Item	*Order Code (Part ##)*
Inspection SW Application for ISONIC 3510T, ISONIC 3510 - Phased Array Modality: **EXPERT SHAFT - Inspection of various shafts, axles, bolts, spindles for the transversal cracks and other imperfections**	SWA 3510029
Inspection SW Application for ISONIC 3510T, ISONIC 3510 - Phased Array Modality: **EXPERT SHAFT - Inspection of various shafts, axles, bolts, spindles for the transversal cracks and other imperfections**	SWA 910029
Inspection SW Application for ISONIC 3510T, ISONIC 3510 - Phased Array Modality: **EXPERT SHAFT - Inspection of various shafts, axles, bolts, spindles for the transversal cracks and other imperfections**	SWA 909029
⇨ True-To-Geometry Shaft/Axle/Bolt/Spindle Overlay Volume Corrected Imaging - Cross Sectional Along the Bridge Pin / Unfolded C-Scan / 3D ⇨ Sector-Scan Cross Sectional Along the Shaft/Axle/Bolt/Spindle Coverage with Probe Placed on the End Surface ⇨ Intuitive Image Guided PA Pulser Receiver with Beam Forming View ⇨ DAC / TCG Normalization ⇨ Built-In Shaft/Axle/Bolt/Spindle Geometry Editor and Ray Tracer - Scanning Pattern Design Geometry Editor and Ray Tracer - Scanning Pattern Design ⇨ Independent on TCG Angle Gain Compensation (AGC) - Gain Per Focal Law Correction ⇨ Encoded and Time based Unfolded C-Scan ⇨ 100% Raw Data Capturing ⇨ Automatic Defects Alarming Upon C-Scan Acquisition Completed ⇨ Automatic Generating of Editable Defects List ⇨ Comprehensive Postrpocessing Including: → Recovery and Evaluation of Captured A-Scans from the Recorded Cross Sectional Along the Shaft/Axle/Bolt/Spindle Views (Sector Scan) and C-Scans → Recovery of Cross Sectional Along the Shaft/Axle/Bolt/Spindle Views from the Recorded C-Scans → Converting Recorded C-Scans or their Segments into 3D Images → Off-Line Gain Manipulation → Off-Line DAC to TCG / TCG to DAC toggling for all types of stored files (A-Scans, cross-sectional views, C-Scans, etc) → Off-Line DAC Normalization of the Recorded Images / DAC Evaluation → Off-Line editing of Angle Gain Compensation / Gain per Shot Correction applied to the stored the Cross-sectional Views / C-Scan data → Numerous Filtering / Reject Options (by Geometry / Position / By Amplitude / dB-to-DAC / etc) → Defects Sizing → Generating of Defect List and Storing it Into a Separate File → Automatic creating of inspection reports - hard copy / PDF File	

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There is no disassembly of axle set required for the inspection, just the access to the end side surface of the railway axle from both sides

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Inspection of Railway Axles

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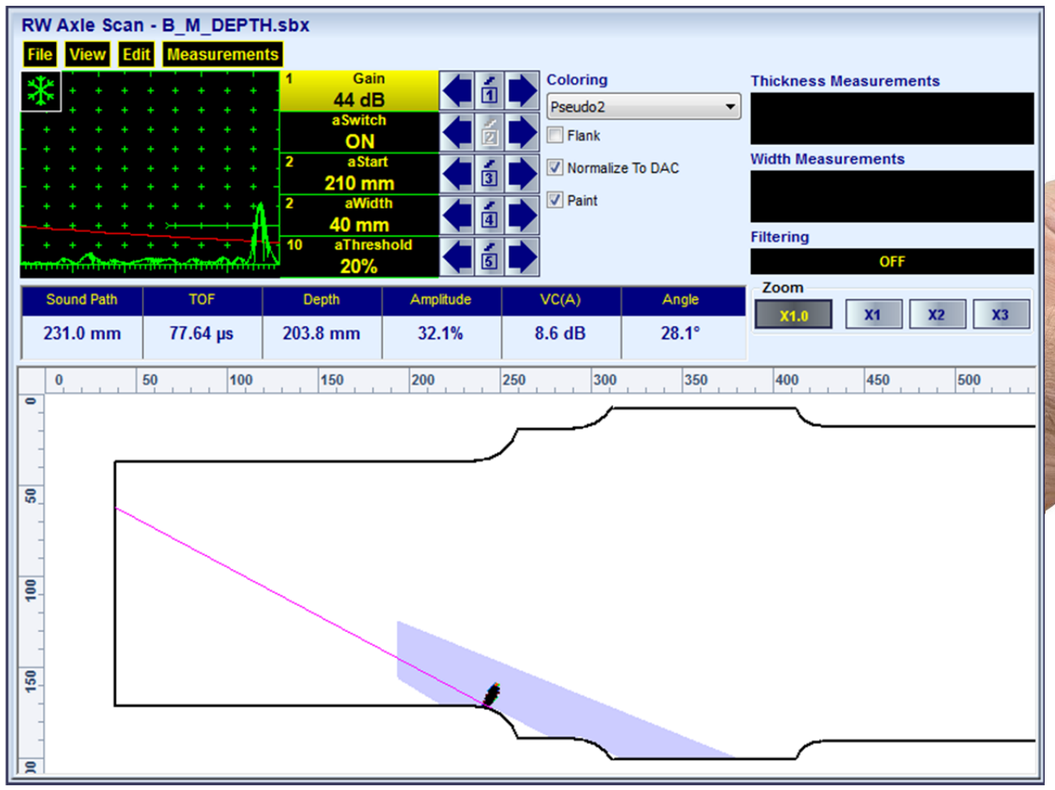

Inspection of Railway Axles

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RW Axle Scan - RW_AXLE_006A.sbx

File View Edit Measurements

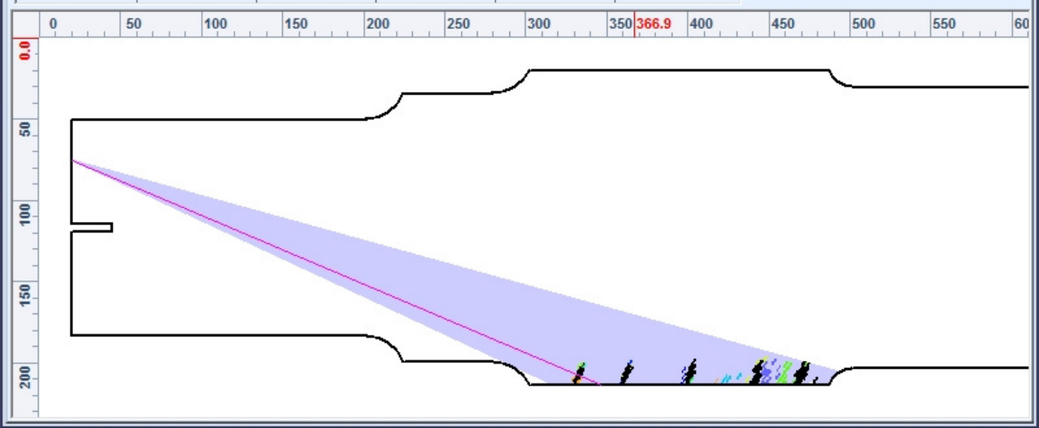
1 Gain 38 dB
aSwitch OFF
2 aStart 30 mm
2 aWidth 40 mm
10 aThreshold 20%

Coloring: Pseudo2
Flank
Normalize To DAC
Paint

Thickness Measurements
Width Measurements
Filtering: OFF

Zoom: X1.0 X1 X2 X3

Sound Path	TOF	Depth	Amplitude	VC(A)	Angle
< Threshold	< Threshold	< Threshold	> 130%	> 130%	23.0°



RW Axle Scan - RW_AXLE_006B.sbx

File View Edit Measurements

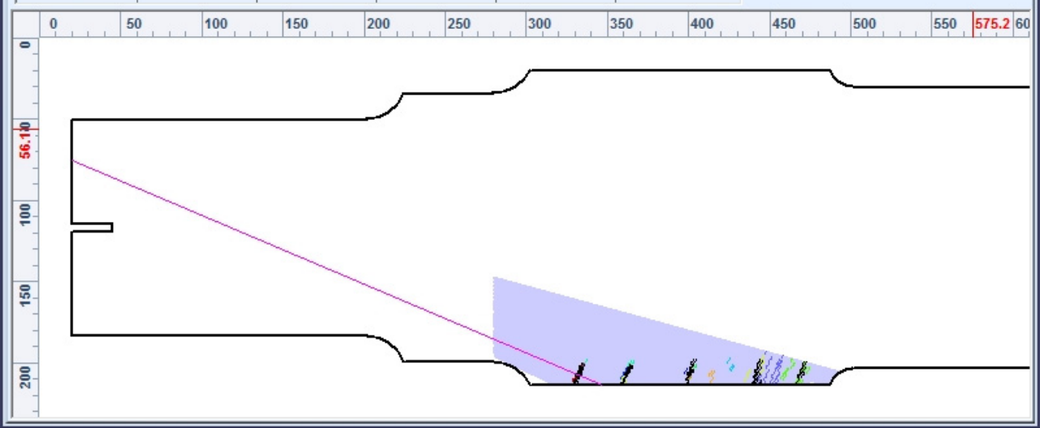
6 Gain 38 dB
aSwitch OFF
2 aStart 30 mm
2 aWidth 40 mm
10 aThreshold 20%

Coloring: Pseudo2
Flank
Normalize To DAC
Paint

Thickness Measurements
Width Measurements
Filtering: OFF

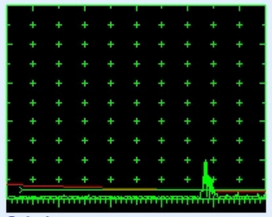
Zoom: X1.0 X1 X2 X3

Sound Path	TOF	Depth	Amplitude	VC(A)	Angle
< Threshold	< Threshold	< Threshold	> 130%	> 130%	23.0°



CScan Postprocessing - RW_AXLE_006.scx

File View Edit Mark Measurements 3D View



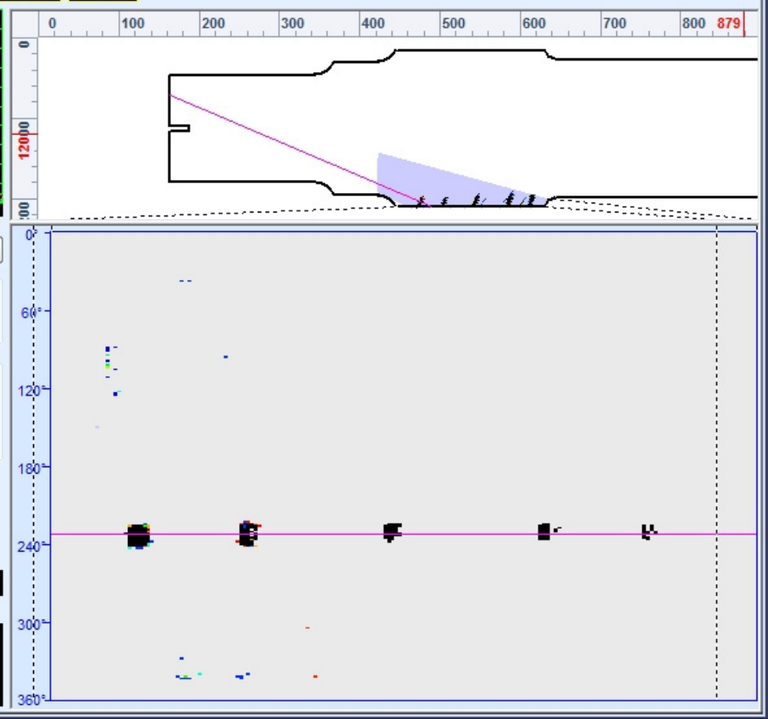
Coloring: Pseudo2

Mapping: Amplitude / Distance

Mark: CScan ON OFF / BScan ON OFF

Filtering: OFF

Measurements: Length Width Height

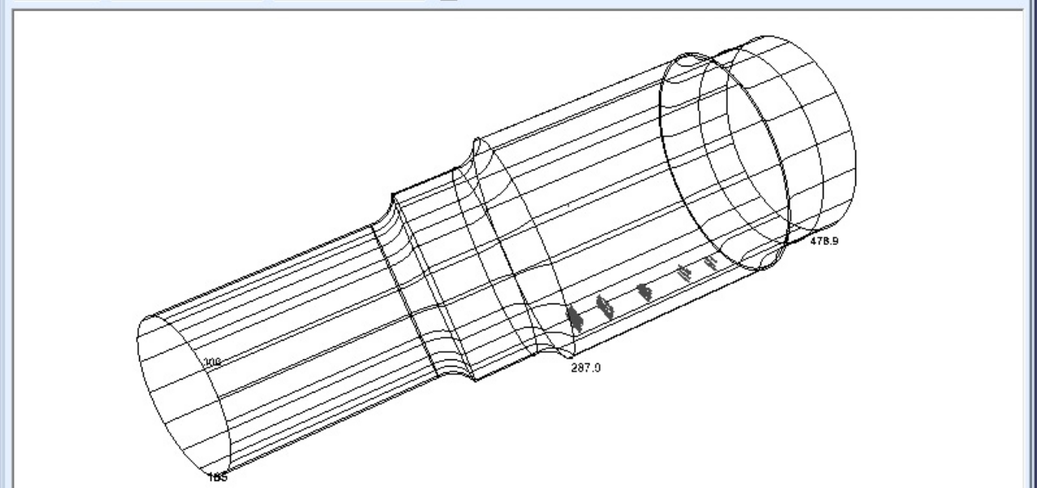


3D View

Zoom | Navigation | Rotate | Mapping: Amplitude / Distance

Show Grid
Show Dimensions

Save Print Close
Reset View



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There is no disassembly required for the inspection of the axle shafts in the bridges, cranes, and the like, just the access to the end side surface

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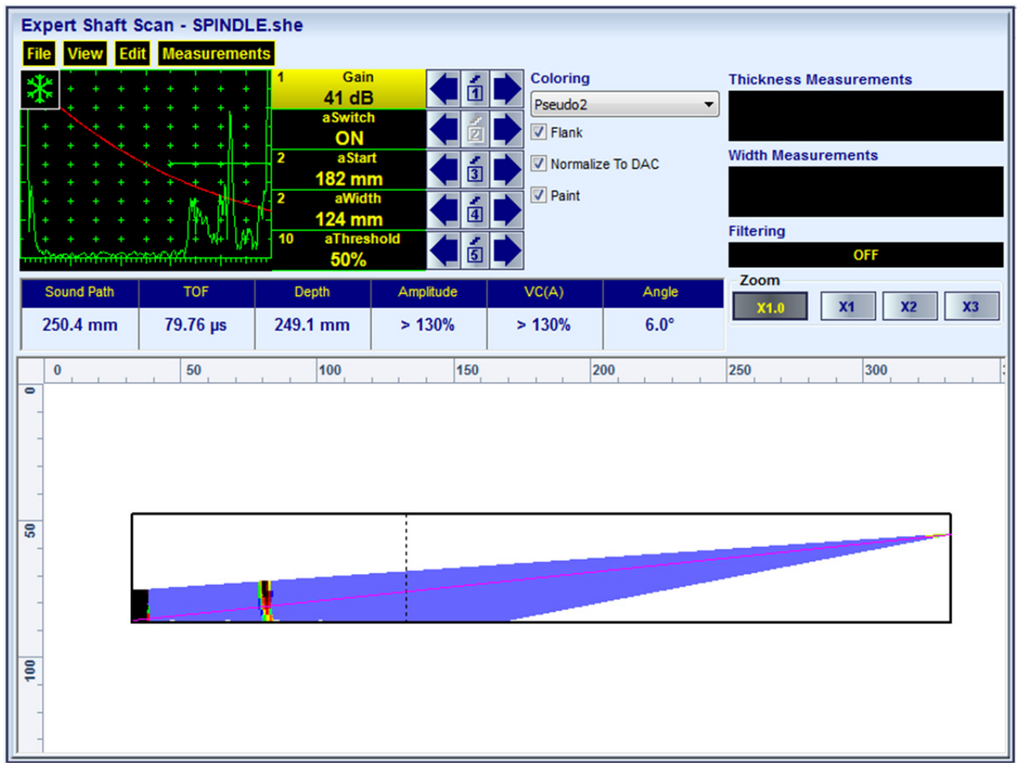

Inspection of bolts and spindles

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Inspection of Solid Bolts

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Inspection of Hollow Stud Bolts

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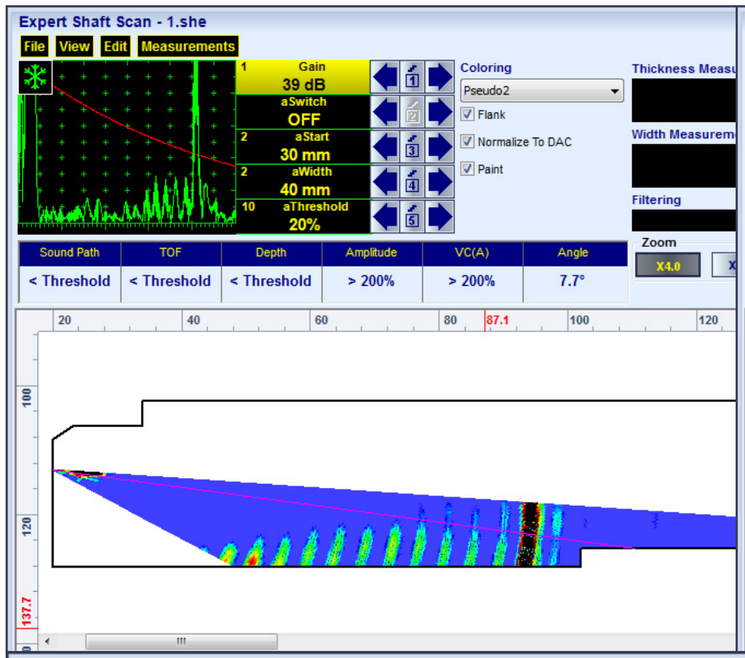

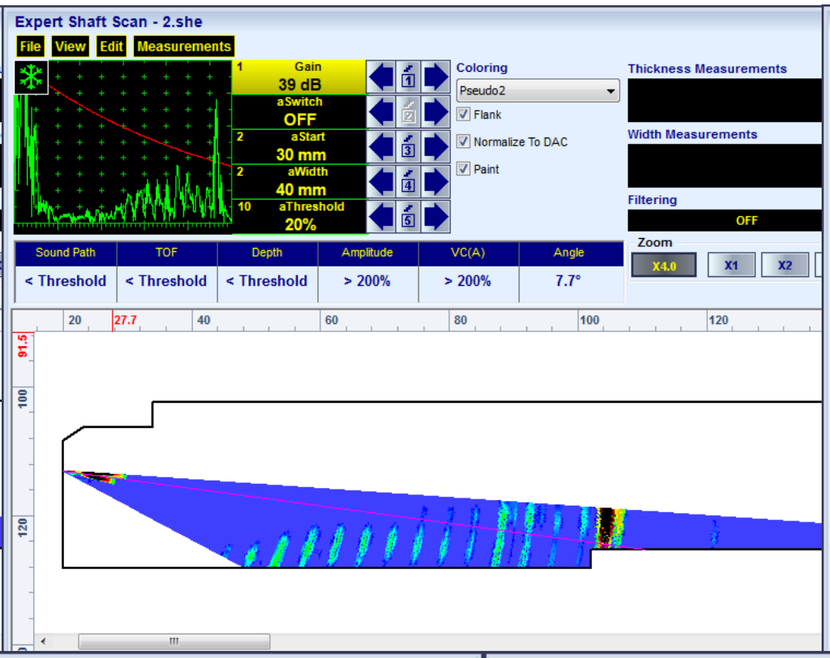

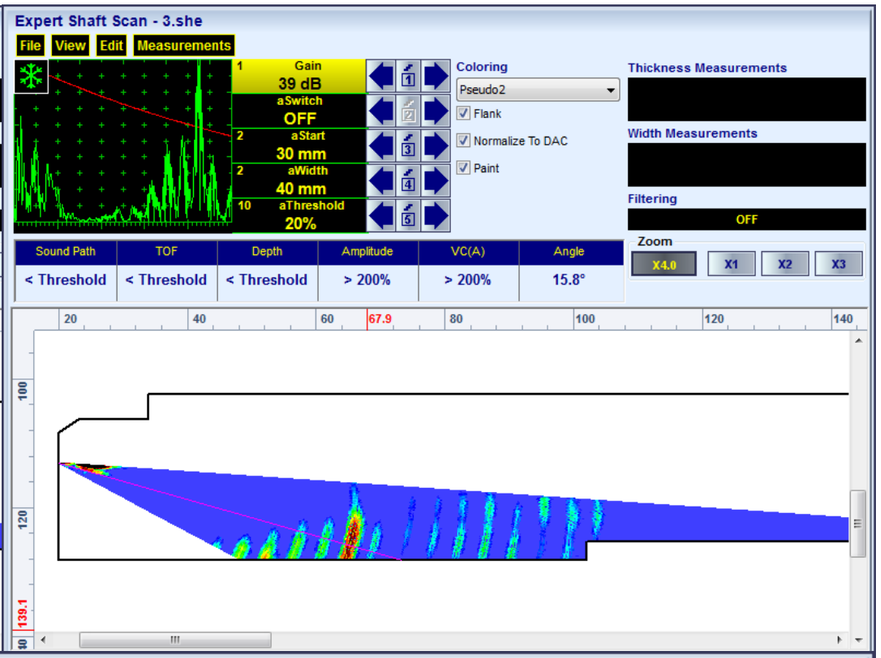

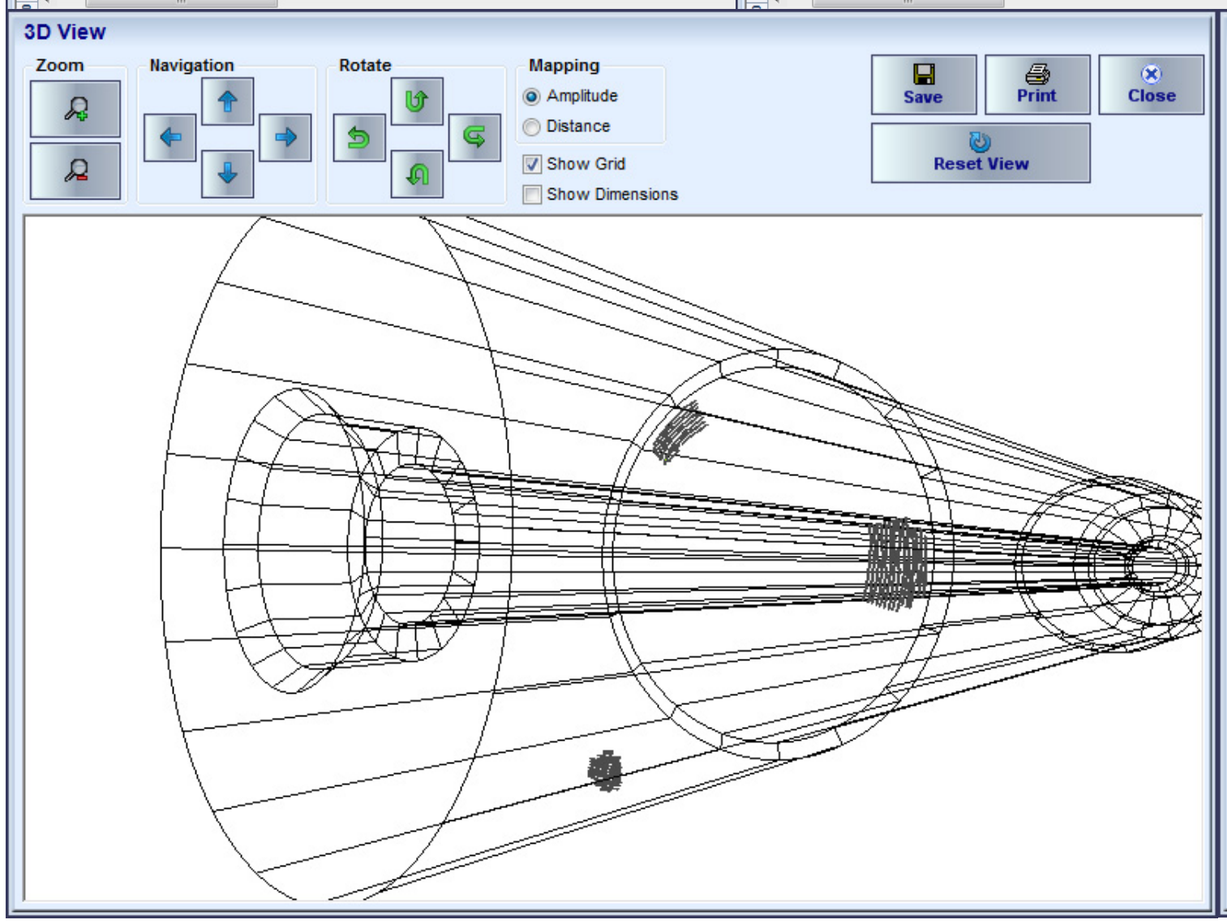

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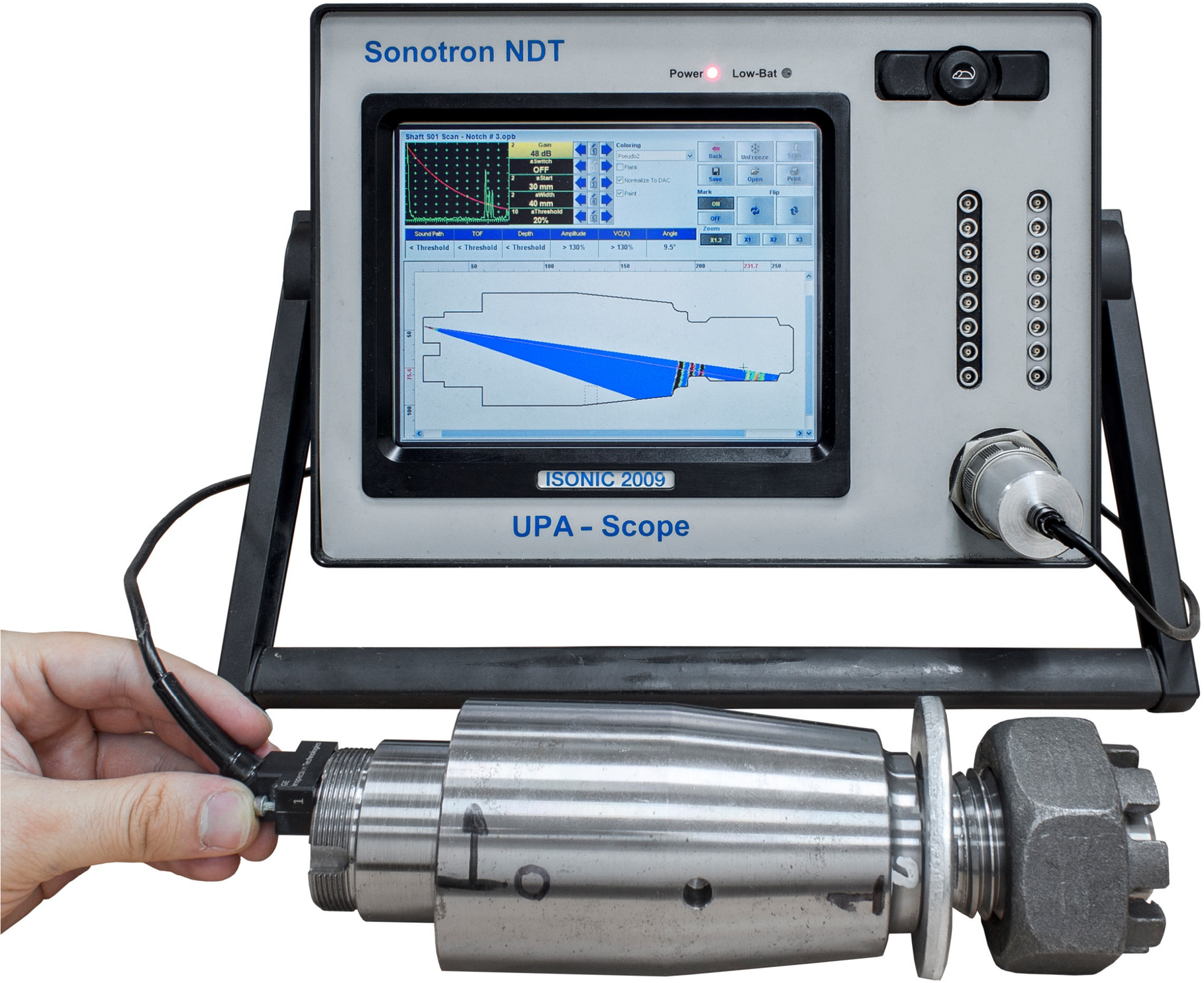

Inspection of the complex geometry shafts

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Inspection of the complex geometry shafts

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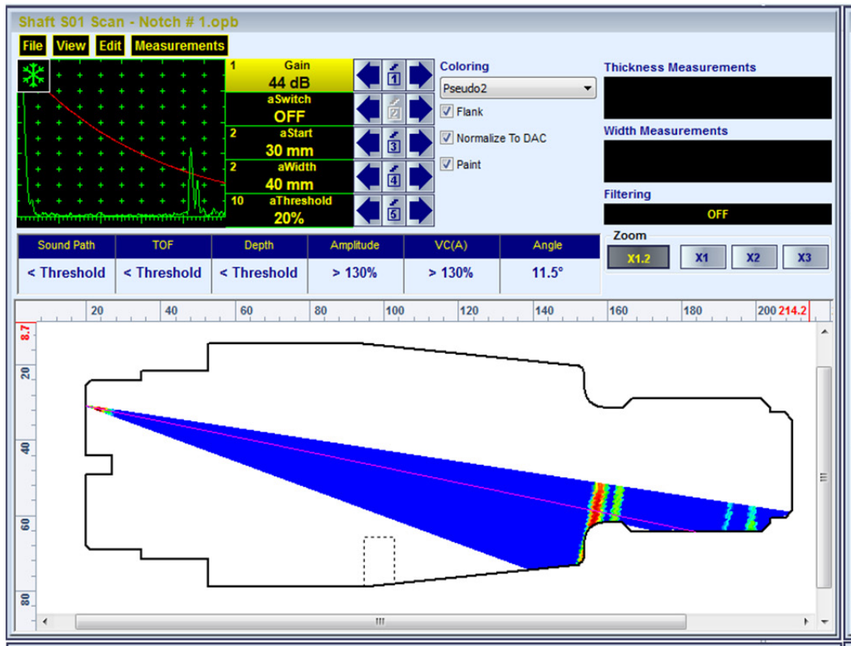
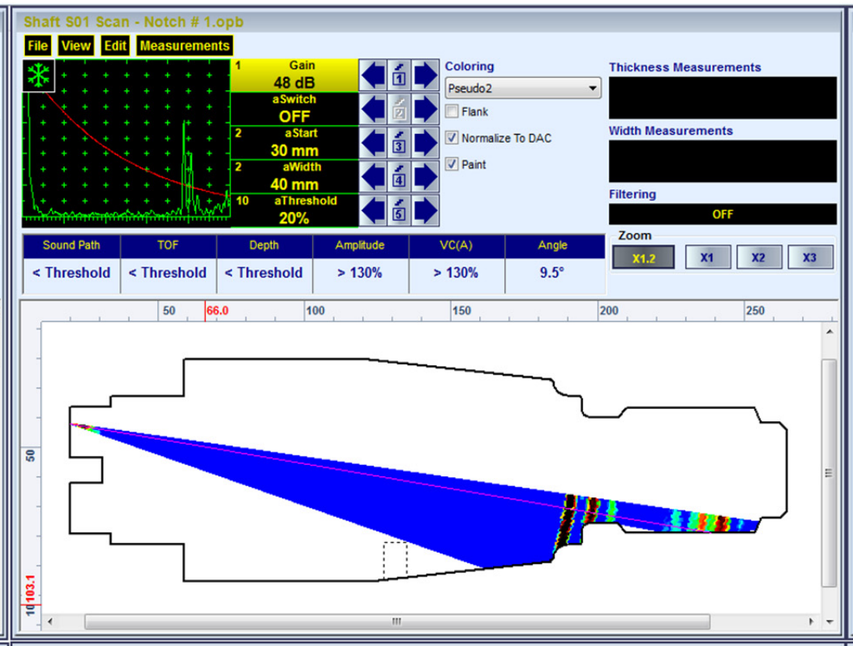
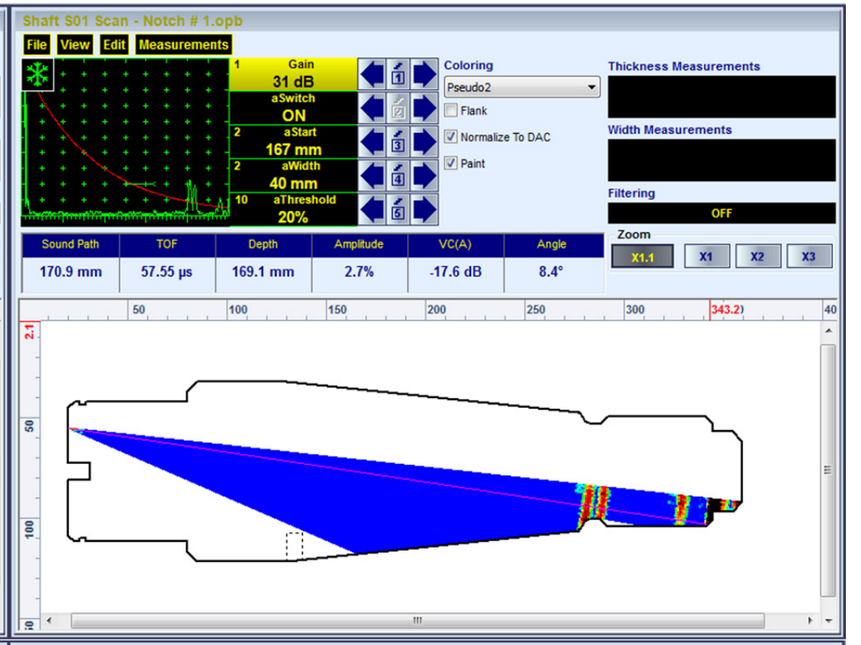
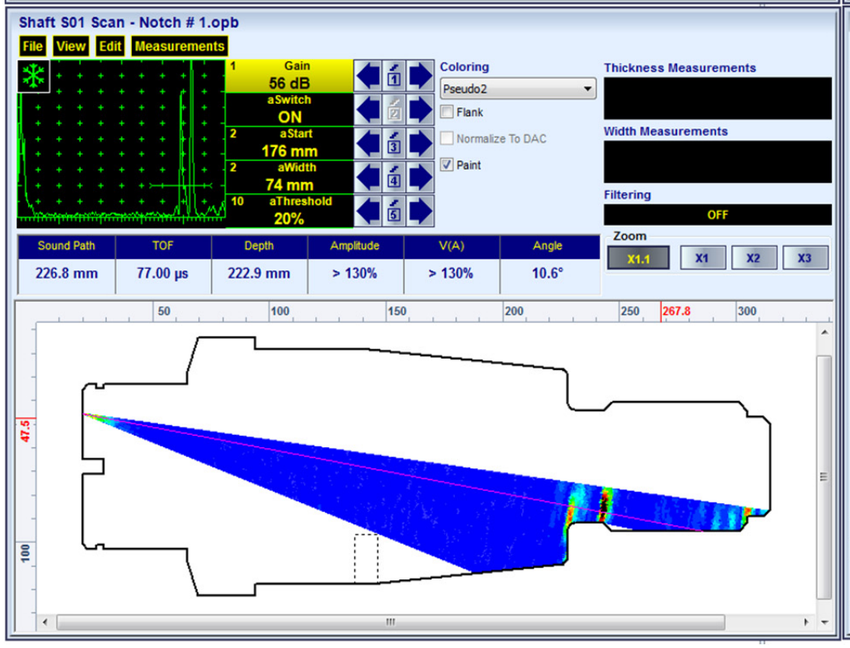
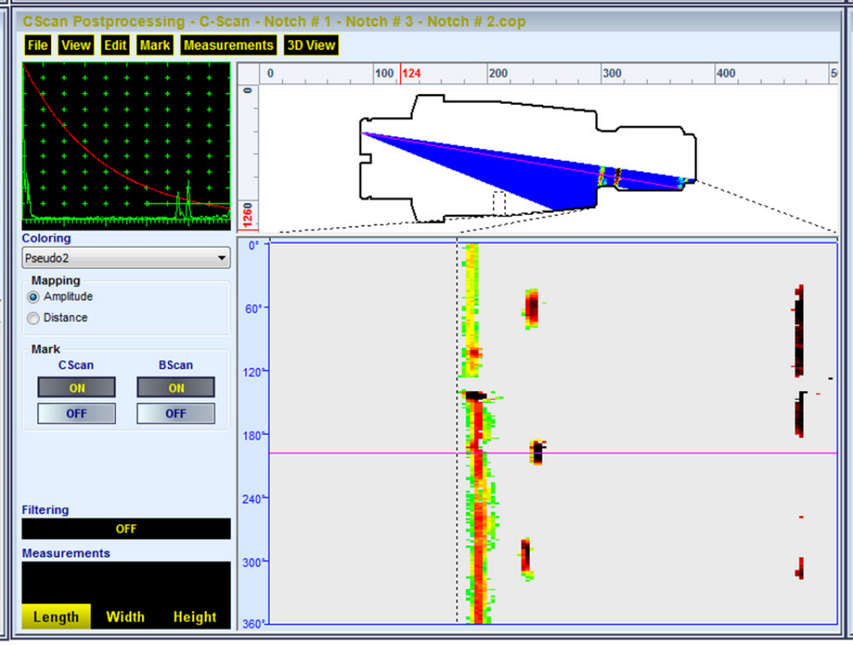
Typical Postprocessing Screenshots

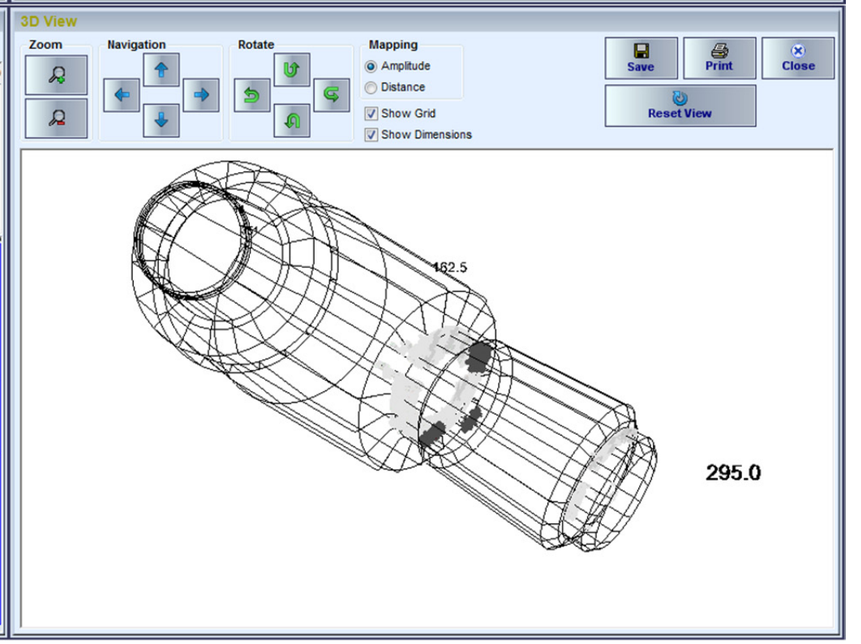












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Inspection of the wind turbine shaft

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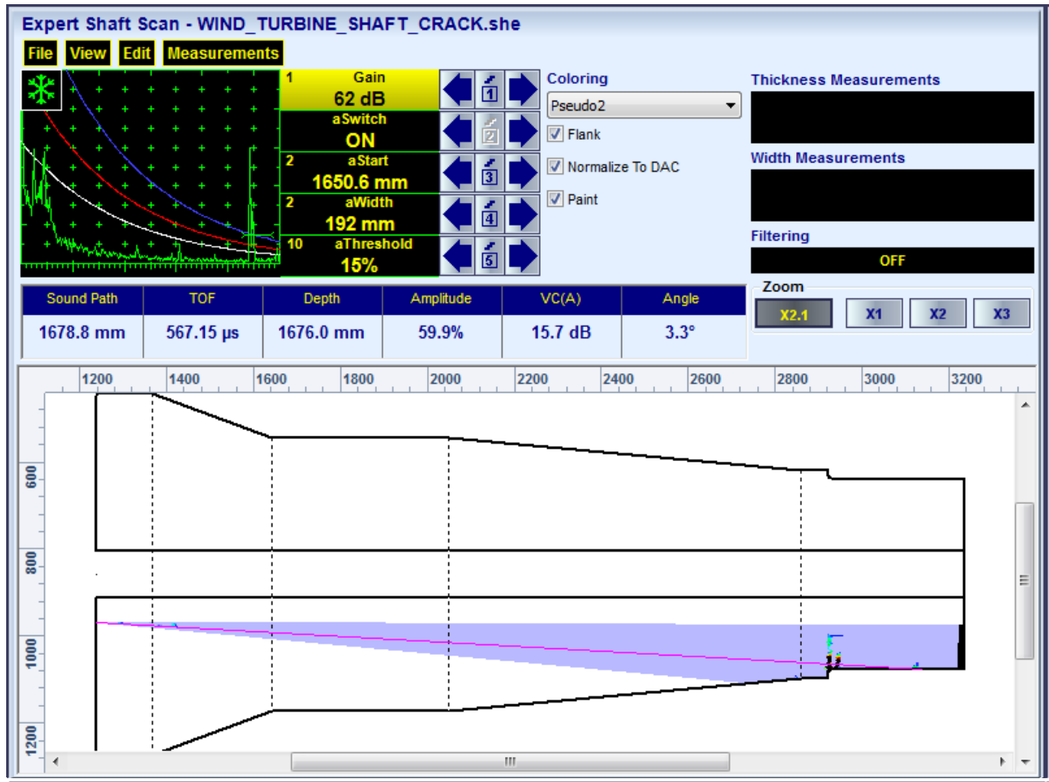

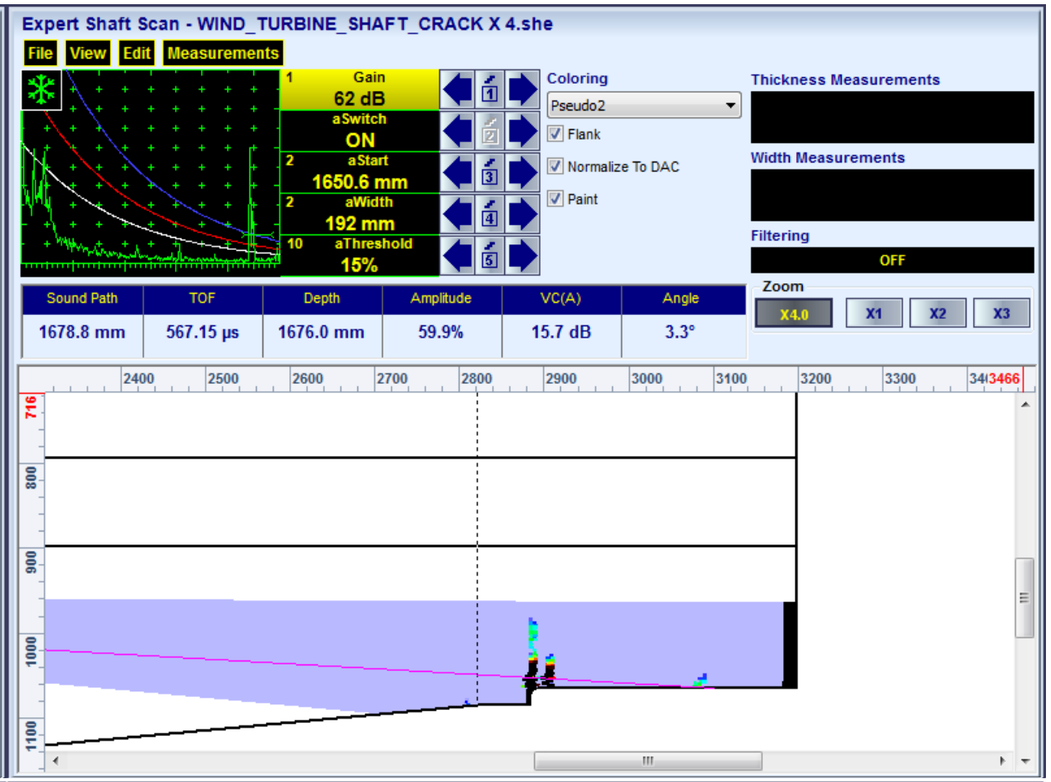

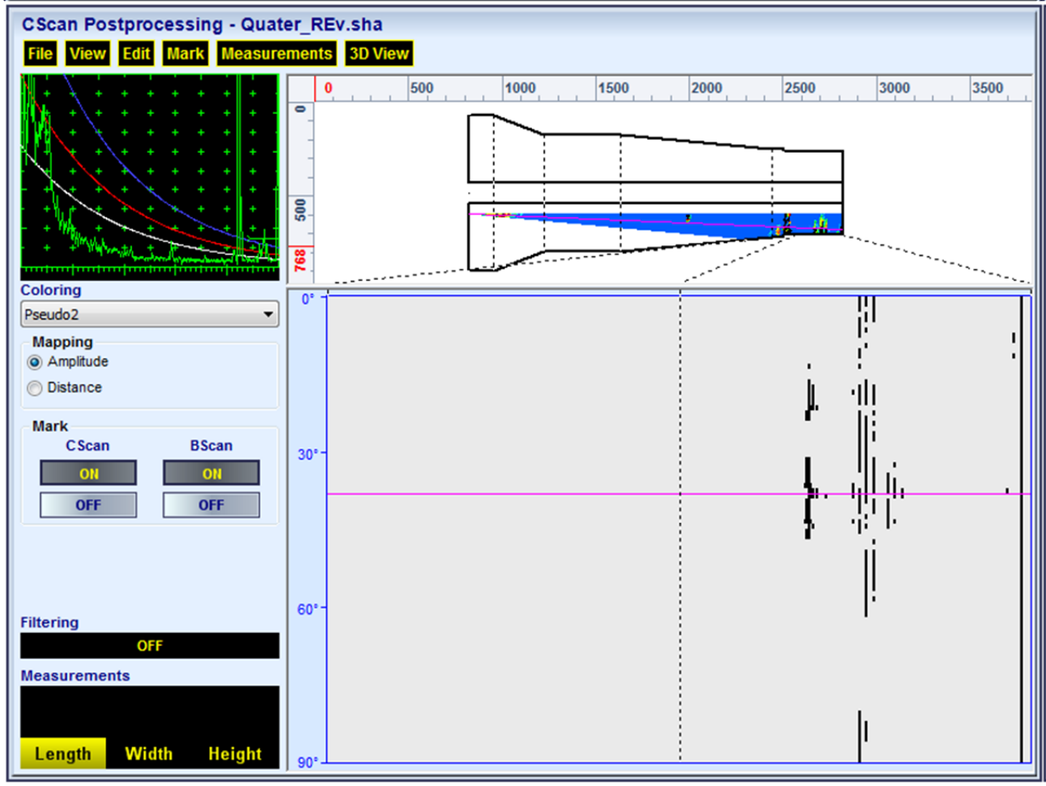

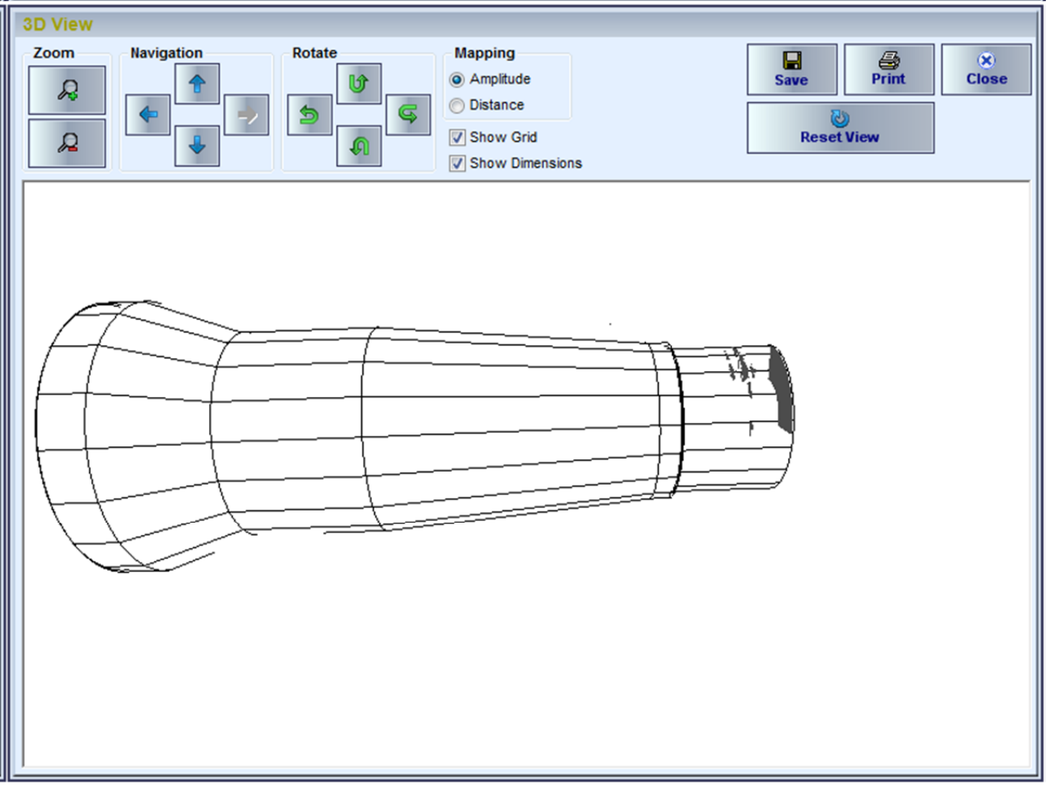

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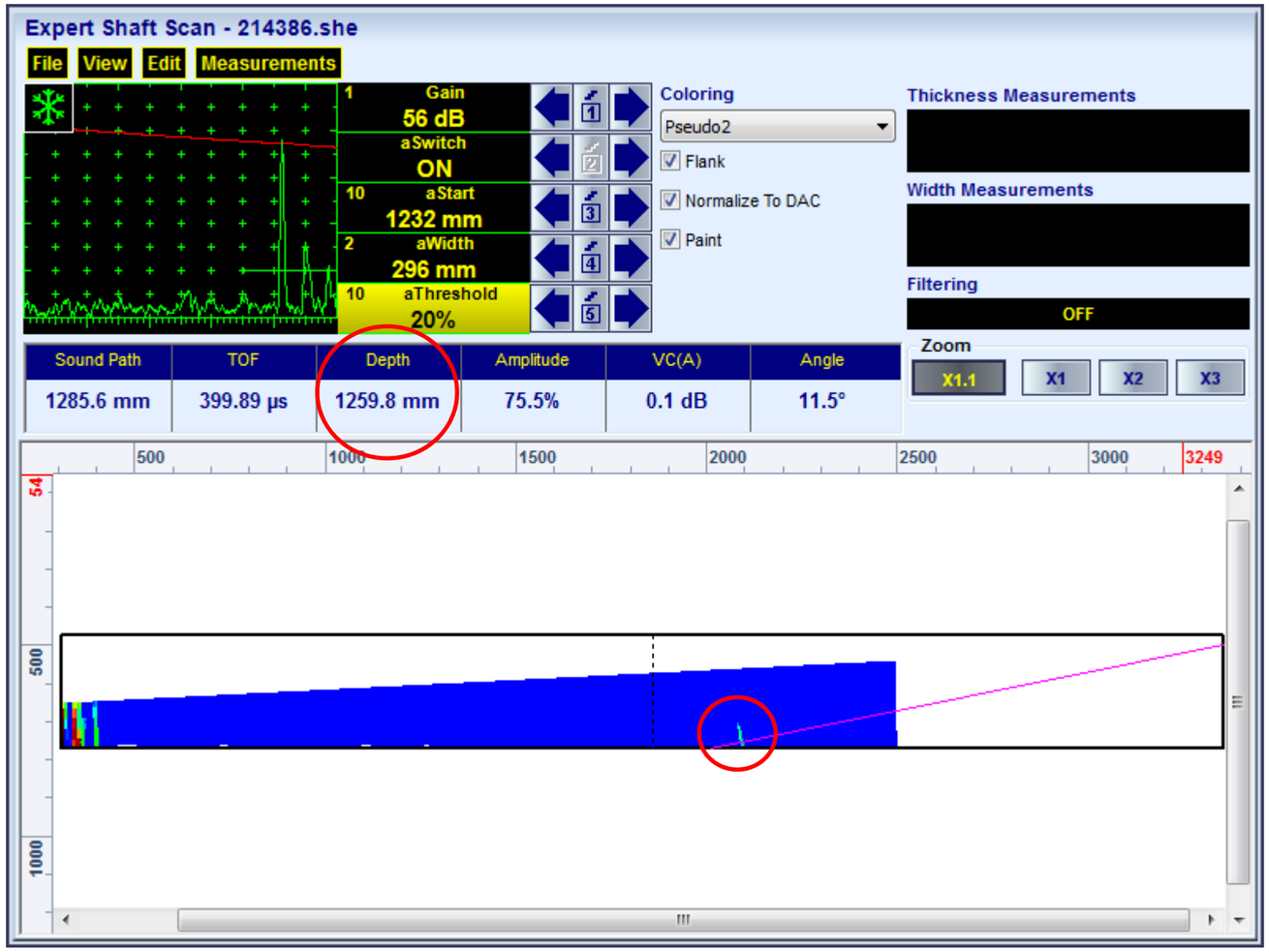
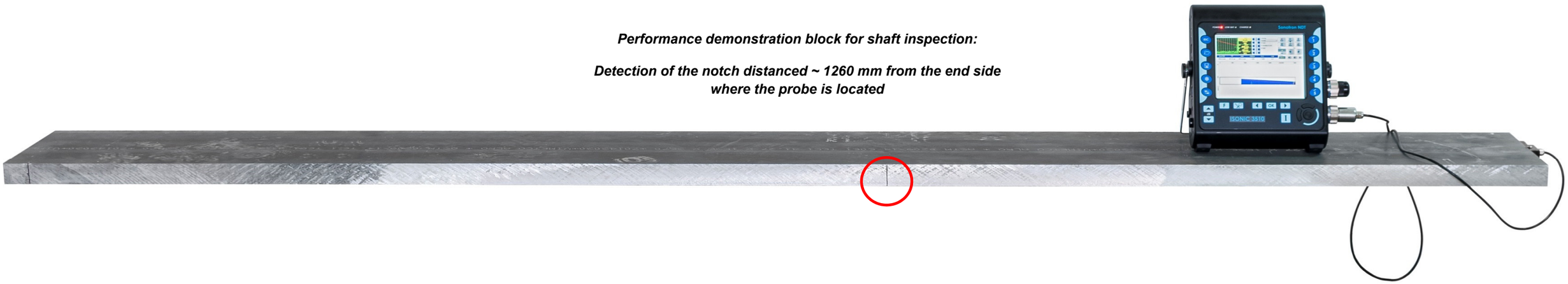


Performance demonstration block for shaft inspection:

Detection of the notch distanced ~ 1260 mm from the end side where the probe is located



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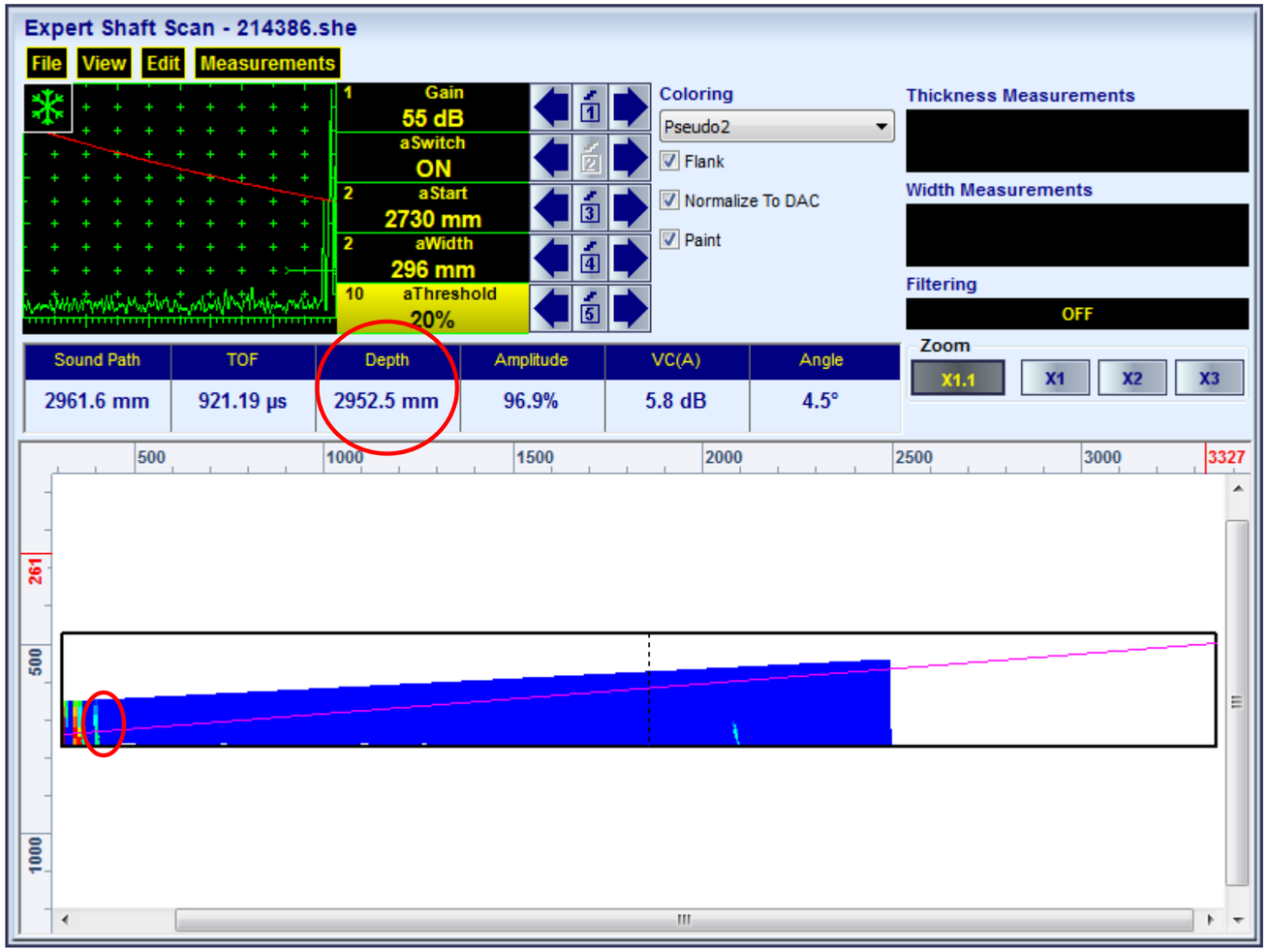
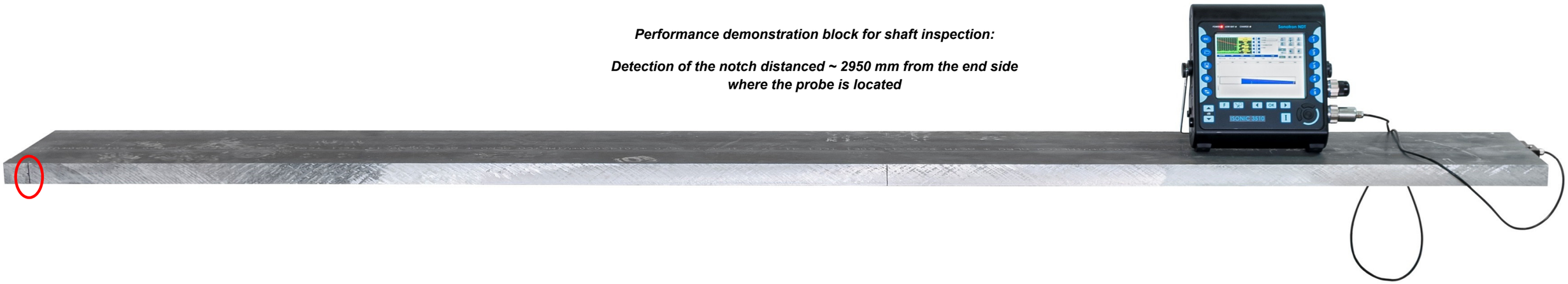


Performance demonstration block for shaft inspection:

Detection of the notch distanced ~ 2950 mm from the end side where the probe is located



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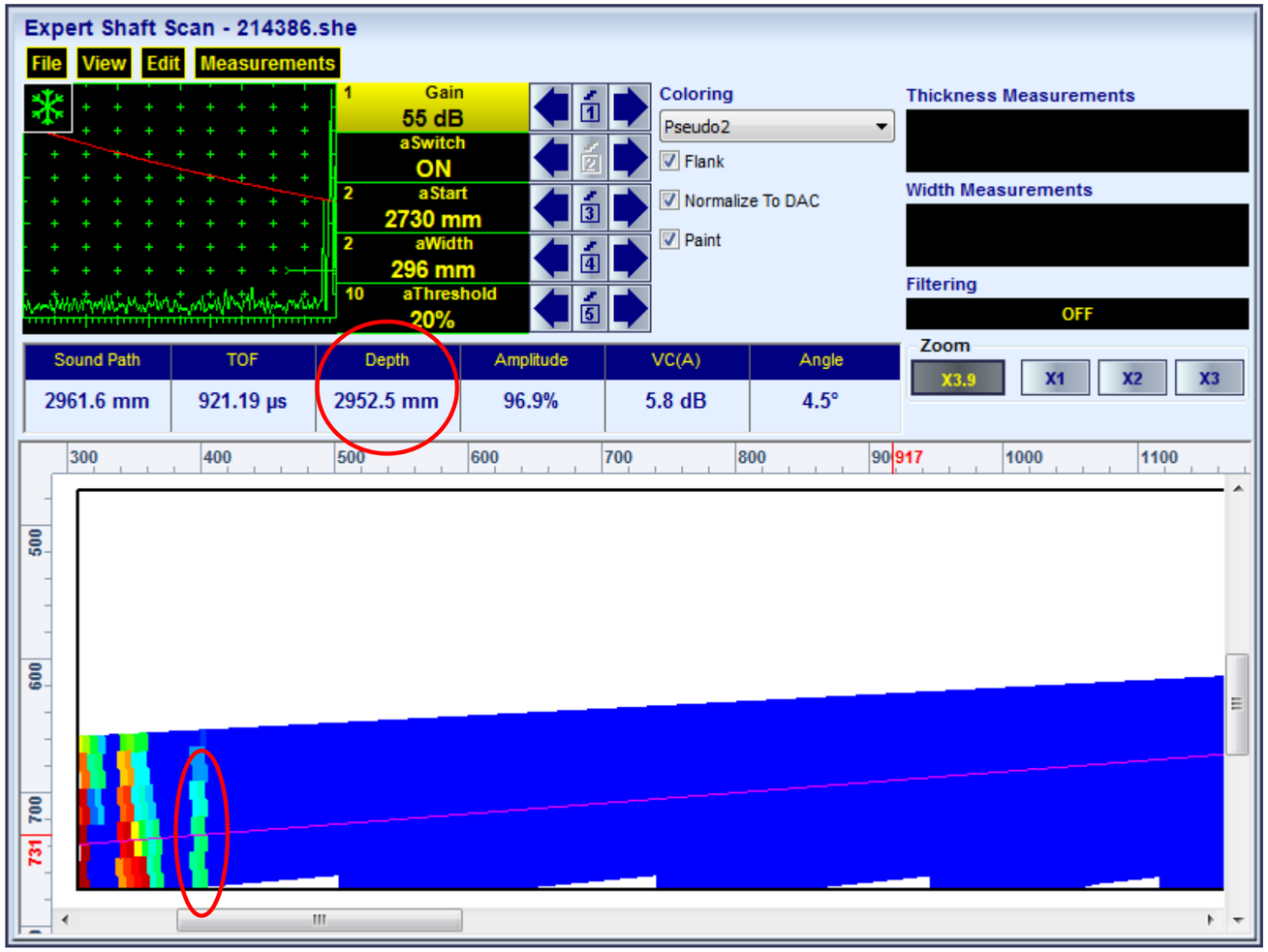
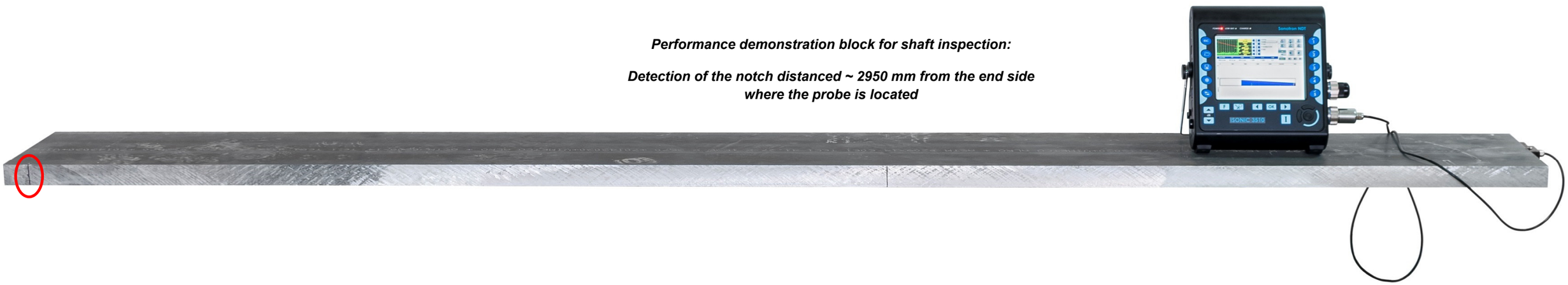


Performance demonstration block for shaft inspection:

Detection of the notch distanced ~ 2950 mm from the end side where the probe is located



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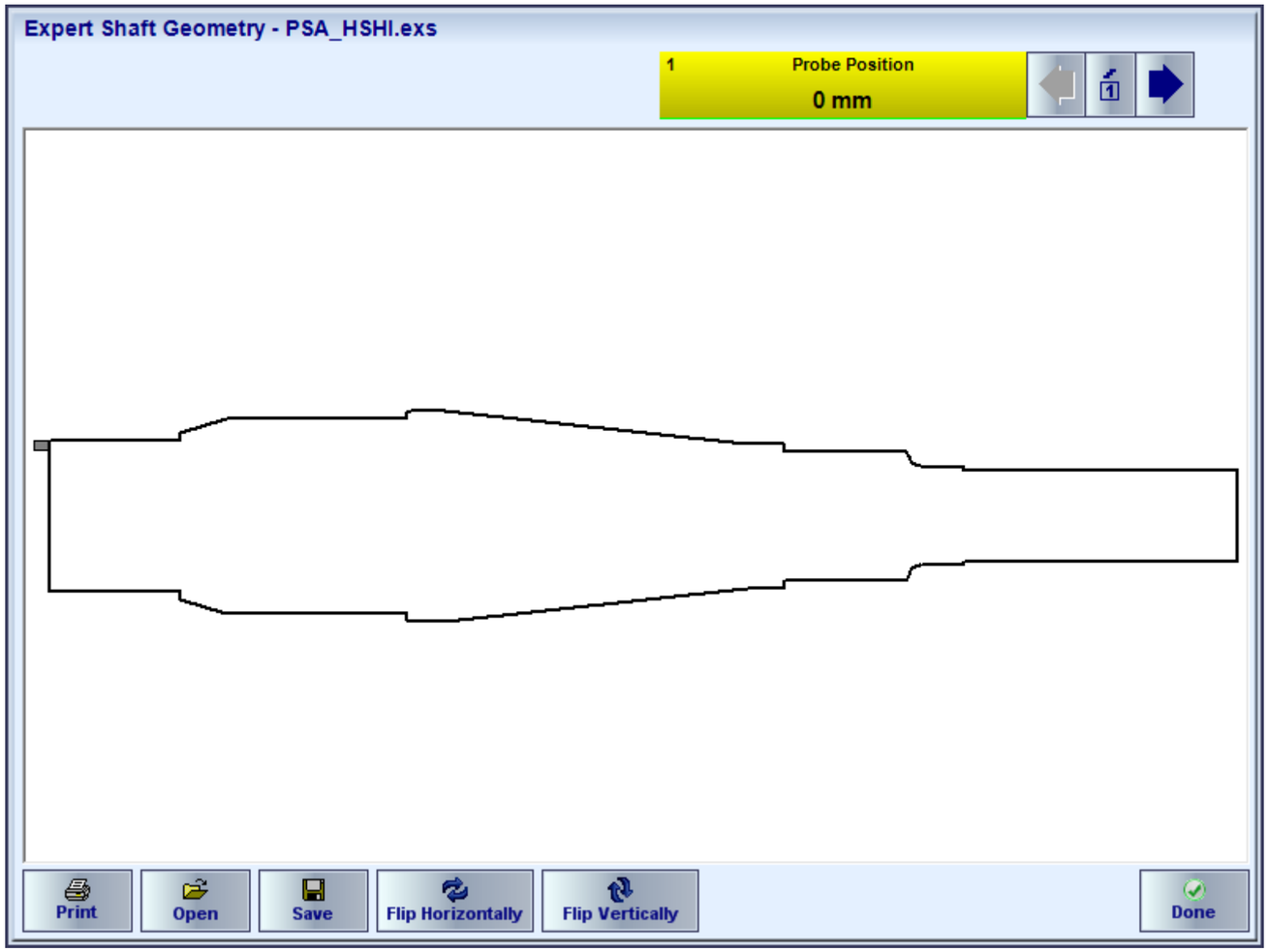
Shaft Geometry Entered into the Instrument from the CAD File



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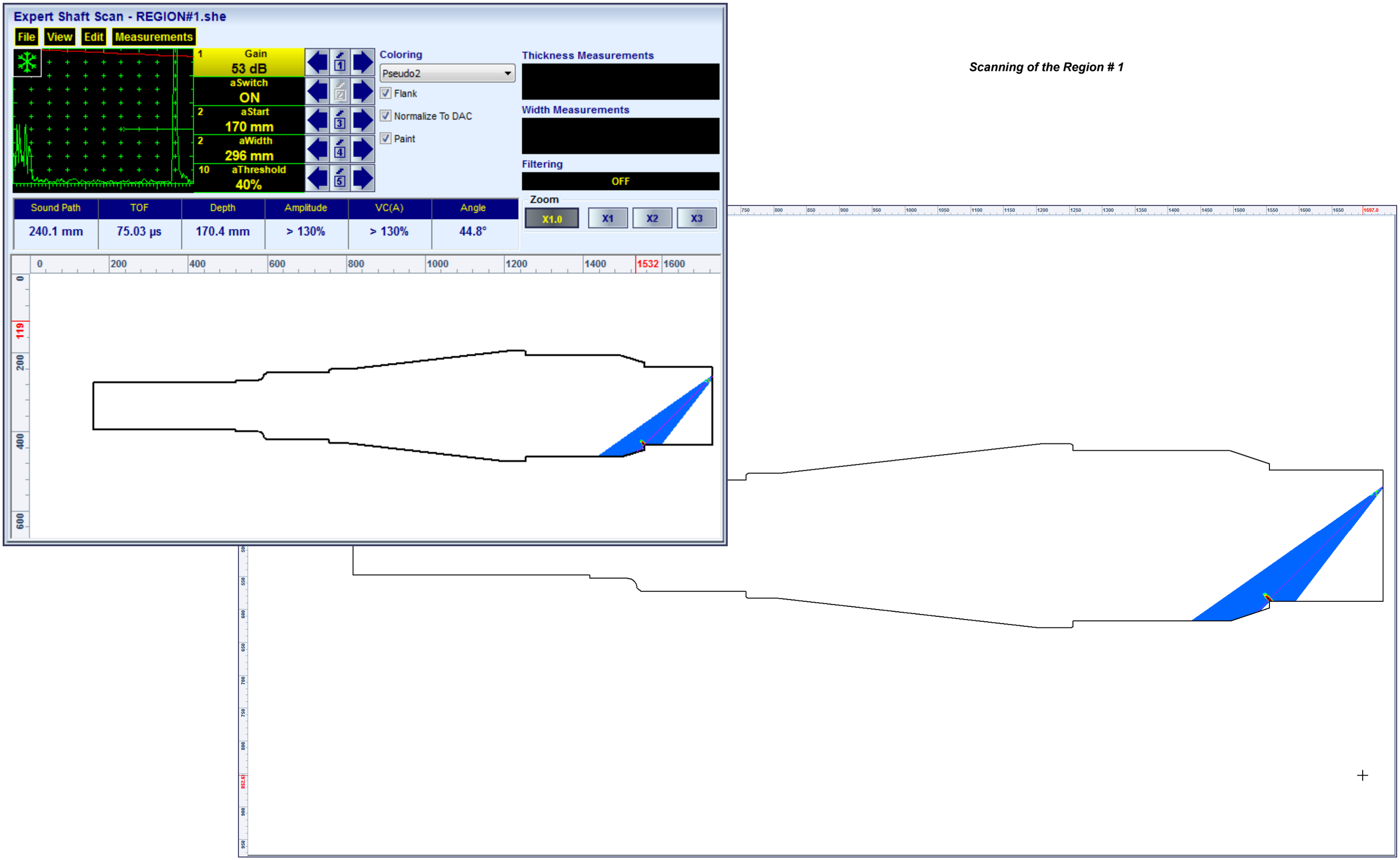
Scanning of the Region # 1



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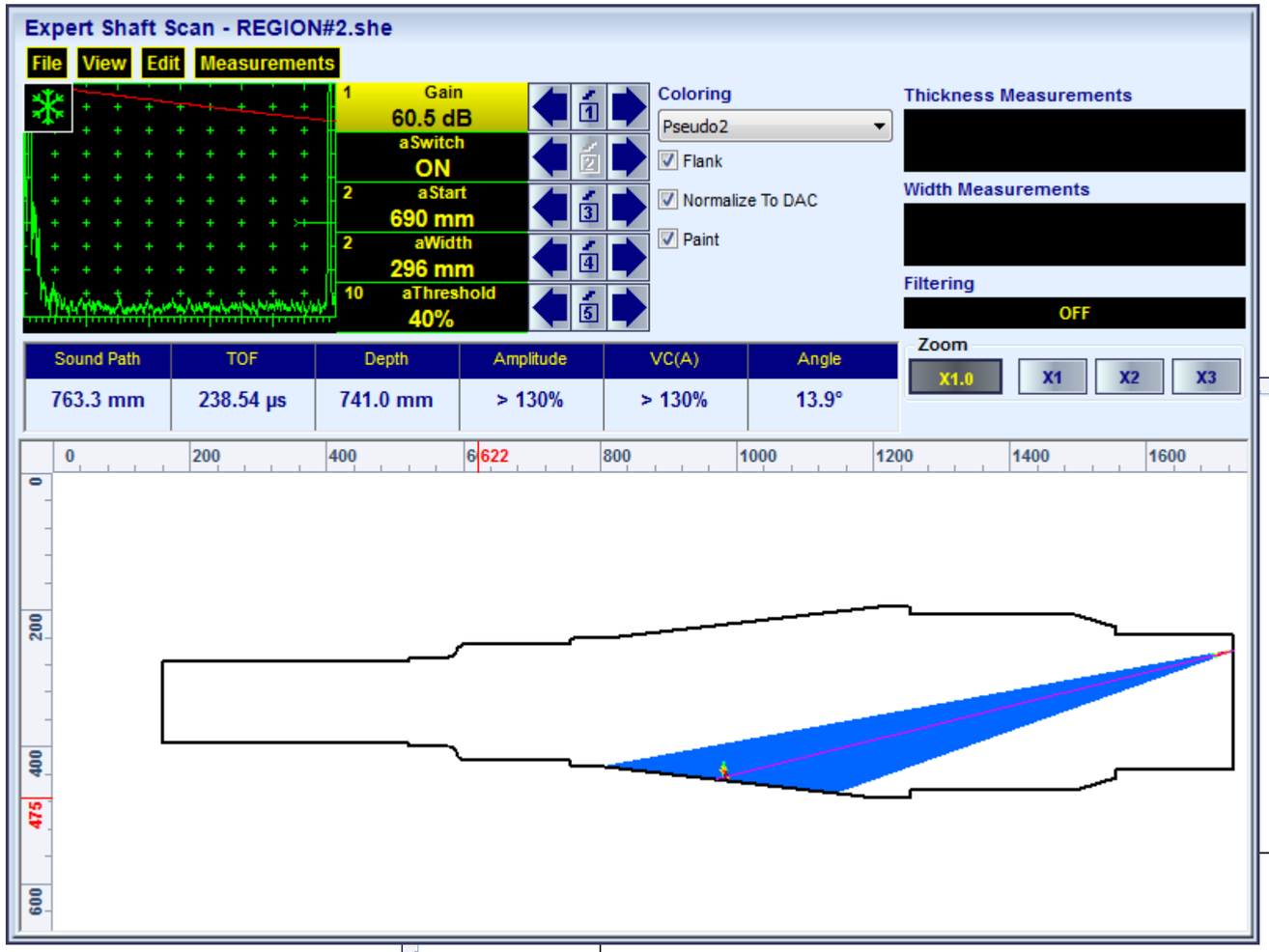
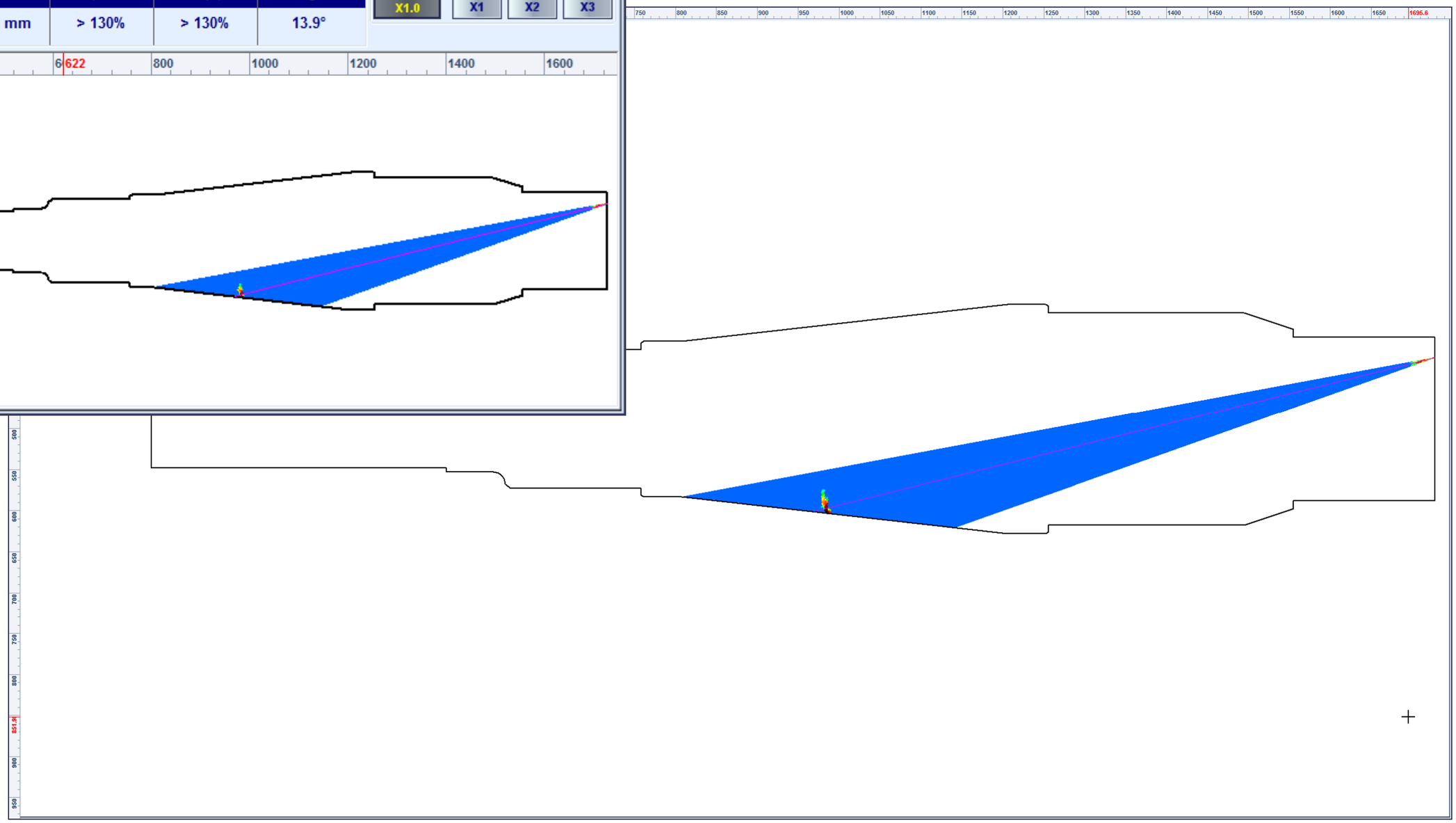
Scanning of the Region # 2





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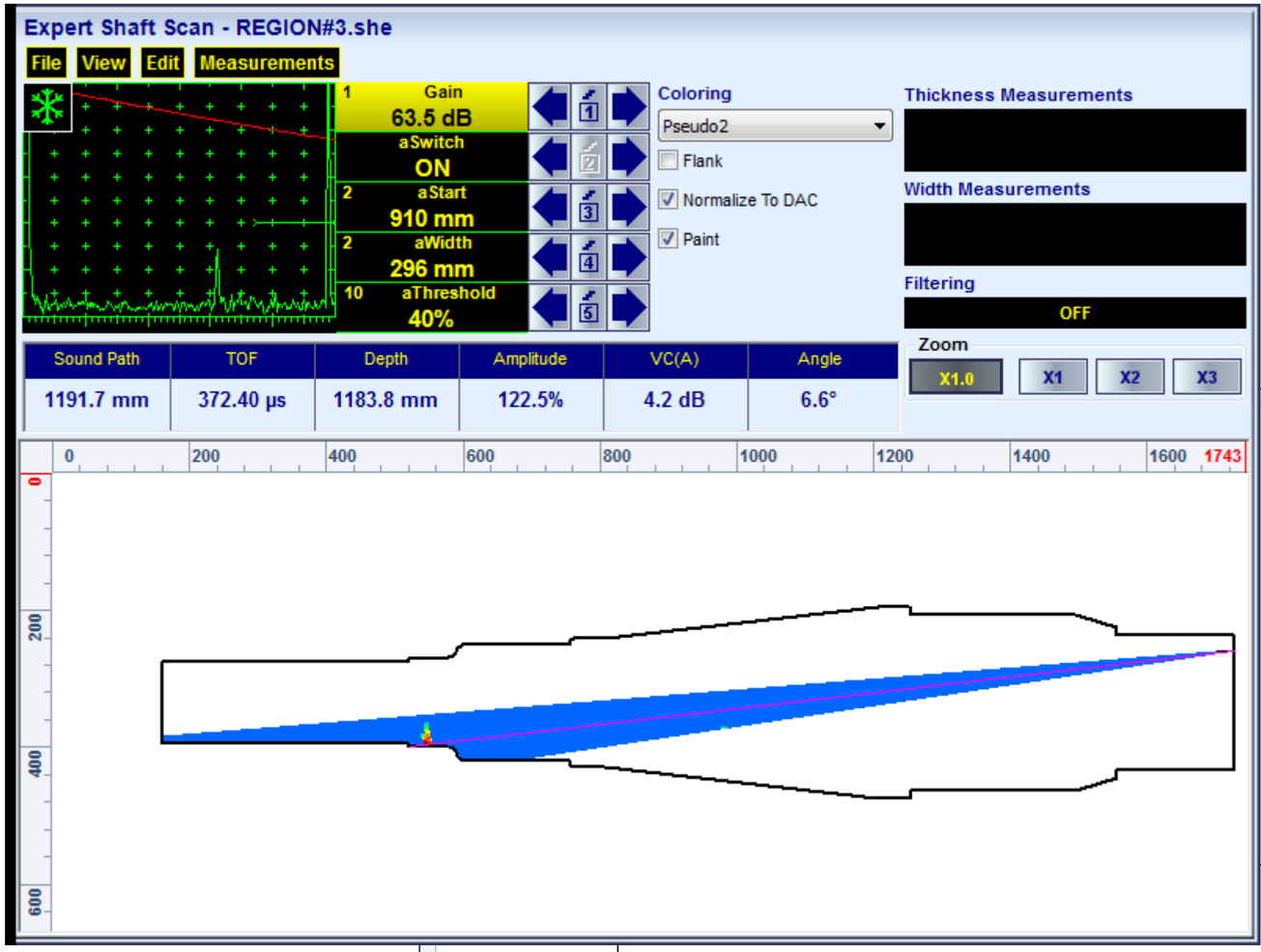
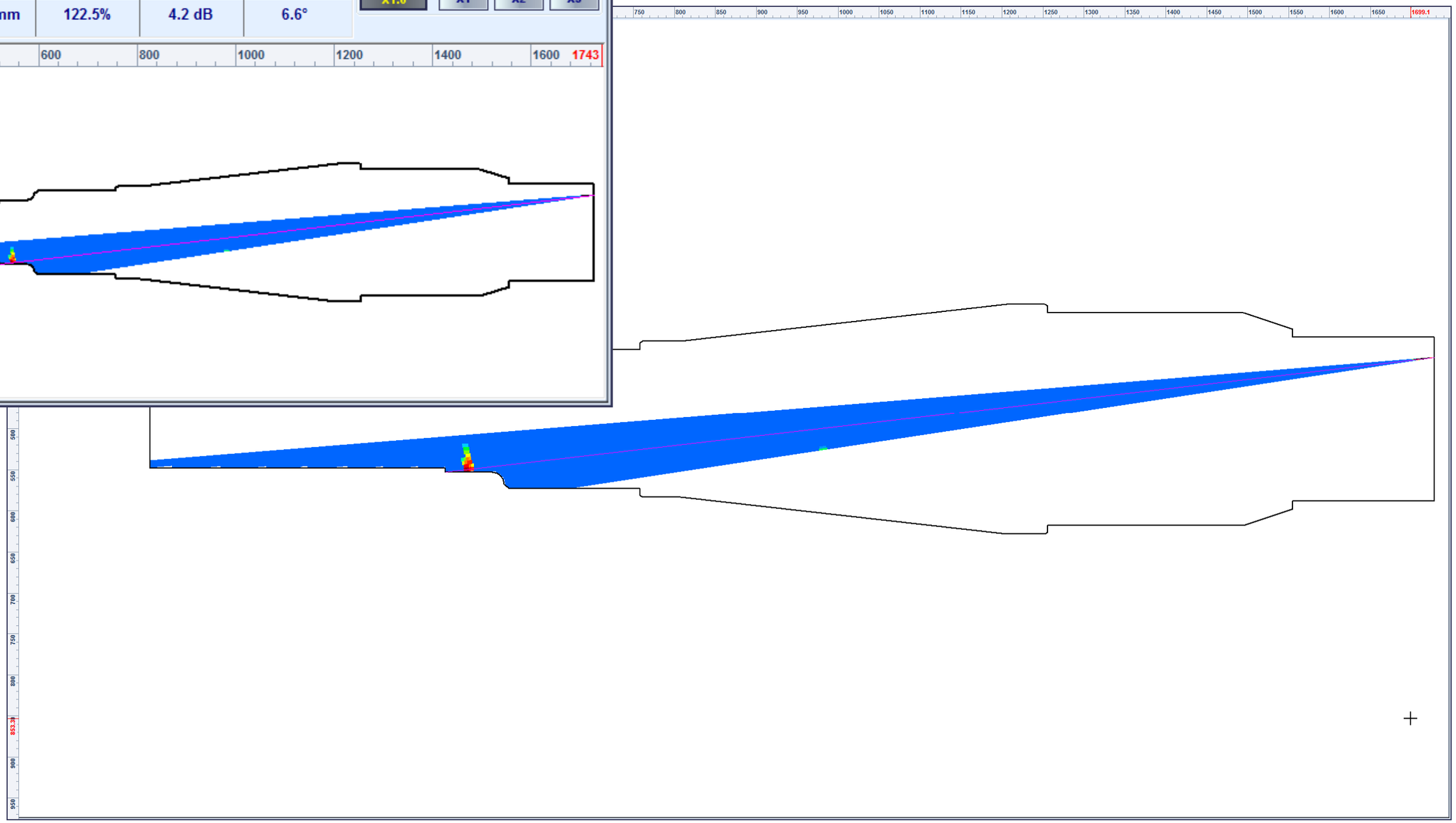
Scanning of the Region # 3





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Encoded Scanning of the hollow shaft – calibration block

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Encoded Scanning of the solid shaft – calibration block

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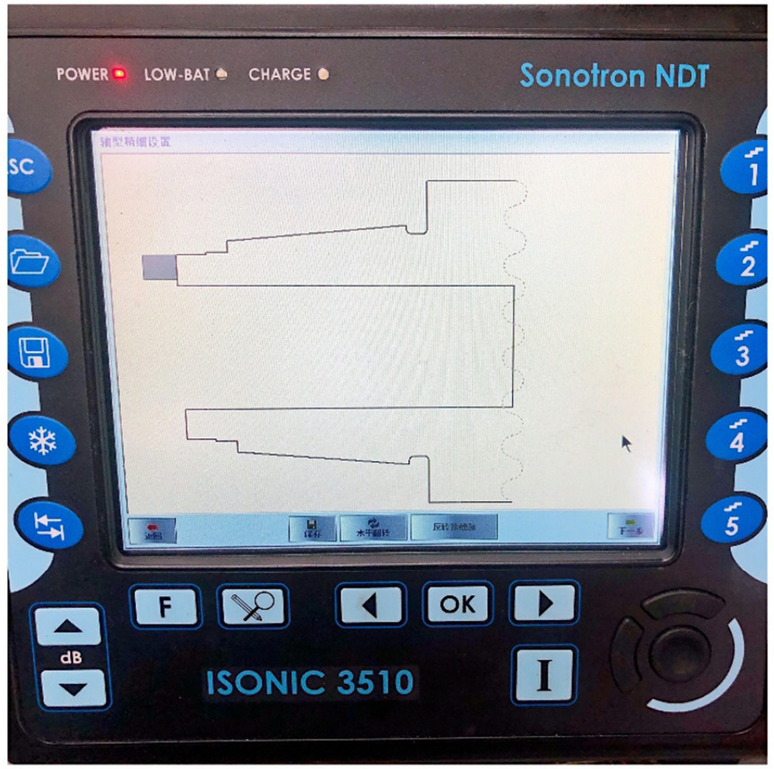

Inspection of the thread end area in the hollow shaft

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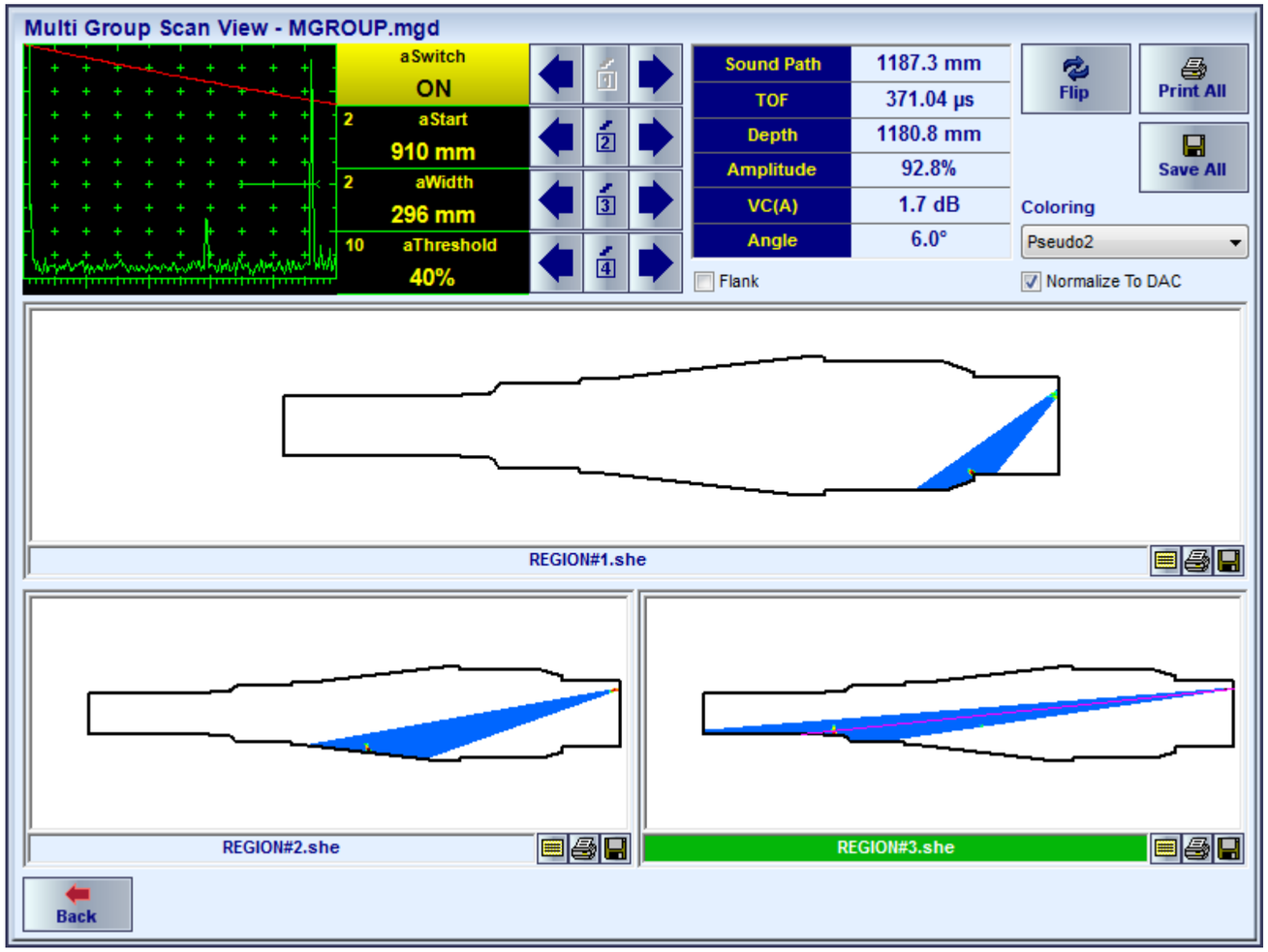
Item	*Order Code (Part ##)*
Inspection SW Application for ISONIC 3510T, ISONIC 3510 - PA Modality: **Multi-Group D – Implementation of Several (up to 4) Linear Scan Insonification Schemes Simultaneously with Use of One Linear Array Probe with / without Delay Line**	SWA 3510020
Inspection SW Application for ISONIC 2010 - PA Modality: **Multi-Group D – Implementation of Several (up to 4) Linear Scan Insonification Schemes Simultaneously with Use of One Linear Array Probe with / without Delay Line**	SWA 910820
Inspection SW Application for ISONIC 2009 UPA-Scope - PA Modality: **Multi-Group D – Implementation of Several (up to 4) Linear Scan Insonification Schemes Simultaneously with Use of One Linear Array Probe with / without Delay Line**	SWA 909820
⇨ Multi-Group Cross Sectional Coverage - Built-In Intuitive Material Coverage Composer ⇨ Straight Beam and Inclined B-Scan (Linear Scan), and Combined Cross Sectional Coverage ⇨ DAC / TCG Normalization ⇨ Independent on TCG Gain Per Focal Law Correction ⇨ Encoded and Time Based Recording ⇨ 100% Raw Data Capturing ⇨ Automatic Creation of Editable Defects List for Each Group Scanning ⇨ Comprehensive Postrpocessing Including: → Recovery and Evaluation of Captured A-Scans from the Recorded Cross Sectional Along the Shaft/Axle/Bolt/Spindle Views (Sector Scan) and C-Scans → Recovery of Cross Sectional Along the Shaft/Axle/Bolt/Spindle Views from the Recorded C-Scans → Converting Recorded C-Scans or their Segments into 3D Images → Off-Line Gain Manipulation → Off-Line DAC to TCG / TCG to DAC toggling for all types of stored files (A-Scans, cross-sectional views, C-Scans, etc) → Off-Line DAC Normalization of the Recorded Images / DAC Evaluation → Off-Line editing of Angle Gain Compensation / Gain per Shot Correction applied to the stored the Cross-sectional Views / C-Scan data → Numerous Filtering / Reject Options (by Geometry / Position / By Amplitude / dB-to-DAC / etc) → Defects Sizing → Generating of Defect List and Storing it Into a Separate File → Automatic creating of inspection reports - hard copy / PDF File	

MULTIGROUP_D – Scanning of 3 regions of the shaft simultaneously



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On the next 7 pages there are presented the results of International Case Study for the Detection and Precision of Imaging of the Small Defects in the Journal to Dust Guard Radius

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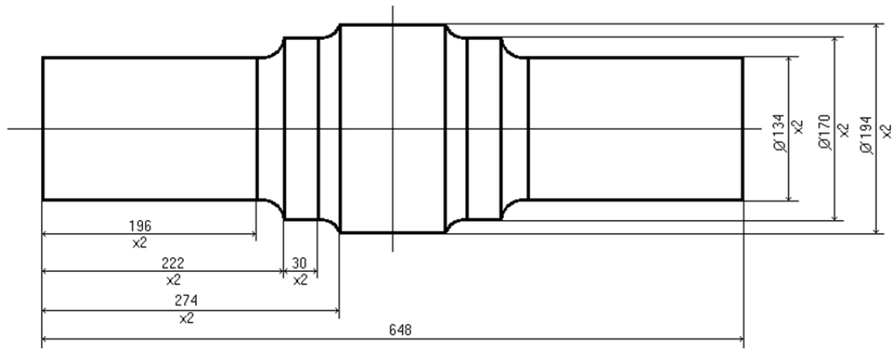
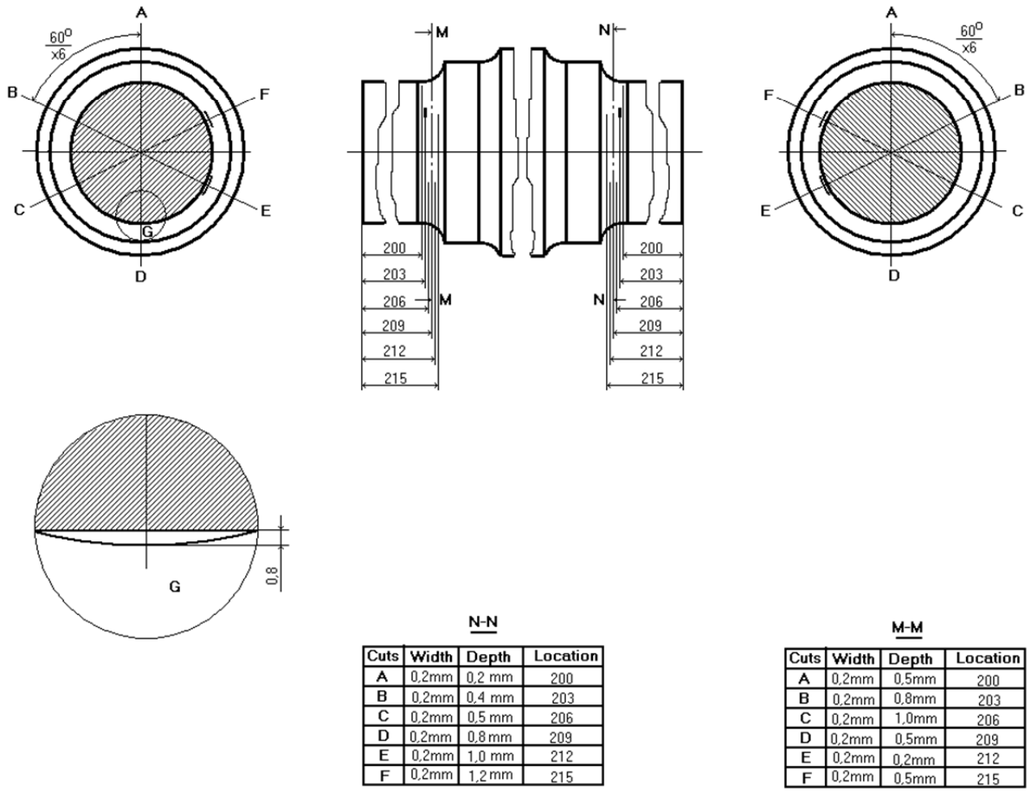
Dimensioned sketch of the shaft sample and notches in the journal to dust guard radius (6 at each side)
Образмеренный эскиз образца оси с пропилами в галтельном переходе между шейкой и предподступицей (по 6 пропилов с каждой стороны)





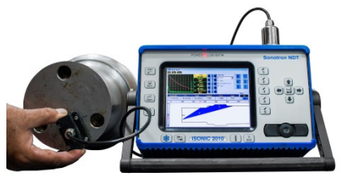
N-N

Cuts	Width	Depth	Location
A	0,2mm	0,2 mm	200
B	0,2mm	0,4 mm	203
C	0,2mm	0,5 mm	206
D	0,2mm	0,8 mm	209
E	0,2mm	1,0 mm	212
F	0,2mm	1,2 mm	215

M-M

Cuts	Width	Depth	Location
A	0,2mm	0,5mm	200
B	0,2mm	0,8mm	203
C	0,2mm	1,0mm	206
D	0,2mm	0,5mm	209
E	0,2mm	0,2mm	212
F	0,2mm	0,5mm	215

Shaft Sample and placement of the PA probe (Образец и расположение ФР-преобразователя при обнаружении пропилов)



File naming policy (наименование файлов):

X_Y.sbx – cross-view along the shaft (sectorial scan) for the cut **X** (**A** through **F**) at the side **Y** (**M** or **N**) of the sample with the recovery of the maximal echo A-Scan from the plurality of A-Scans composing the image and the corresponding beam trace

X_Y_DEPTH.sbx – cross-view along the shaft (sectorial scan) for the cut **X** (**A** through **F**) at the side **Y** (**M** or **N**) of the sample with the recovery of the cut root echo A-Scan used for the determining of the distance between the cut and shaft end

File naming policy (наименование файлов):

X_Y.sbx – разрез вдоль оси (сектор скан) для пропила **X** (**A** … **F**) со стороны **Y** (**M** или **N**) образца с отображением А-Скана, содержащего максимальный эхо-сигнал, выбранного из совокупности А-Сканов, формирующих изображение, и соответствующего хода по лучу

X_Y_DEPTH.sbx – разрез вдоль оси (сектор скан) для пропила **X** (**A** … **F**) со стороны **Y** (**M** или **N**) образца с отображением А-Скана, содержащего эхо-сигнал от корня пропила, используемого для определения расстояния от пропила до торца

Insonification has been performed through the beam steering whilst the focal point travels along the outer surface of the shaft

Прозвучивание осуществляется способом качающегося луча, причем фокальная точка перемещается вдоль внешней поверхности оси

The following PA probe was used / Применялся снижеуказанный ФР преобразователь:

PA-5M32E1P - LINEAR ARRAY PROBE / ЛИНЕЙНАЯ РЕШЕТКА Frequency / Частота: **5 MHz** Pitch Size / Шаг решетки (размер элемента): **1 mm** Number of Elements / Количество элементов: **32** Elevation / Ширина: **10 mm**	Sonotron NDT part # Sonotron NDT артикул: S 4922214381

The aperture composed of all 32 elements was recieved for the emitting / receiving whilst performing pulse echo sectorial scan coverage (Апертура излучения / приема, состоящая из всех 32 элементов, применялась для реализации прозвучивания способом качающегося луча)

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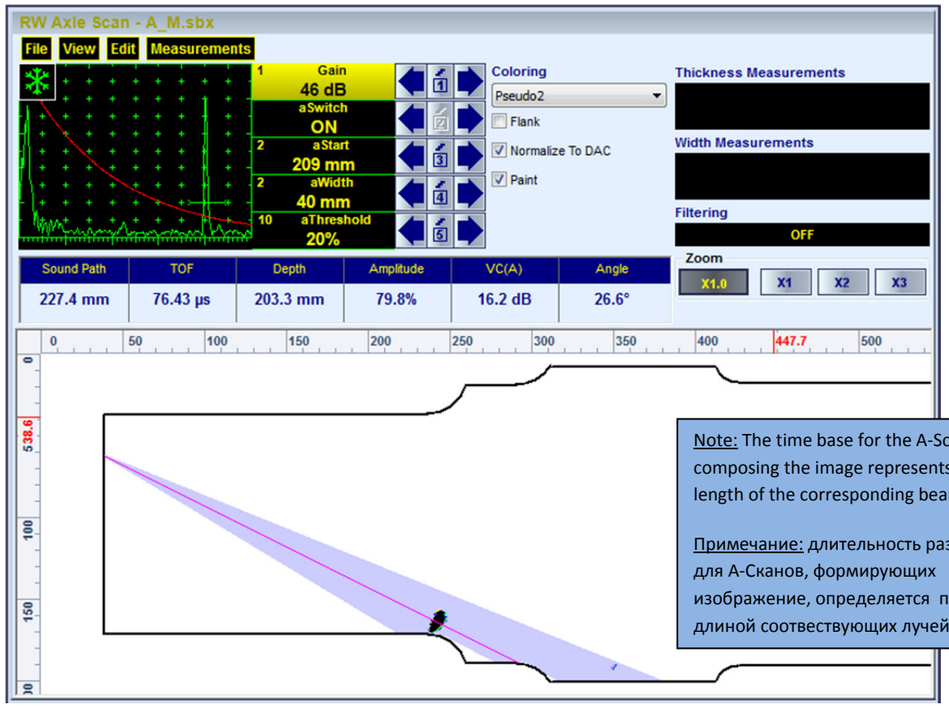
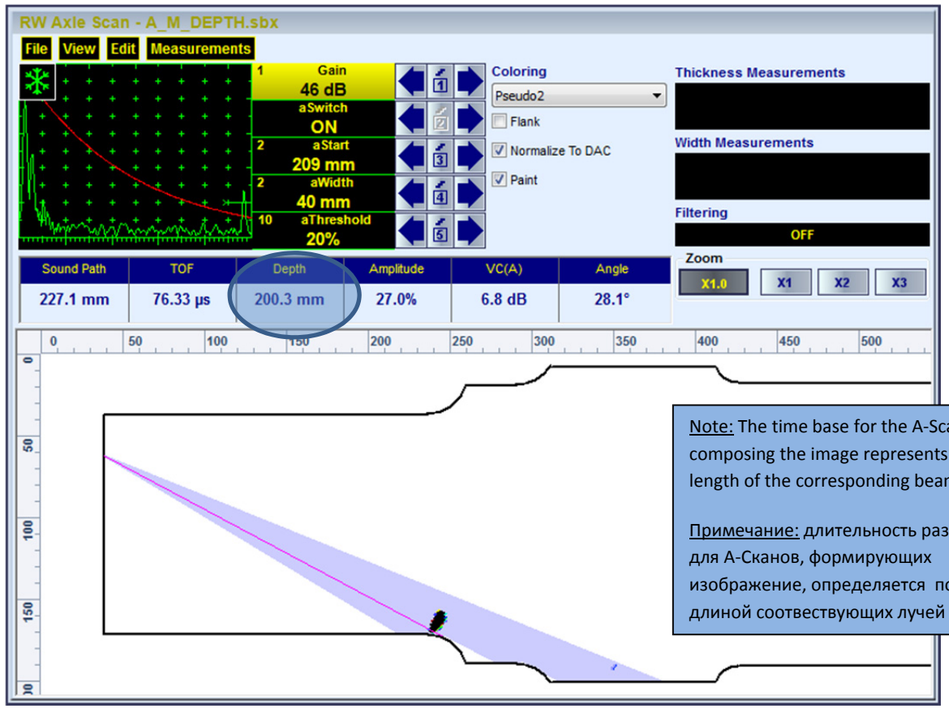
A_M.sbx



Note: The time base for the A-Scans composing the image represents full length of the corresponding beams

Примечание: длительность развертки для А-Сканов, формирующих изображение, определяется полной длиной соотвествующих лучей

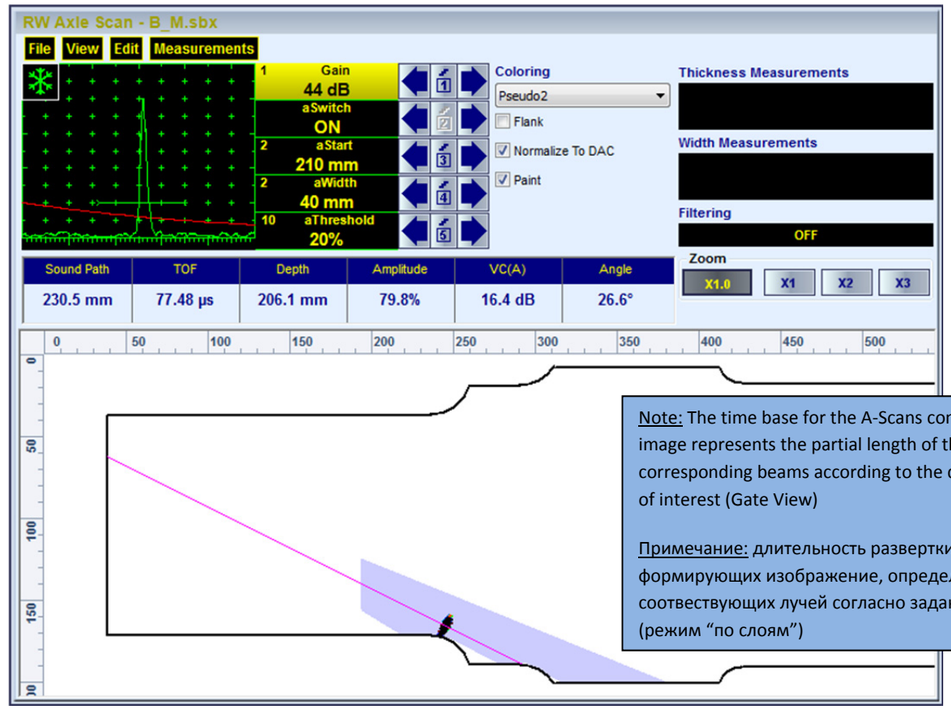
A_M_DEPTH.sbx



Note: The time base for the A-Scans composing the image represents full length of the corresponding beams

Примечание: длительность развертки для А-Сканов, формирующих изображение, определяется полной длиной соотвествующих лучей

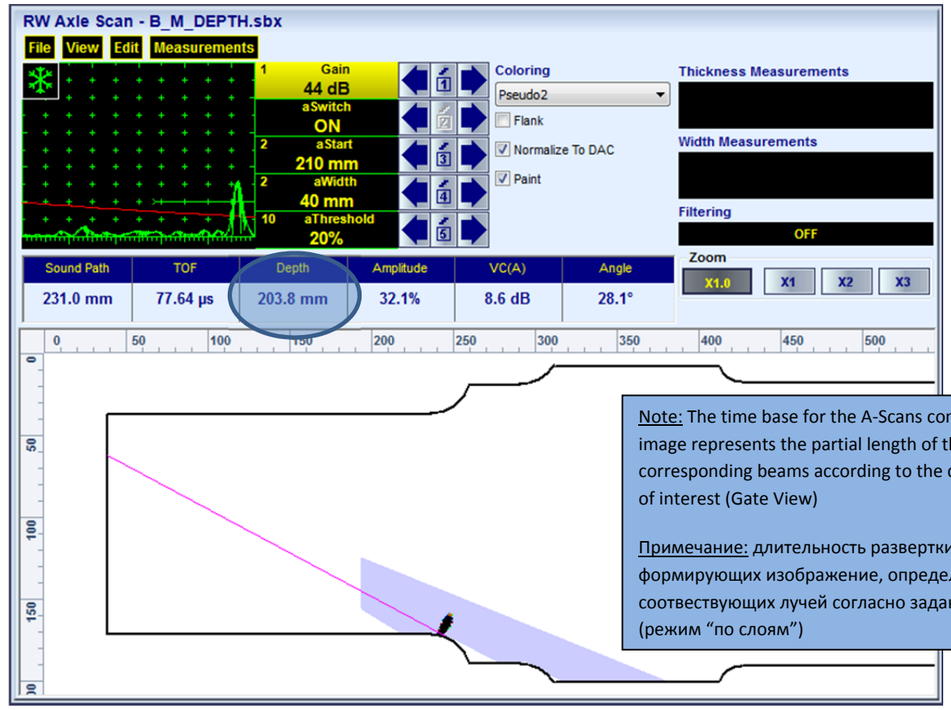
B_M.sbx



Note: The time base for the A-Scans composing the image represents the partial length of the corresponding beams according to the desired region of interest (Gate View)

Примечание: длительность развертки для А-Сканов, формирующих изображение, определяется длиной соотвествующих лучей согласно заданному “слою” (режим “по слоям”)

B_M_DEPTH.sbx



Note: The time base for the A-Scans composing the image represents the partial length of the corresponding beams according to the desired region of interest (Gate View)

Примечание: длительность развертки для А-Сканов, формирующих изображение, определяется длиной соотвествующих лучей согласно заданному “слою” (режим “по слоям”)

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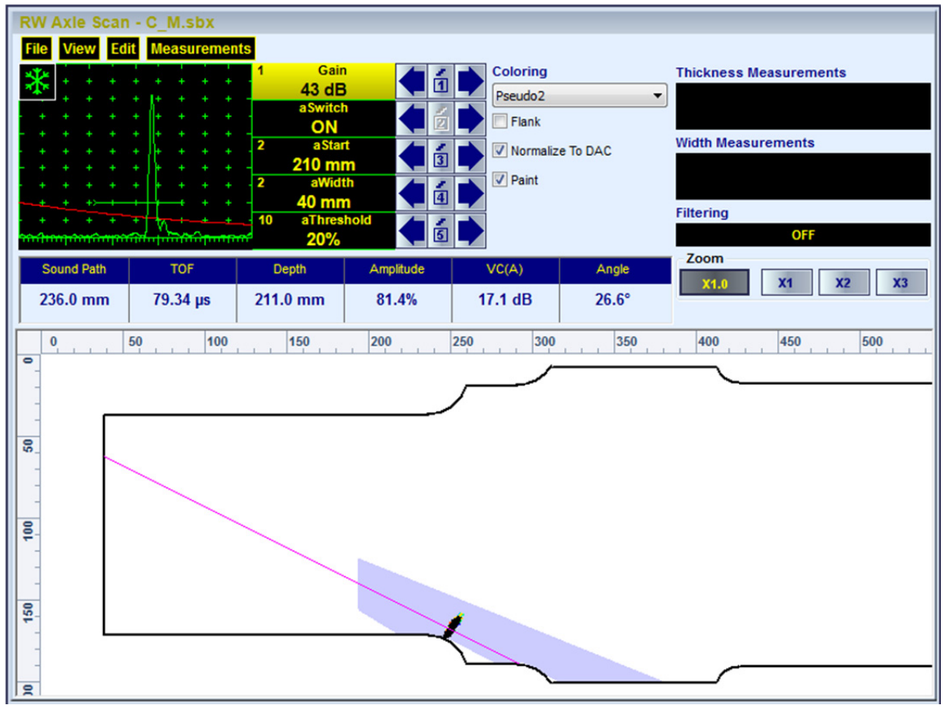
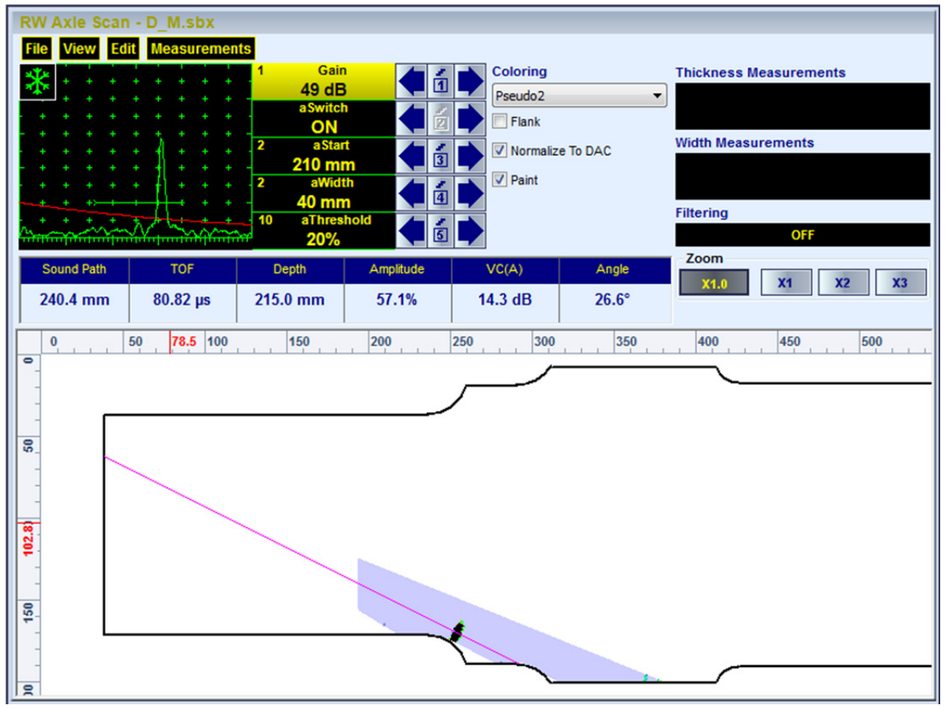
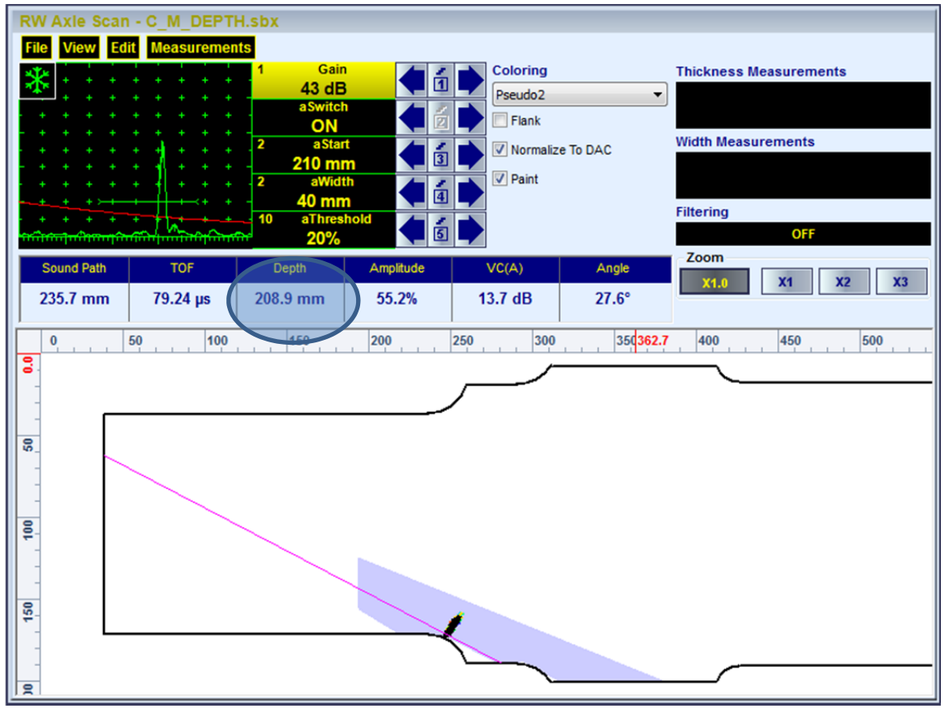
C_M.sbx



D_M.sbx



C_M_DEPTH.sbx



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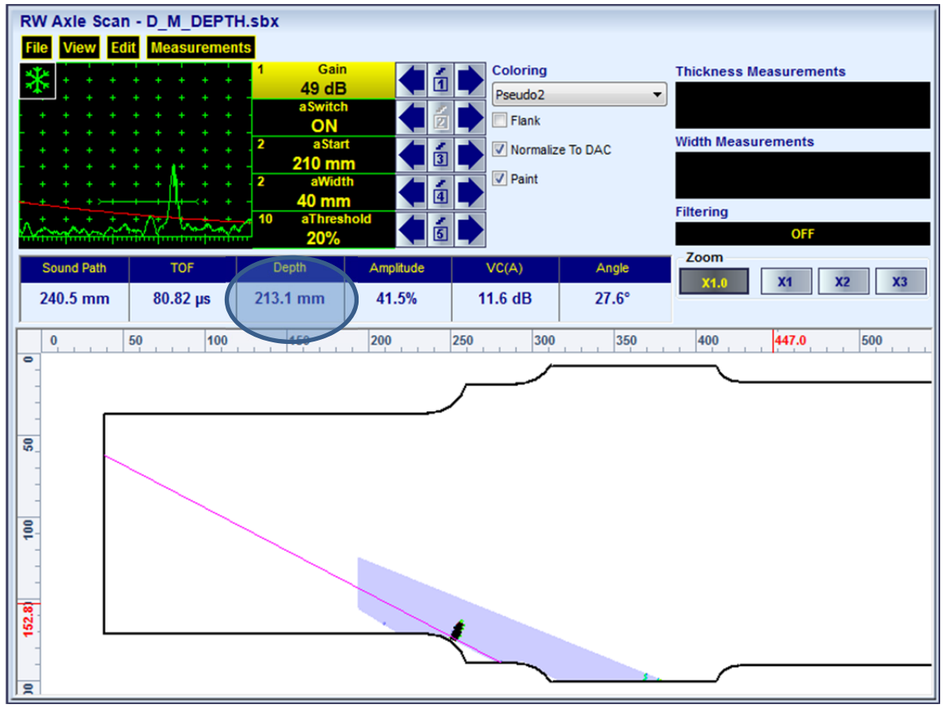

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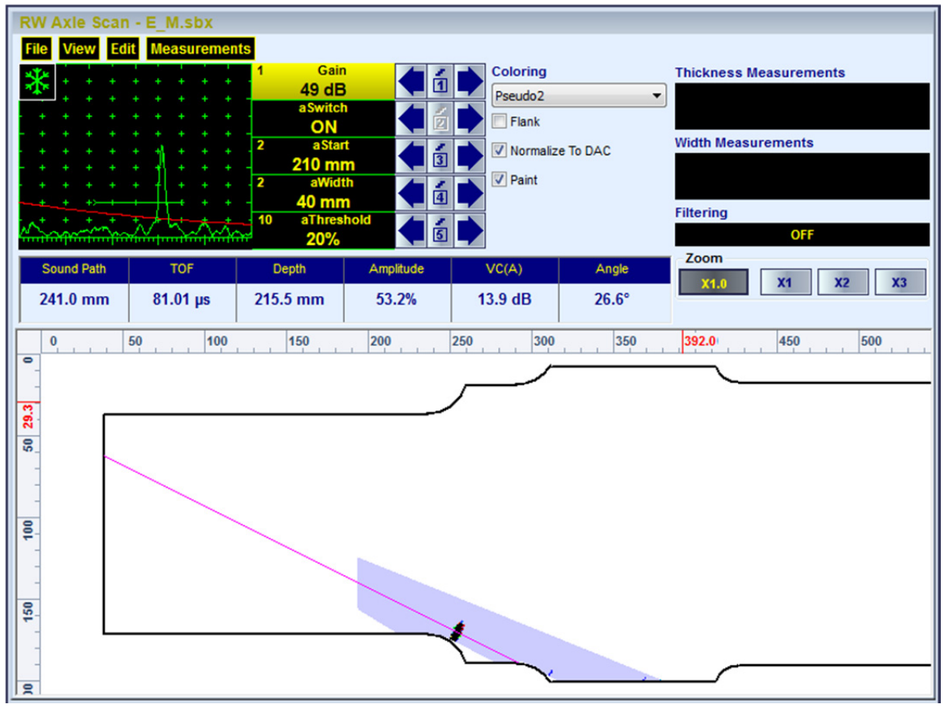
E_M.sbx



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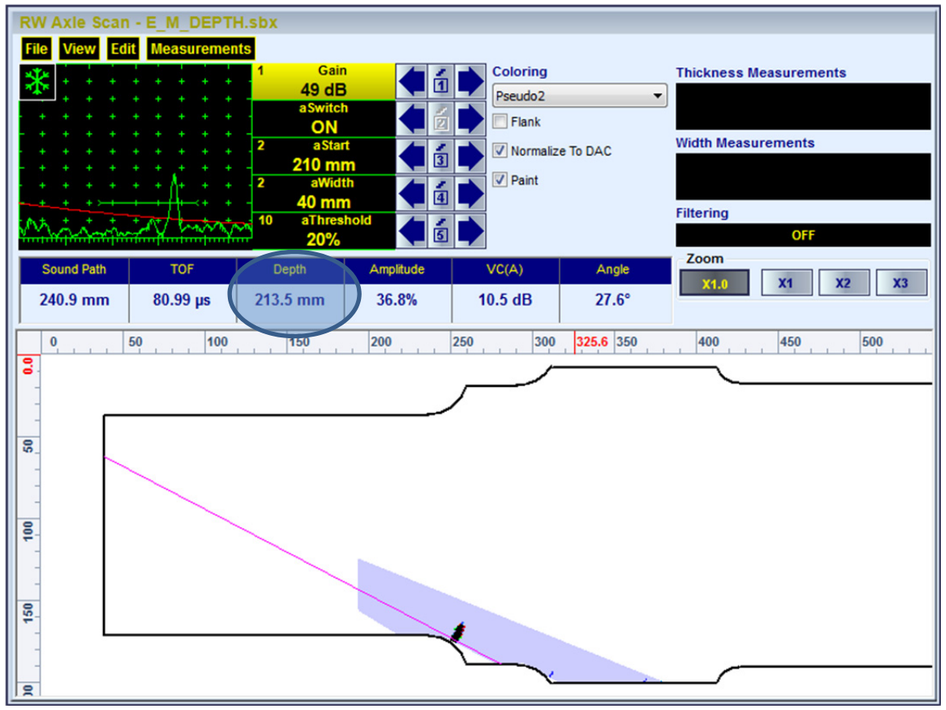
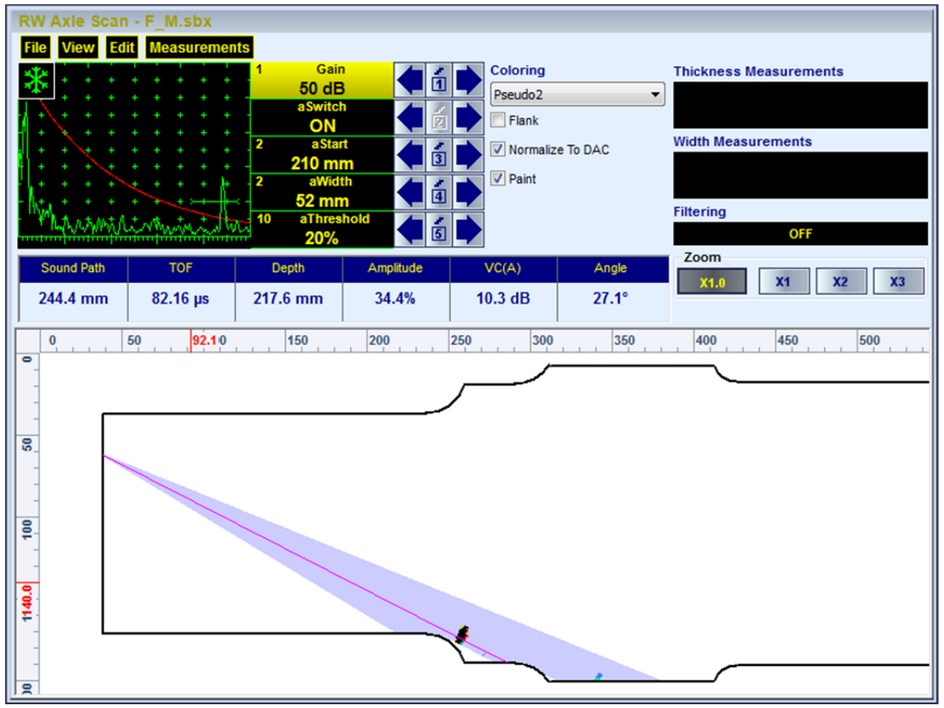
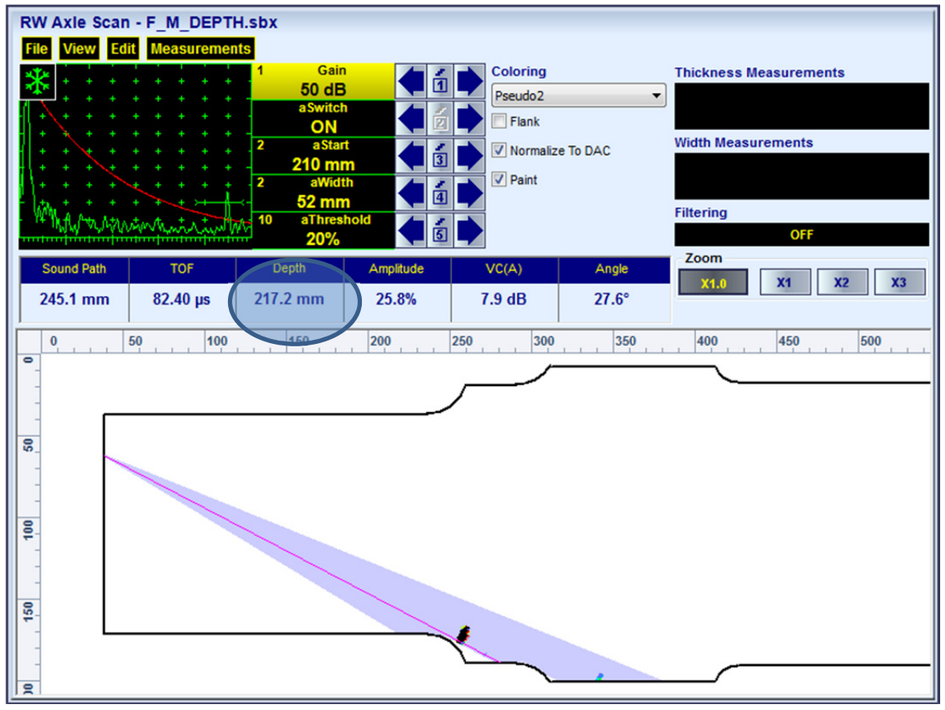


F_M.sbx



F_M_DEPTH.sbx



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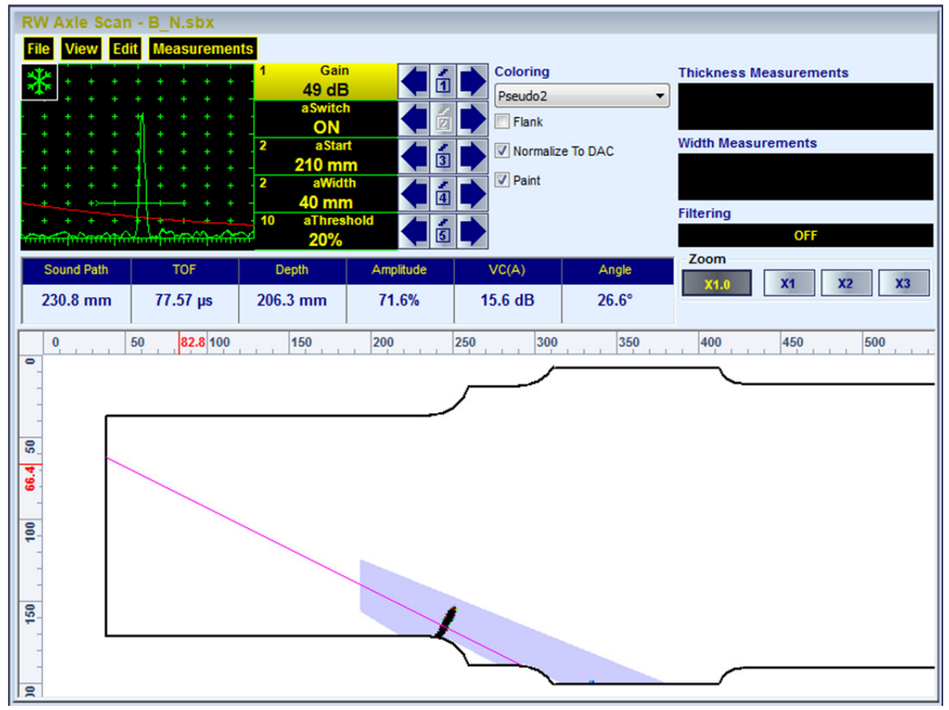
A_N.sbx

A_N_DEPTH.sbx

B_N.sbx



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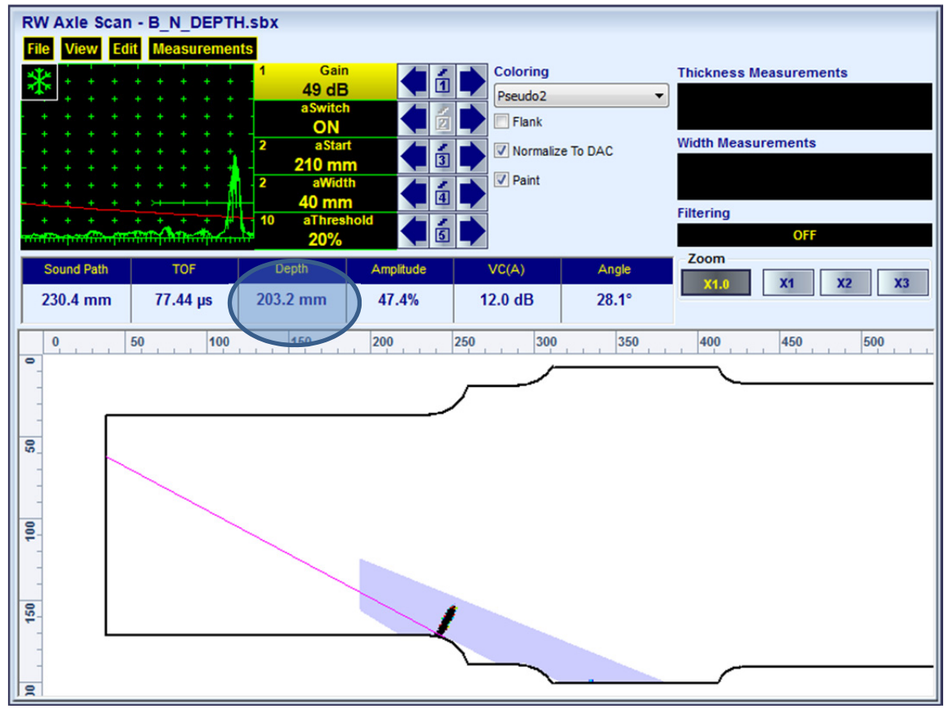

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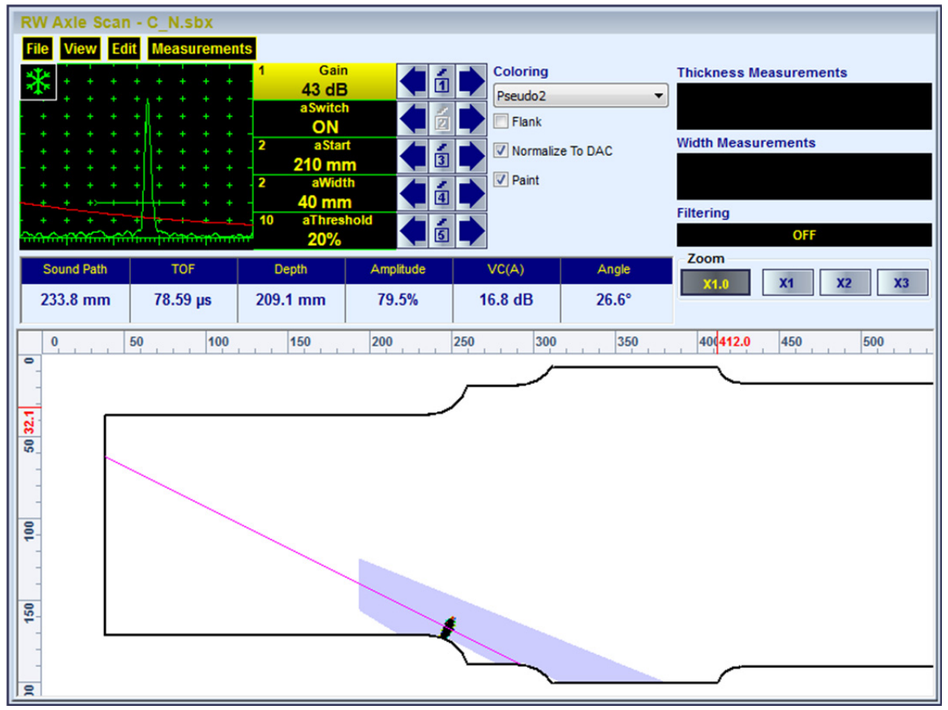
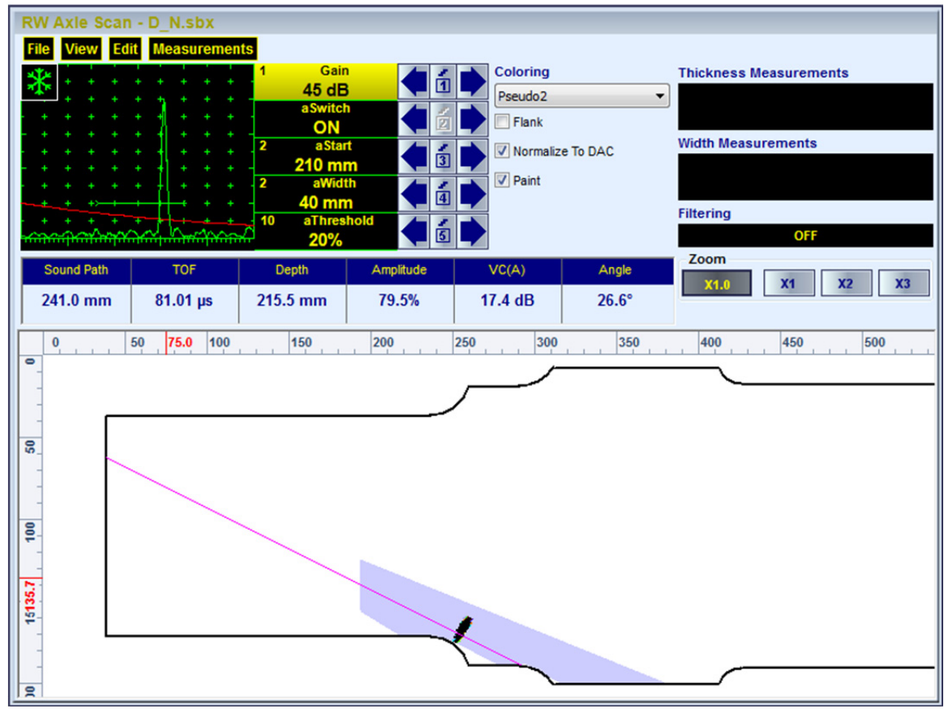
C_N.sbx



D_N.sbx



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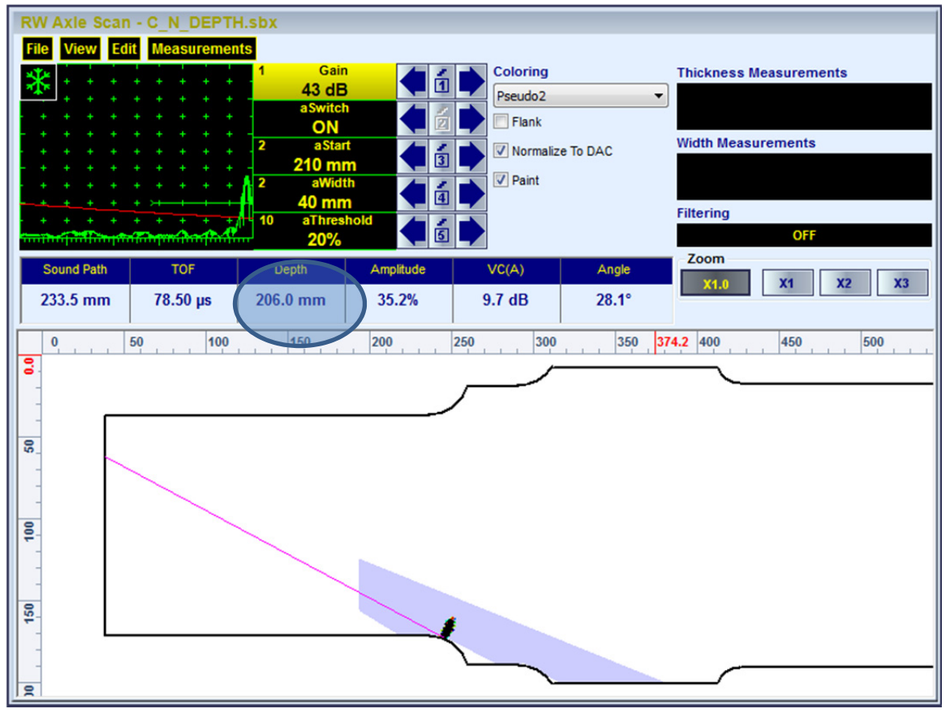

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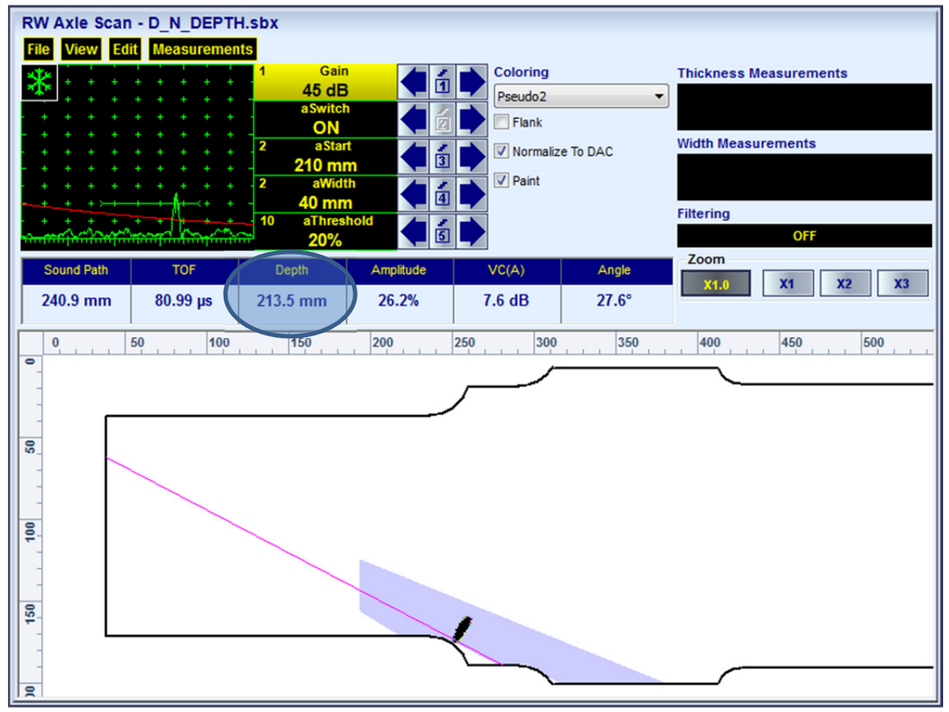

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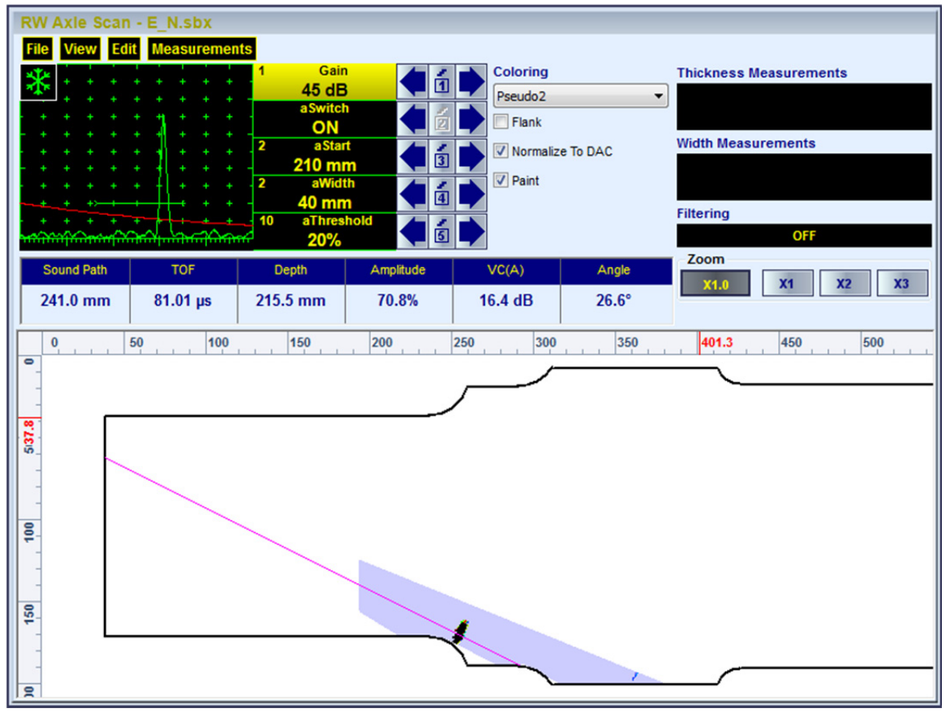
E_N.sbx



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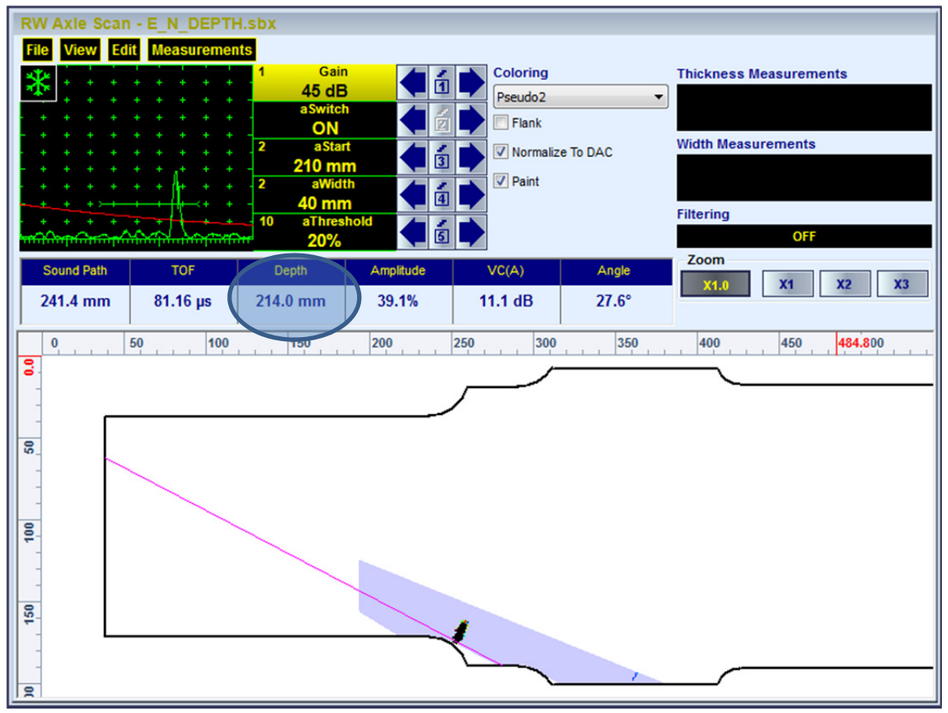

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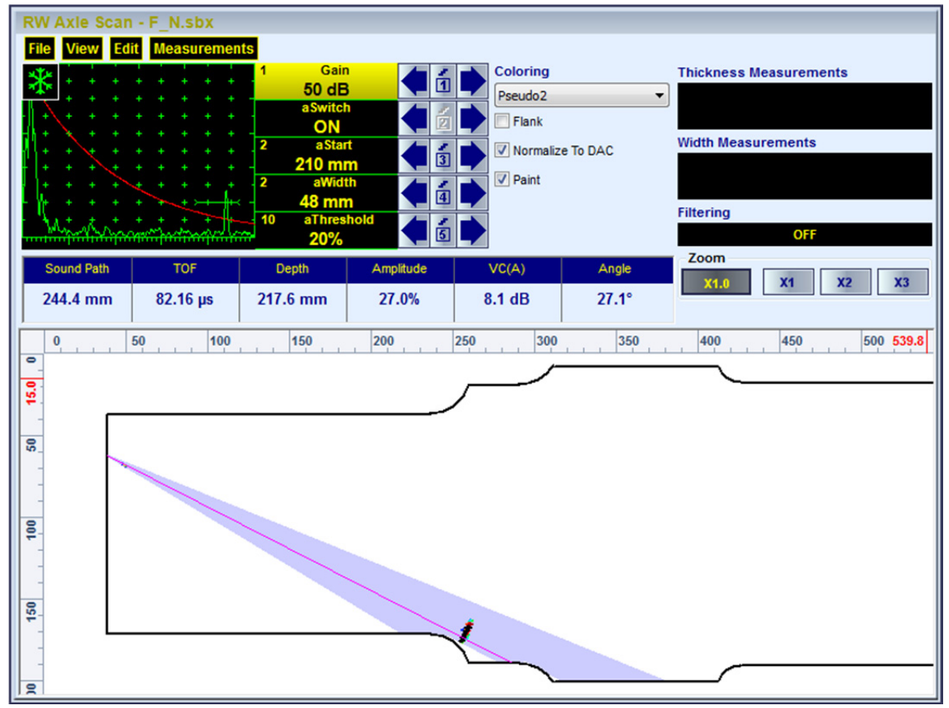

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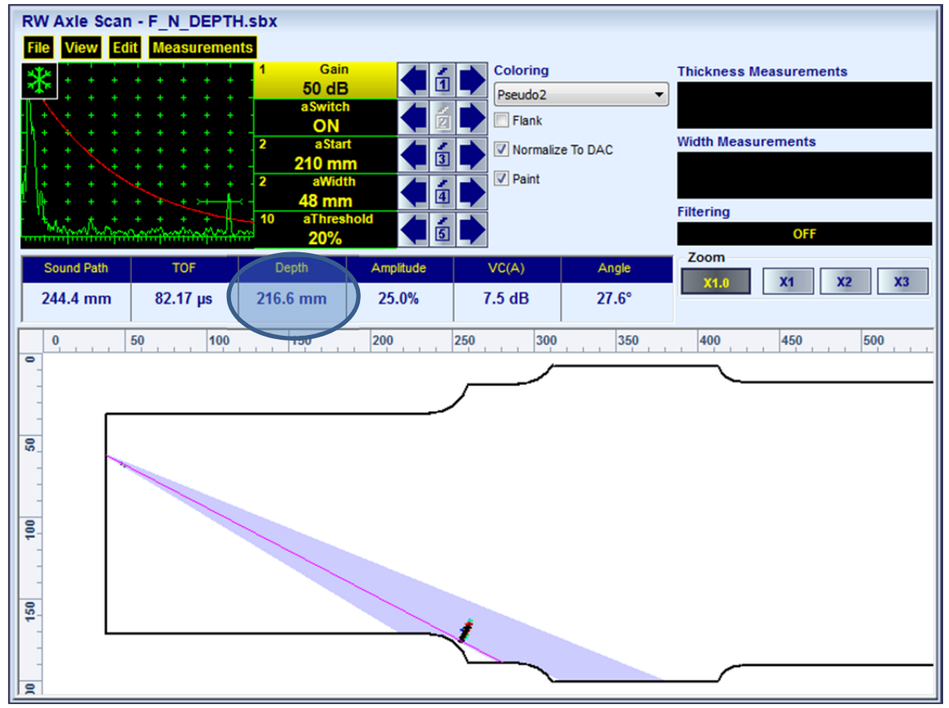

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