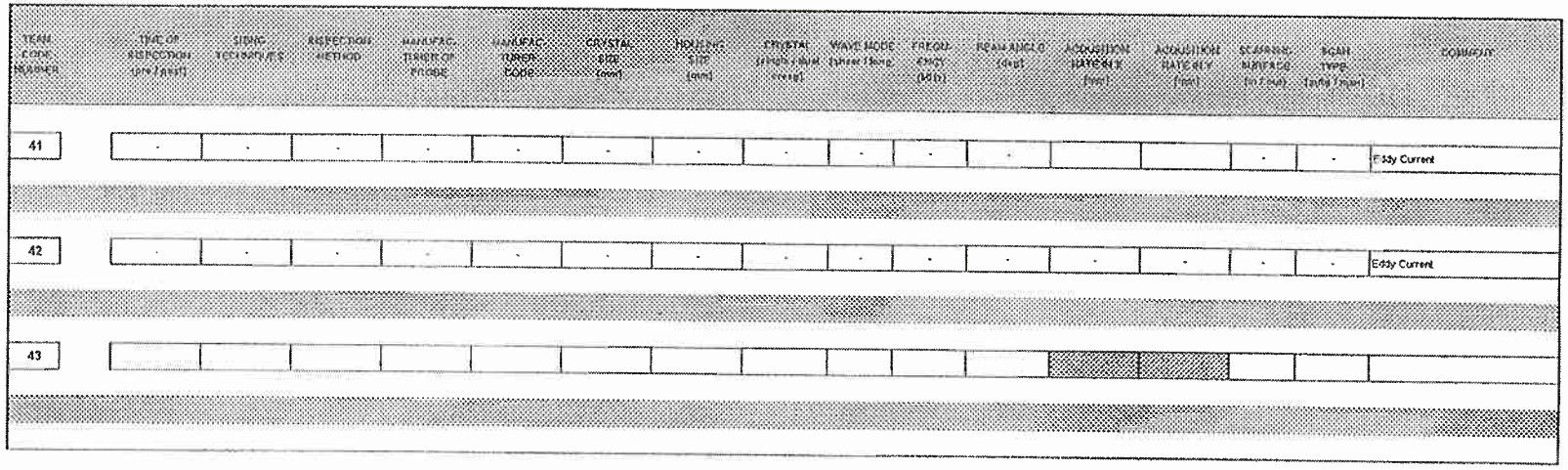
TEAM CODE NUMBER	TYPE OF INSPECTION (on / off)	SIZING TOLERANCE	INSPECTION METHOD	MANUFACTURER OF PROBE	MANUFACTURER CODE	CRYSTAL SIZE (mm)	HOUSING (Ω) (ohm)	CRYSTAL (wedge / dual)	WAVE MODE (angle / kind)	FREQUENCY (MHz)	CLEARANCE (mm)	ACQUISITION RATE at X (mm)	ACQUISITION RATE at Y (mm)	SCANNING SURFACE (in / out)	SCAN TYPE (auto / man)	COMMENT
41	Post	ET-HF	mix	-	-	-	-	-	-	40 / 50 / 75 / 100 kHz	-			in	auto	
42	Post	ET-LF	LF diff + MS	-	-	-	-	-	-	0.5 / 2.8 / 5.0 kHz	-	-	-	in	auto	
42	Post	ET-LF	LF Remote Far Field (LFR)	-	-	-	-	-	-	0.5 / 2.8 / 5.0 kHz	-	-	-	in	auto	
42	Post	ET-HF	HF absolute	-	-	-	-	-	-	50 / 280 / 600 kHz	-	-	-	in	auto	
43																

Techniques used for TWE SIZING in NESC 1

TEAM CODE NUMBER	TYPE OF INSPECTION (pre / post)	SIZING TECHNIQUES	INSPECTION METHOD	MANUFACTURER OF PROBE	MANUFACTURER PROBE CODE	CRYSTAL SIZE (mm)	HOUSING SIZE (mm)	CRYSTAL (single / dual / array)	WAVE MODE (shear / long.)	FREQUENCY (MHz)	BEAM ANGLE (deg)	ACQUISITION RATE (Hz) (mm)	ACQUISITION RATE (Hz) (mm)	SCANNING SURFACE (in / out)	JOINT TYPE (auto / manual)	COMMENT
11	pre	Crack tip/ Max amplitude	SC-PE-L	Phoenix ISL	AOS01	ø 10 mm	ø 12 mm	single	long	2	0	2 (Sizing = 1.0)	4 (Sizing = 1.6)	in	auto	
11	pre	Crack tip/ Max amplitude	DC-PE-L	RTD		8 x 10		dual	long	2	0	2 (Sizing = 1.0)	4 (Sizing = 1.6)	in	auto	FD = 13 mm
11	pre	Crack tip/ Max amplitude	DC-PE-L	RTD	70TRL-2	2 x (½ à 18 mm)	40 x 40	dual	long	2	70	2 (Sizing = 1.0)	4 (Sizing = 1.6)	in	auto	FD = 5 mm
11	pre	TOFD	TOFD	Panametrics	V551	ø 10 mm	ø 12 mm	2 x single	long	5	45	2 (Sizing = 1.0)	4 (Sizing = 1.6)	in	auto	
11	pre	TOFD	TOFD	Panametrics	V551	ø 10 mm	ø 12 mm	2 x single	long	5	60	2 (Sizing = 1.0)	4 (Sizing = 1.6)	in	auto	
21	pre	Crack tip	SC-PE-T	KB Arotech	KB-A/57172	ø 9.5 mm	-	single	shear	3.5	45	-	-	out	manual	Used for confirmation only
21	pre	Crack tip (SAFT PE)	DC-PE-L (SAFT)	RTD	70TRL-2	-	-	dual	long	2	70	3	1.5	in	auto	
21	pre	Crack tip (SAFT PE)	DC-PE-L (SAFT)	RTD	60TRL-2	-	-	dual	long	2	60			in	auto	Only 4 big defects
21	pre	Crack tip (SAFT PE)	SC-PE-T (SAFT)	KB Arotech	-	ø 9.5 mm	-	single	shear	1.5	45			out	auto	
21	pre	Crack tip (SAFT PE)	Tandem Saft	KB Arotech	-	ø 9.5 mm	-	2 x single	shear	1.5	45			out	auto	Same probe also used for PE
21	post	Crack tip	SC-PE-T	KB Arotech	KB-A-57172	ø 9.5 mm	-	single	shear	3.5	45			out	manual	Used for confirmation only
21	post	Crack tip (SAFT PE)	DC-PE-L (SAFT)	RTD	70TRL-2	-	-	dual	long	2	70			in	auto	
21	post	Crack tip (SAFT PE)	DC-PE-L (SAFT)	RTD	60TRL-2	-	-	dual	long	2	60			in	auto	Only 4 big defects
21	post	Crack tip (SAFT PE)	SC-PE-T (SAFT)	KB Arotech	-	ø 9.5 mm	-	single	shear	1.5	45	-	-	out	auto	
21	post	Crack tip (SAFT PE)	Tandem Saft	KB Arotech	-	ø 9.5 mm	-	2 x single	shear	1.5	45	3	1.5	out	auto	Same probe also used for PE
22	pre	Crack tip	SC-PE-L	Panametrics	Type A	ø 25.4 mm	N/A	single	long	2.25	0	DETECTION		out	auto	
22	pre	TOFD	TOFD	Panametrics	Type V, Br Band	ø 12.6 mm	N/A	2 x single	long	2.25	35	PE from Outside 10 mm (D-sizing = 2 mm)	3.8 mm (1.2 mm)	out	auto	
22	pre	TOFD	TOFD	Panametrics	Type V, Br Band	ø 12.6 mm	N/A	2 x single	long	2.25	45			out	auto	
22	pre	TOFD	TOFD	Panametrics	Type V, Br Band	ø 6.3 mm	N/A	2 x single	long	5	35	PE from inside 5 mm (D-sizing = 2 mm)	2.4 mm (1.2 mm)	out	auto	
22	pre	TOFD	TOFD	Panametrics	Type V, Br Band	ø 6.3 mm	N/A	2 x single	long	5	45			out	auto	
22	post	Crack tip	SC-PE-L	Panametrics	Type A	ø 25.4 mm	N/A	single	long	2.25	0	TOFD outside 10 mm (D-sizing = 2 mm)	3.6 mm (1.2 mm)	out	auto	
22	post	TOFD	TOFD	Panametrics	Type V, Br Band	ø 12.6 mm	N/A	2 x single	long	2.25	35			out	auto	
22	post	TOFD	TOFD	Panametrics	Type V, Br Band	ø 12.6 mm	N/A	2 x single	long	2.25	45			out	auto	
22	post	TOFD	TOFD	Panametrics	Type V, Br Band	ø 6.3 mm	N/A	2 x single	long	5	35			out	auto	
22	post	TOFD	TOFD	Panametrics	Type V, Br Band	ø 6.3 mm	N/A	2 x single	long	5	45	No post test detection	No post test detection	out	auto	

TEAM CODE (leader)	TIME OF INSPECTION (pre / post)	SIGNAL TECHNIQUE	INSPECTION METHOD	MANUFACTURER OF PROBE	MANUFACTURER CODE	CRYSTAL SIZE (mm)	NOMINAL SIZE (mm)	CRYSTAL (single / dual)	WAVE MODE (shear / long)	FREQUENCY (MHz)	BEAM ANGLE (deg)	ACQUISITION RATE IN X (mm)	ACQUISITION RATE IN Y (mm)	SCANNED SURFACE (in / out)	SCAN TYPE (auto / man)	COMMENT
23	pre	Crack tip / 6dB drop	DC-PE-L	N/A	-	-	-	dual	long	2	70	1	2	in	auto	
23	pre	Crack tip / 6dB drop	Phased array	N/A	-	-	-	N/A	shear + long	1.3	T = 35 - 70 deg L = 45 - 70 deg	1	2	in	auto	Phased array angles in step of 5 degrees
23	post	Crack tip / 6dB drop	DC-PE-L	N/A	-	-	-	dual	long	2	70	1	2	in	auto	
23	post	Crack tip / 6dB drop	Phased array	N/A	-	-	-	N/A	long	1.3	L = 43 - 63 deg (step of 5 deg)	1	2	in	auto	Phased array angles in step of 5 degrees
24	pre	Crack tip	SC-PE-L	Metalscan	900608-15	-	-	single	long	6	55			in	auto	Immersion (FD = 5 mm)
24	pre	Crack tip	SC-PE-T	Imasonic	1719	-	-	single	shear	3	45			out	auto	Only for sizing of larger defects Immersion (FD = 110 mm)
24	pre	Crack tip	SC-PE-T	Imasonic	1720	-	-	single	shear	3	32			out	auto	Immersion (FD = 170 mm)
24	post	Crack tip	SC-PE-L	Imasonic	1721	-	-	single	long	5	55	-	-	in	auto	Immersion (FD = 5 mm)
24	post	Crack tip	SC-PE-T	Imasonic	1719	-	-	single	shear	3	45			out	auto	Only for sizing of larger defects Immersion (FD = 110 mm)
24	post	Crack tip	SC-PE-T	Imasonic	1720	-	-	single	shear	3	32	-	-	out	auto	Immersion (FD = 170 mm)
25	pre	ampl > treshold	SC-PE-T	N/A				single	shear	2.5	40	-	-	out	man	T = 3 - 175 mm
25	pre	ampl > treshold	SC-PE-T	N/A				single	shear	2.5	50	-	-	out	man	T = 3 - 175 mm
25	pre	ampl > treshold	SC-PE-L	N/A				single	long	2.5	0	-	-	out	man	T = 30 - 175 mm
25	pre	ampl > treshold	DC-PE-L	N/A				dual	long	2.5	0 [?]	-	-	in + out	man	T = 2 - 50 mm
25	pre	ampl > treshold	Creeping Wave	N/A				dual	creep	1.8	-	-	-	in	man	T = 2 - 8 mm
25	post	ampl > treshold	SC-PE-T	N/A				single	shear	2.5	40	-	-	out	man	T = 3 - 175 mm
25	post	ampl > treshold	SC-PE-T	N/A				single	shear	2.5	50	-	-	out	man	T = 3 - 175 mm
25	post	ampl > treshold	SC-PE-L	N/A				single	long	2.5	0	-	-	out	man	T = 30 - 175 mm
25	post	ampl > treshold	DC-PE-L	N/A				dual	long	2.5	0 [?]	-	-	in + out	man	T = 2 - 50 mm
25	post	ampl > treshold	Creeping Wave	N/A				dual	creep	1.8	-	-	-	in	man	T = 2 - 8 mm
26	pre	Crack tip	SC-PE-T	RTD	Broad band	ø 10 mm		single	long	5	0	1	4	out	auto	
26	pre	Crack tip	SC-PE-T	RTD	Broad band	ø 25.4 mm		single	long	5	0	1	4	out	auto	
26	pre	Crack tip	SC-PE-T	RTD		16 x 20		single	shear	1.5	41			out	auto	
												2	4			
26	post	Crack tip	SC-PE-T	RTD	Broad band	ø 10 mm		single	long	5	0	2	4	out	auto	
26	post	Crack tip	DC-PE-L	RTD		16 x 20		single	shear/long	1.5	37/70			out	auto	
26	post	Crack tip	SC-PE-T	RTD		16 x 20		single	shear	1.5	41	2	4	out	auto	

TEAM CODE NUMBER	TYPE OF INSPECTION (pre / post)	SCANS TECHNIQUES	INSPECTION METHOD	MANUFACTURER OF PROBE	MANUFACTURER CODES	CRYSTAL SIZE (mm)	HOUSING SIZE (mm)	CRYSTAL (single / dual / twin)	WAVE MODE (shear / long)	FREQUENCY (MHz)	BEAM ANGLE (deg)	ACQUISITION RATE (in λ) (mm)	ACQUISITION RATE (in) (mm)	SCANNING SURFACE (ins / out)	SCAN TYPE (auto / man)	COMMENT
31	post	Crack tip	DC-PE-L	RTD	05EL-2	2 x (½ ø 25 mm)	ø 30 mm	dual	long	2	0	-	-	out	auto	
31	post	Crack tip	SC-PE-L	Krautkramer	B5S-N	ø 25 mm	ø 30 mm	single	long	5	0			out	auto	
31	post	Crack tip	SC-PE-T	RTD	35ET-2	23 x 25	40 x40	single	shear	2	35			out	auto	
31	post	Crack tip	SC-PE-T	RTD	39ET-1	23 x 25	40 x40	single	shear	1	39			out	auto	
31	post	Crack tip	SC-PE-L	RTD	28EL-2	25 x 30	40 x40	single	long	2	28			out	auto	
31	post	Crack tip	SC-PE-L	RTD	30EL-2	27 x 30	40 x40	single	long	2	30	-	-	out	auto	
31	post	Crack tip	Phased array	RD-TECH	16 elements	16 (10 x 16)	14 x 24 x 40	N/A	long	5	15, 20 & 30			out	auto	
31	post	Crack tip	SC-PE-T	Krautkramer	WB35-4	20 x 22	29 x 54	single	shear	4	35			out	auto	
31	post	TOFD	TOFD	RTD	39ET-1	23 x 25	40 x40	2 X single	shear	1	39			out	auto	Same probe used for detection
31	post	TOFD	TOFD	RTD	28EL-2	25 x 30	40 x40	2 X single	long	2	28	-	-	out	auto	Same probe used for detection
31	post	TOFD	TOFD	RTD	30EL-2	27 x 30	40 x40	2 X single	long	2	30	-	-	out	auto	Same probe used for detection
32	post	Crack tip	SC-PE-T	Krautkramer	MAP	ø 10 mm	12 x 20	single	shear	2	45	1	1	in	auto	
32	post	Crack tip	DC-PE-L	RTD	70TRL-2 (HCC)	2 x (½ ø 18 mm)	40 x 40	dual	long	2	70			in	auto	FS = 18 mm
32	post	TOFD	TOFD	Krautkramer	G5KB	ø 12.5 mm	N/A	2 x single	long	5	20			out	auto	Only complex defect measured from the outside surface
32	post	TOFD	TOFD	Krautkramer	G5KB	ø 12.5 mm	N/A	2 x single	long	5	20			in	auto	
32	post	TOFD	TOFD	Krautkramer	G5KB	ø 12.5 mm	N/A	2 x single	long	5	35	1	1	in	auto	
32	post	TOFD	TOFD	Krautkramer	G5KB	ø 12.5 mm	N/A	2 x single	long	5	60	1	1	in	auto	
33	post	Crack tip	SC-PE-T	RTD	45T-1	25 x 23	40 x 40	single	shear	1	45	10	1	in	auto	
33	post	Crack tip	DC-PE-L	RTD	70TRL-2	2 x (8 x 14)	25 x 25	dual	long	2	70	10	1	in	auto	
33	post	Crack tip	DC-PE-T	RTD	45TRT-1	2 x (12 x 23))	40 x 40	dual	shear	1	45	10	1	in	auto	
33	post	Crack tip	Tandem tech	Krautkramer	MWB45-E2	8 x9	13 x23	2 x dual	shear	2	45	10	1	in	auto	
33	post	Crack tip	Tandem tech	RTD	45T-2	25 x 23	40 x 40	2 x dual	shear	2	45	10	1	in	auto	
34	post	Crack tip	DC-PE-T	RTD	45ET-1	25 x 23	40 x 40	dual	shear	1	45	2-dim saft = 10, 3-dim saft = 1	0.3	in	auto	SAFT
34	post	Crack tip	SC-PE-T	Krautkramer	MWB45 N2	8 x 9	13 x23	single	shear	2	45	2-dim saft = 5, 3-dim saft = 0.5	0.3	in	auto	SAFT
35	post	-	DC-PE-L	N/A				dual	long	2	70			in	auto	Data recorded by team DD Sizing only performed on defect Ei + Fd
35	post	-	Phased array	N/A				N/A	long	1.3	L = 43 - 63 deg (step of 5 deg)	No datechon	No datechon	in	auto	Data recorded by team DD Sizing only performed on defect Ei + Fd
36	post	-	DC-PE-L	N/A				dual	long	2	70			in	auto	Data recorded by team DD Sizing only performed on defect Ei + Fd
36	post	-	Phased array	N/A				N/A	long	1.3	L = 43 - 63 deg (step of 5 deg)	No datechon	No datechon	in	auto	Data recorded by team DD Sizing only performed on defect Ei + Fd



TEAM CODE NUMBER	TYPE OF INSPECTION (pre / post)	SIGNAL TECHNIQUES	INSPECTION METHOD	MANUFAC. TYPE OF PROBE	MANUFAC. TYPE Code	CRYSTAL SIZE (mm)	HOUSING SIZE (mm)	CRYSTAL (single / dual crystal)	WAVE MODE (shear / long.	FREQU. ENCY (MHz)	BEAM ANGLE (deg)	ACQUISITION GATE KEY (mm)	ACQUISITION RATE KEY (mm)	SCANNING INCREASE (in / out)	SCAN TYPE (auto / man)	COMMENT
41	-	-	-	-	-	-	-	-	-	-	-			-	-	Eddy Current
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Eddy Current
43																