



# Hebei Abter Steel Pipe Co.,Ltd

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## INSPECTION REPORT

Project Ref.: 110176TND

Issued on: July 21<sup>st</sup>, 2011

Inspection Time: July 9<sup>th</sup>- 20<sup>th</sup>, 2011

P.O. No. 110176TND  
QCLNG Project,Australia

Inspection  
Subject:

Induction Bends

1. Induction Bend -QCLNG-BG00-  
PLE-SPE-000006\_0 Rev. 4

2. Line Pipe -API 5L X70 PSL 2/  
QCLNG-BG00-PLE-SPE-

Specification:

000002\_4  
AS 2885-1

Inspector:

Lin Gaojie

3. Bend Drawings -QCLNDG-BG00-  
PLE-DET-000064\_E

### Visit Summary:

#### Scope of Inspection

- Induction bending.
- Preliminary inspection.
- Temper heat treatment.
- NDT.
- Bend residual magnetism.
- Visual inspection.
- Product inspection.
- Gauging pig test.
- Packaging, labels and marking inspection.
- Documents review.
- Part photo service.

### Results of inspection to 110176TND Induction Bends

#### ● Process Inspection

##### 1. Induction bending

We had witnessed the whole manufacturing process of induction bends. They were done in accordance with the specification.

The details were in the following table.

Tag No.	IND-N1	IND-N2	IND-N3	IND-N4	IND-N5	IND-N6	IND-N7	IND-N8	IND-N16	IND-N18
Inspection*	M	M	W	M	W	W	M	M	M	W
Start-up time	7 <sup>th</sup> 5:40	11 <sup>th</sup> 2:25	11 <sup>th</sup> 11:40	8 <sup>th</sup> 23:00	10 <sup>th</sup> 21:10	9 <sup>th</sup> 15:20	9 <sup>th</sup> 2:20	11 <sup>th</sup> 4:25	11 <sup>th</sup> 0:00	9 <sup>th</sup> 17:15
Stop time	7 <sup>th</sup> 7:15	11 <sup>th</sup> 2:48	11 <sup>th</sup> 12:10	8 <sup>th</sup> 23:30	10 <sup>th</sup> 22:15	9 <sup>th</sup> 16:10	9 <sup>th</sup> 3:35	11 <sup>th</sup> 6:27	11 <sup>th</sup> 0:50	9 <sup>th</sup> 18:55

\*Remark: H: Hold Point, W: Witness Point, M: Monitor, R: Review

Photo attachment as below

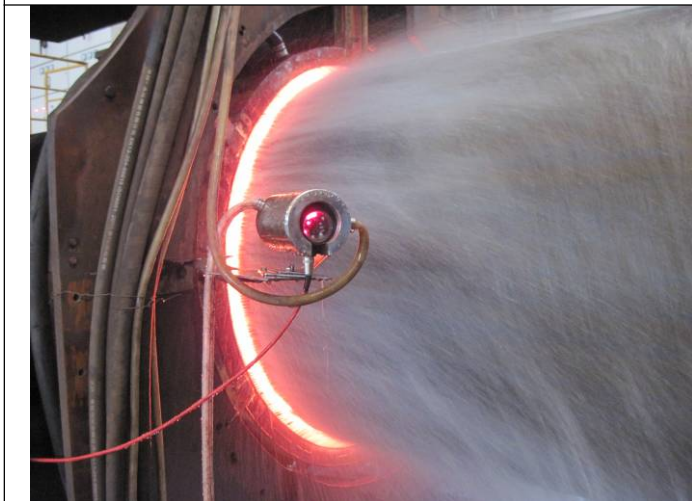


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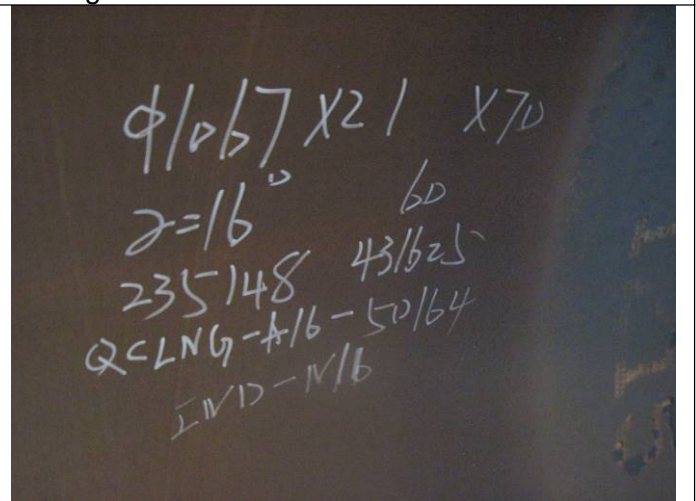
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Induction bending



Temperature pyrometer



Marking on inner surface

**2. Preliminary inspection**

They were qualified and there was a severe machining mark on the outer surface of IND-N18, which had been grinded and WT was qualified.  
Photo attachment as below





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Bends for inspection



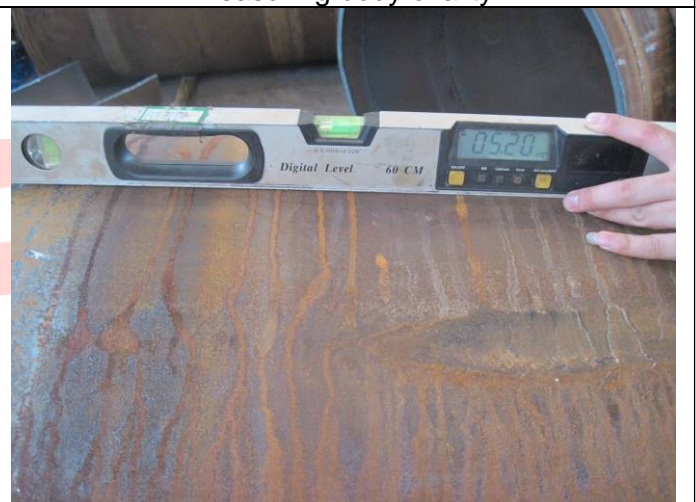
Measuring end ovality



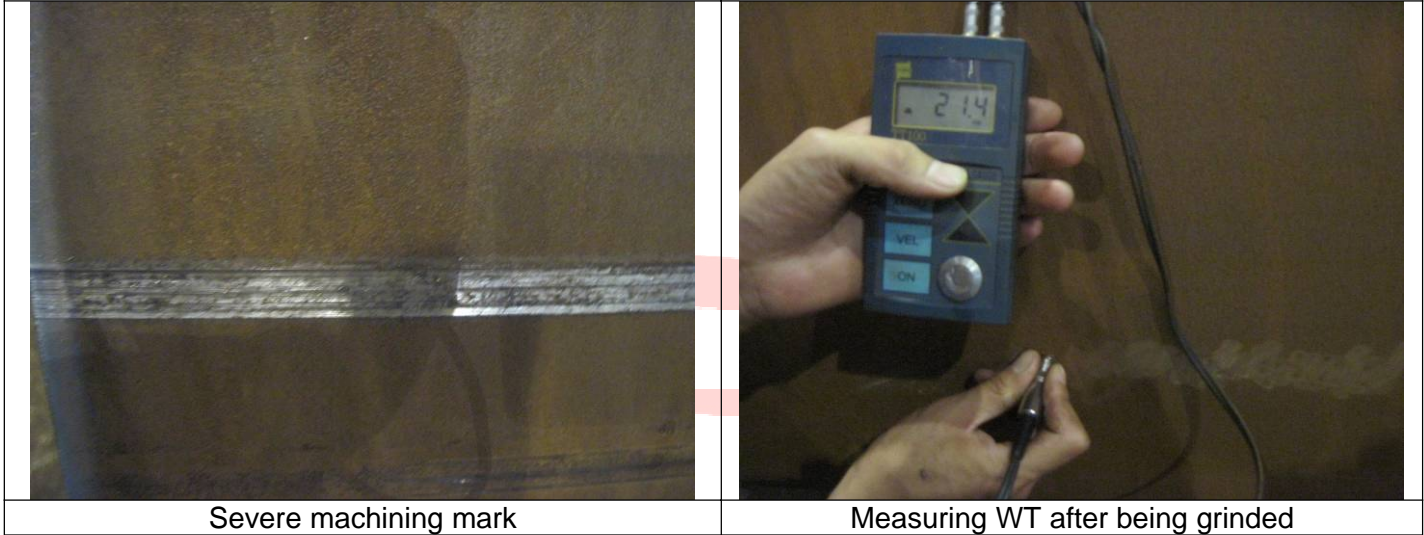
Measuring body ovality



Measuring WT



Measuring angle



Severe machining mark

Measuring WT after being grinded

### 3. Temper heat treatment

We had witnessed the temper heat treatment which was in accordance with the specification. The process was showed in the following table.

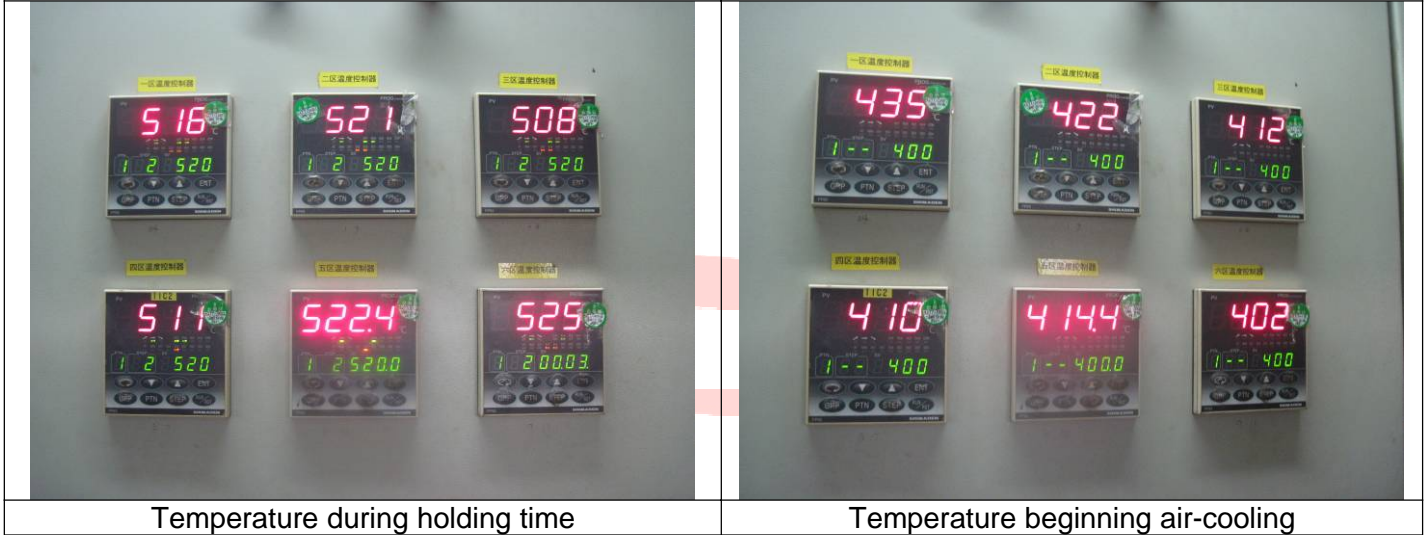
Time Jul 12 <sup>st</sup>	9:28	10:43	11:43	12:43	13:25	17:30
Stage	Start-up	Achieving 400°C	Achieving suitable temperature Beginning holding	Finishing holding	Reducing to 400°C Beginning air-cooling	Finishing air-cooling

Photo attachment as below



Bends in the furnace

Temper heat treatment



Temperature during holding time

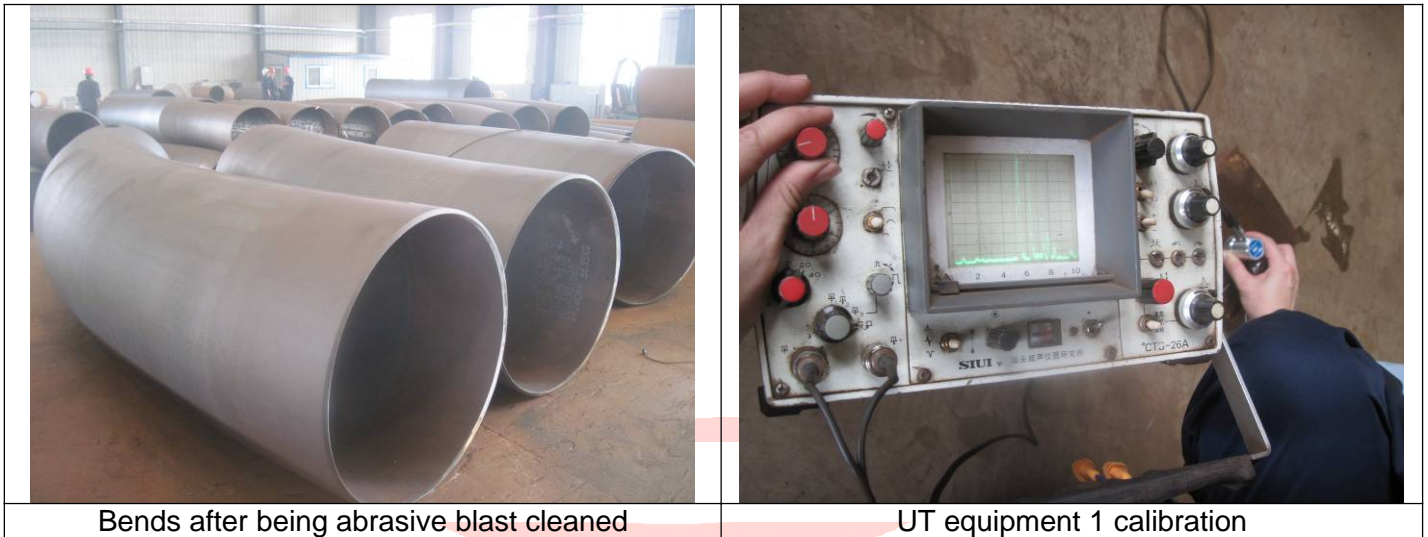
Temperature beginning air-cooling

#### 4. NDT

We had witnessed the NDT including Ultrasonic Test and Magnetic Particle Test which were in accordance with the specification. Details as below:

- 1) Bends had been abrasive blast cleaned before NDT;
- 2) The equipments used for NDT had been calibrated each shift;
- 3) The injurious anomalies on the surface had been grinded and passed the NDT.

Photo attachment as below



Bends after being abrasive blast cleaned

UT equipment 1 calibration



UT equipment 2 calibration



UT equipment 3 calibration



MPT equipment calibration



Bend body UT



Full weld UT



100mm from beveled face UT



Bend body MPT



Full weld MPT



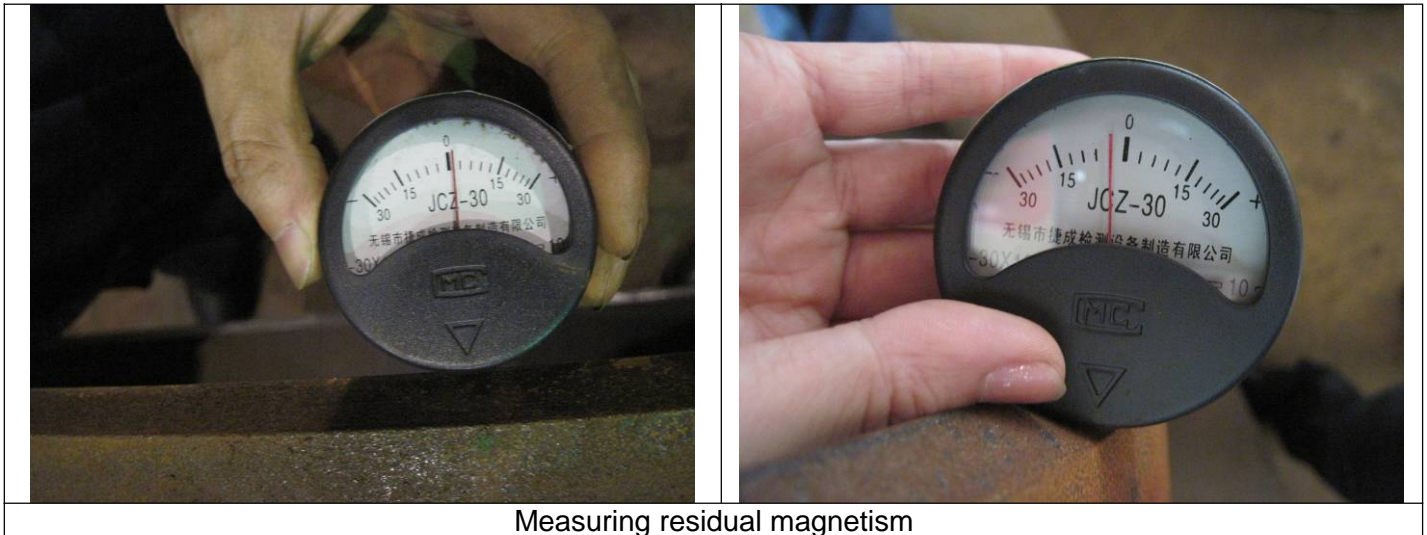
Bevel and root face MPT

**5. Bend residual magnetism**

We had witnessed the measuring of bend residual magnetism and they were qualified.  
The detail data is in the following table.

Tag No.	IND-N1	IND-N2	IND-N3	IND-N4	IND-N5	IND-N6	IND-N7	IND-N8	IND-N16	IND-N18
Location1 (G)	2/1	3/2	2/1	1/2	1/1	1/2	1/2	2/1	1/2	1/2
Location2 (G)	1/2	2/2	2/1	2/1	1/2	1/1	2/2	1/2	1/1	2/1
Location3 (G)	1/1	1/2	3/2	3/1	3/1	2/1	3/2	1/1	2/1	1/2
Location4 (G)	2/1	2/1	1/2	1/2	2/2	1/2	1/3	2/1	1/2	1/1

Photo attachment as below



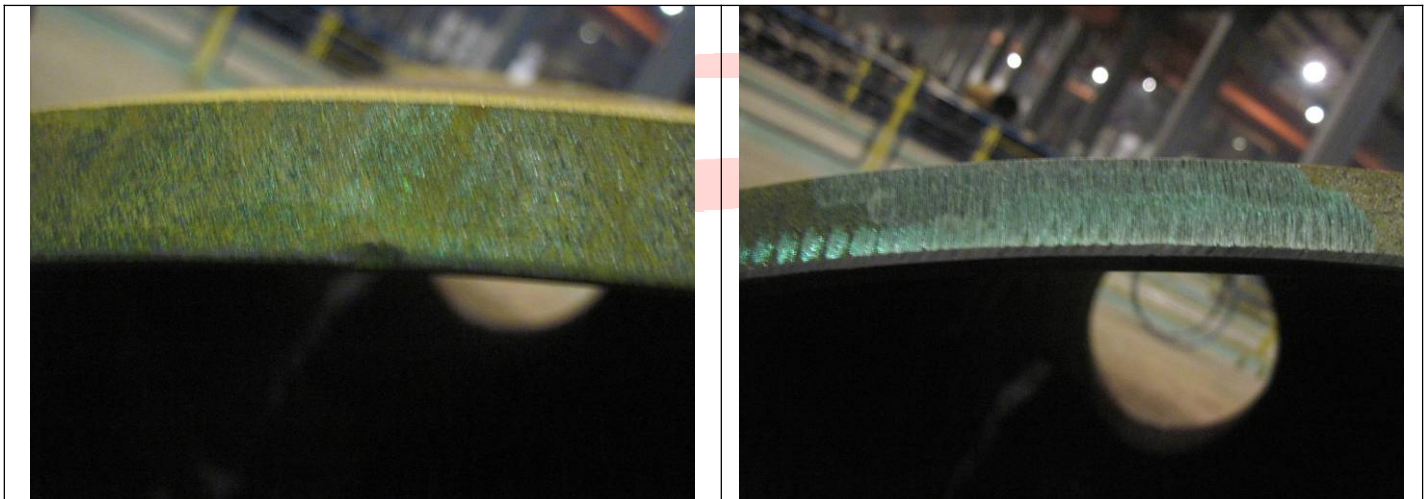
Measuring residual magnetism

### 6. Visual Inspection

The Bends were good and the details were as followed:

- 1) Some root faces were hurt which had been repaired;
- 2) There were some pits on the outer surface, which had been grinded and WT was qualified.

Photo attachment as below





Hurt root face	After being repaired
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**7. Product inspection**

The products were all qualified and the details were as followed:

1) We had witnessed the measuring WT of all bends.

The detailed data is in the following table.

Tag No.	IND-N1	IND-N2	IND-N3	IND-N4	IND-N5	IND-N6	IND-N7	IND-N8	IND-N16	IND-N18
<b>Extrados Min. WT /mm</b>	19.9	19.7	19.6	19.6	19.6	19.7	19.7	19.6	19.7	19.9

2) We had witnessed the measuring dimensions of 2 bends (IND-N6&IND-N7) and reviewed the reports of other bends;

The detailed data is in the following table.

Tag No.	End ovality (%)	Body ovality (%)	Angle (deg)	Curvature radius (mm)	Out of plain (mm)	End squareness (mm)	Beveling angle (deg)		Root face (mm)	Straight tangent end (mm)	Diameter (mm)
							Inner	Outer			
IND-N6	0.47/0.47	0.56/1.03/1.12	15.8	6406	<5	2.1/2.0	19/17	31.5/31.5	1.00~1.86	520/515	1067.01 /1067.01
IND-N7	0.37/0.47	0.47/0.66/0.66	33.4	6404	<5	1.5/0.5	22/21	31/31	1.36~2.20	530/520	1067.32 /1067.32

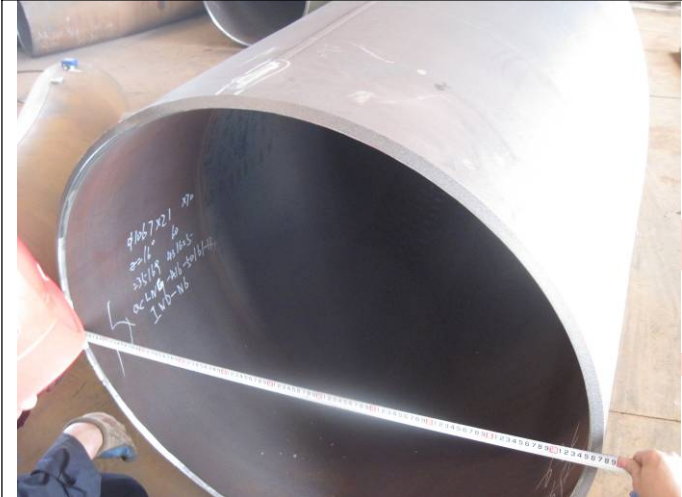
Photo attachment as below





UT thickness calibration

Measuring WT



Measuring end ovality

Measuring body ovality



Measuring angle



Measuring out of plain



Measuring curvature radius



Measuring end squareness



Measuring inner bevel angle



Measuring outer bevel angle



Measuring root face



Measuring straight tangent end



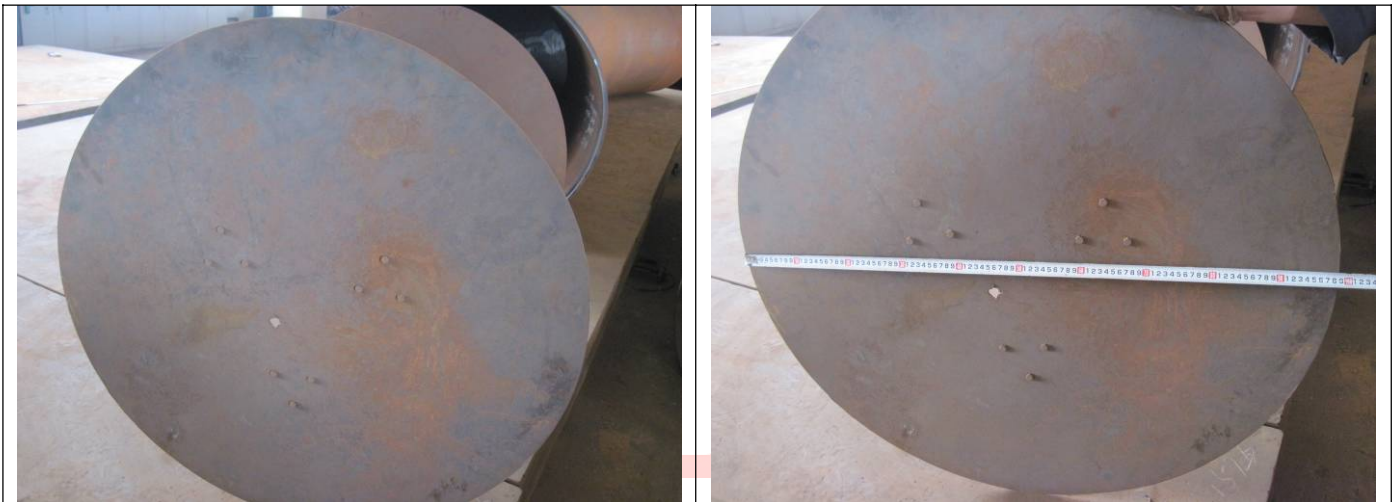
Measuring diameter

**8. Gauging pig test**

We had witnessed gauging pig test and they were all passed. The details were as followed:

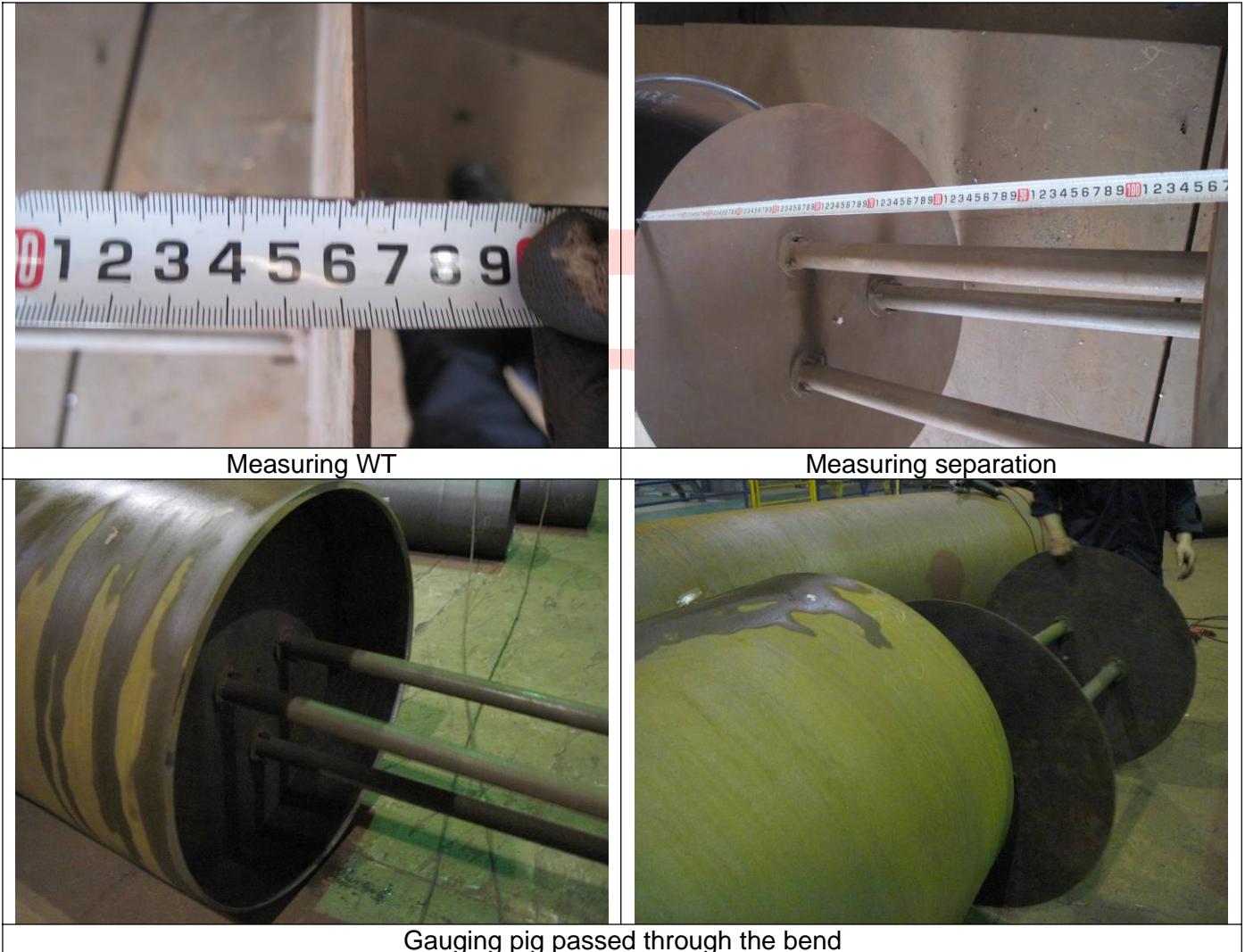
- 1) The diameter and wall thickness of gauging plate was 985mm and 3mm respectively;
- 2) The separation of two plates was 1065mm.

Photo attachment as below



Gauging pig

Measuring diameter



Measuring WT

Measuring separation

Gauging pig passed through the bend

### 9. Packaging, labels and marking inspection

- 1) The mill had fixed end protectors on both ends of the bend;
- 2) The bends were separated by nylon rope;
- 3) The labels were right and there were 6 labels inside of each bend (3 ones each end);
- 4) The marking was right.

Photo attachment as below



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End protector and Nylon rope	Tag

**10. Checking the quantity, labels, marking and polyester sling**

We had checked the quantity, labels, marking and polyester sling according to the contract and Packing List. Details as below:

- 4) The quantity was right;
- 5) The new labels were right and there were 6 labels inside of each bend( 3 ones each end);
- 6) The old polyester slings(safety factor: 6:1) had been replaced by new ones(safety factor: 8:1).  
Photo attachment as below

	
polyester sling Bundling	

**11. Verifying the truck loading**

We had overseen the operation of two trucks loading and the bends were good after being loaded into the truck.

Photo attachment as below



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● **Review of Documentation**

Mother Pipe Mill Test Certificate.

Record for Production of Hot Induction Bends.

Heat Treatment Report.

UT Report.

MPT Report.

Hydrostatic Testing Report

Inspection Report of Finished product.

SGS Certificate for Polyester slings



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archival code

档号

## QUEENSLAND CURTIS LNG PROJECT

昆士兰柯蒂斯天然气管道工程

**Project No.: 110176TND**

**工程编号: 110176TND**

K.A. SHARPE

*K.A. Sharpe*

ACCEPTED. QQC.

10/08/11