ภาคผนวก ก

มหาวิทยาลัยนเรศวร

STP & I

Record No. : 131

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 5/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness : 12,19 mm	
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity : HOLE	Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-6VB30		

SEE ATTACHED DRAWING SKETCH

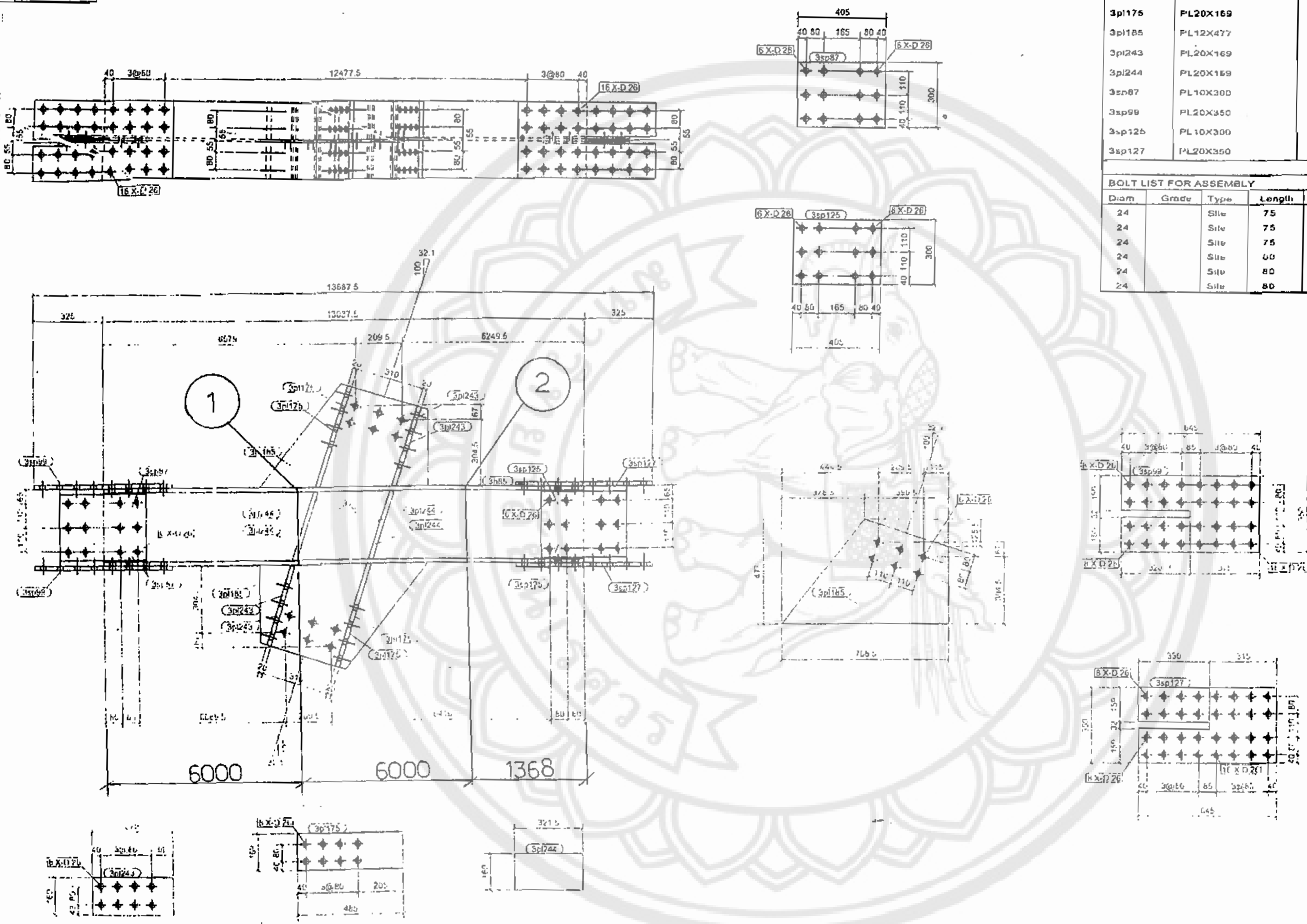
Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Discontinuity: Distance From X	Discontinuity: Distance From Y	Discontinuity evaluation	REMARK
1TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
2TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
2WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
2BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUTEPT.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

LOCATION LIST	
	COORDINATE
2	DF/2-3/+22500-+31980



MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-6VB30		1	No. Required	
Mark	Description	Grade	Q'ty	Length (mm)	Area (m2)	Weight (kg)
3h85	H-350X350X12X19	SS400	1	13037 7	26 60	1779 [illegible]
3pl175	PL20X169	SS400	4	484.9	0.76	51 46
3pl185	PL12X477	SS400	2	768 7	1.06	69 08
3pl243	PL20X169	SS400	4	379 1	0 60	40.23
3pl244	PL20X169	SS400	4	321 3	0 51	34.10
3sp87	PL10X300	SS400	2	405 0	0 51	19 08
3sp99	PL20X350	SS400	2	645 0	0 97	67 67
3sp125	PL10X300	SS400	2	405 0	0 51	19 08
3sp127	PL20X350	SS400	2	645 0	0.97	67 57
				Total	32 49	2148 06

BOLT LIST FOR ASSEMBLY			FN-6VB30		No. 1	
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	6	0.54	FN-2C17 FN-6VB30
24		Site	75	6	0 64	FN-3C16 FN-6VB30
24		Site	75	12	0 54	FN-6VB30 FN-6VD30
24		Site	60	32	0.50	FN-2C17
24		Site	80	32	0.56	FN-3C16
24		Site	80	64	0.66	FN-6VB30

01 DEC 2006

CONTROLLED

KOBELCO KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDU	FURNACE TOWER
CHECKED		V-BRACING FN-6VB3
APPROVED		REFER DRAWING NO

GENERAL NOTES:
1 All Welding To Be In

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-6VB30

STP&I

Record No. : 134

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 6/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness : 13,21 mm	
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-6VB22		

SEE ATTACHED DRAWING SKETCH

Weld Identification

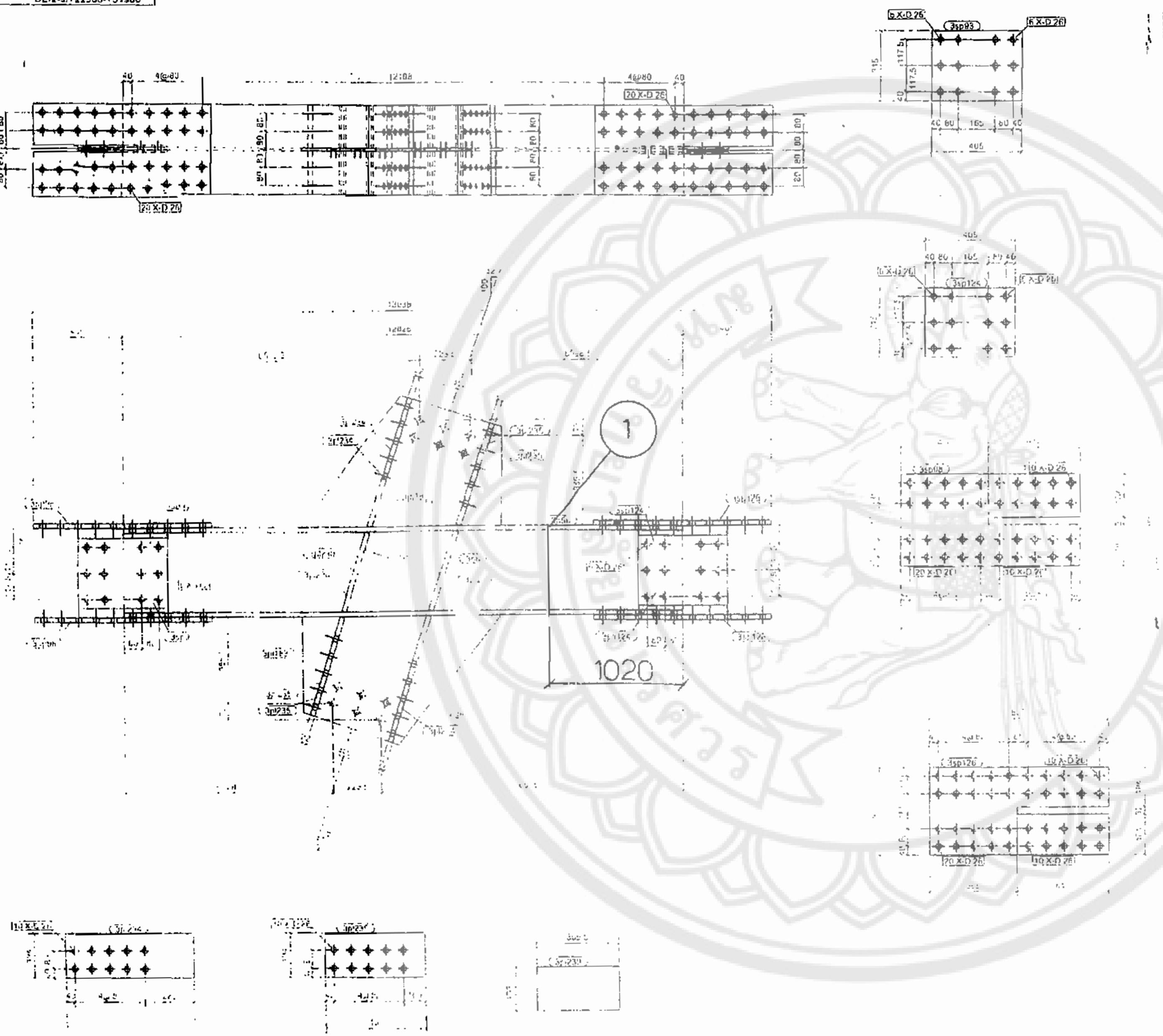
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	1	70	A	II	50	46	2	+2	30	50	17	-4	120	CLASS A	REJECT
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

Q.C. STP&I DEPT.

LOCATION LIST	
	COORDINATE
43	OE/2-3/+22500-+31980



MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-6VB22		1 No. Required		
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
3n90	H-400X400X13X21	SS400	1	12027.8	[illegible]	2202.57
3pl183	PL12X571	SS400	2	897.8	1.46	96.61
3pl236	PL22X183.5	SS400	4	[illegible]	[illegible]	49.38
3pl234	PL22X194	SS400	[illegible]	[illegible]	[illegible]	78.16
3pl258	PL22X194	SS400	4	[illegible]	[illegible]	[illegible]
3sp95	PL10X315	SS400	[illegible]	[illegible]	[illegible]	[illegible]
3sp98	PL22X400	SS400	[illegible]	[illegible]	[illegible]	[illegible]
3sp124	PL16X315	SS400	2	[illegible]	[illegible]	[illegible]
3sp126	PL22X400	SS400	[illegible]	[illegible]	[illegible]	[illegible]
			Total		[illegible]	2741.46

BOLT LIST FOR ASSEMBLY		FN-6VB22			No. 1	
Diam	Grade	Type	Length	No	kg/bolt	Member
24		[illegible]	[illegible]	6	0.54	FN-2C-14 FN-6VB22
24		[illegible]	[illegible]	6	[illegible]	[illegible]
24		[illegible]	[illegible]	[illegible]	0.54	FN-6VB22 FN-6VB22
24		[illegible]	[illegible]	40	[illegible]	FN-2C-14
24		[illegible]	[illegible]	[illegible]	0.56	[illegible]
24		[illegible]	[illegible]	60	[illegible]	FN-6VB22

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-6VB22

...AL NOTES
...Welding To Be In
...ordance With AWS D1.1
...ches To Have 10 mm
...ius At Internal Corners ...

A	2011/06	For Review		SDD

KOBELCO ◈ KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER
CHECKED		V-BRACING FN-6VB2
APPROVED		REFER DRAWING NO.

STP&I

Record No. : 136

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 8/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	12.19 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-6VB42		

SEE ATTACHED DRAWING SKETCH

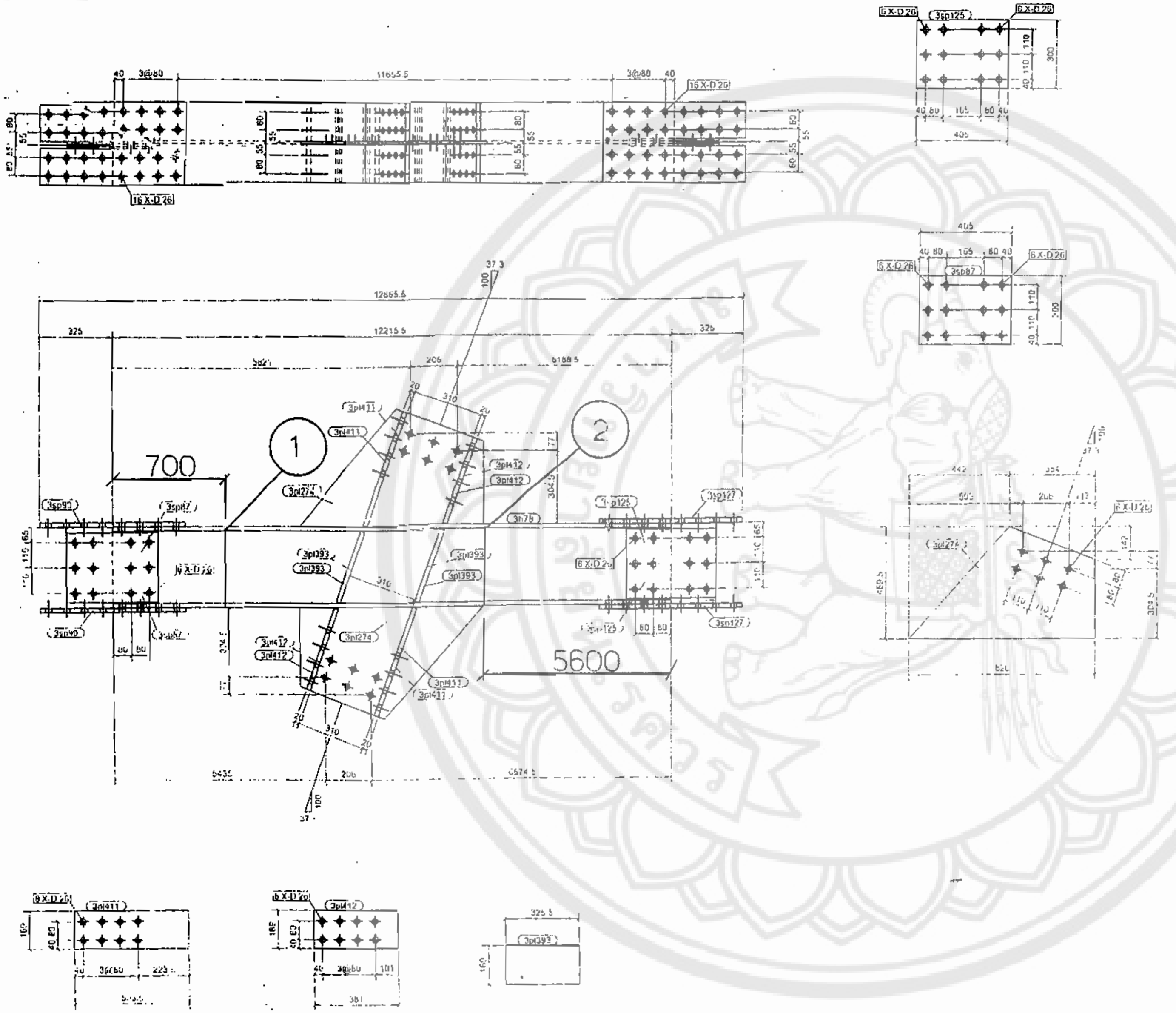
Weld Identification

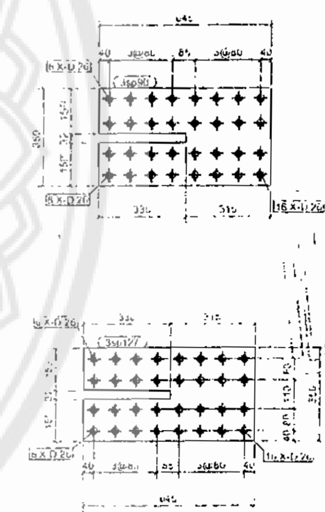
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Decibels: Reference Level B	Decibels: Attenuation factor C	Decibels: Indication rating D	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	1	70	A	III	53	46	2	+5	20	56	19	+2	200	CLASS A	REJECT
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
2TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
2WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
2BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO..LTD
Signature			
Name	MR. SUTEP T.	MR. CHAYAPHOL W (ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

LOCATION LIST	
[illegible]S	COORDINATE
[illegible].078	DB-DE/1/+22500-+31980





MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-6VB42		1	No	required
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
3h78	H-350X350X12X19	SS400	1	12215.6	24.92	1667.57
3pl274	PL12X489	SS400	2	826.0	1.13	76.17
3pl393	PL20X169	SS400	4	325.5	0.52	34.55
3pl411	PL20X169	SS400	4	503.7	0.79	53.46
3pl412	PL20X169	SS400	4	380.6	0.60	40.42
3sp87	PL10X300	SS400	2	405.0	0.51	19.08
3sp90	PL20X350	SS400	2	645.0	0.97	67.57
3sp125	PL10X300	SS400	2	405.0	0.51	19.08
3sp127	PL20X350	SS400	2	645.0	0.97	67.57
				Total	30.92	2045.45

BOLT LIST FOR ASSEMBLY			FN-6VB42		No 1	
Diam	Grade	Type	Length	No	kg/bol	Member
24		Site	75	6	0.54	FN-2C10 FN-6VB42
24		Site	75	6	0.54	FN-3C4 FN-6VB42
24		Site	75	12	0.54	FN-6VB42 FN-6VB42
24		Site	80	32	0.56	FN-2C10
24		Site	80	32	0.56	FN-3C4
24		Site	80	64	0.56	FN-6VB42

01 DEC 2006

ORIGINAL

CONTROLLED

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-6VB42

A	28/11/06	For Review	SDD		

KOBELCO — KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER			
CHECKED		V-BRACING FN-6VB4			
APPROVED		KEFLH DRAWING NO.			
SCALE	NTS	DRAWING NO.	754-S- FN-6VB42	REV.	A

STP&I

Page : "1 OF 1

Record No. : 141

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 10/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	12,19 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste

Sketch of Examined Location P/M FN-6VB39

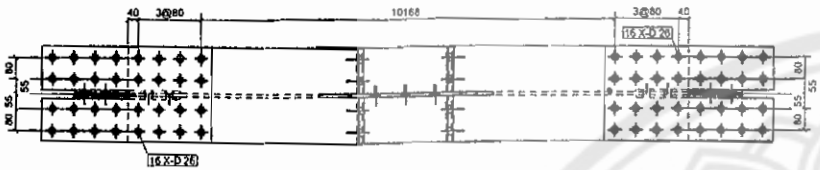
SEE ATTACHED DRAWING SKETCH

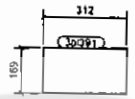
Weld Identification

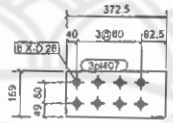
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Discontinuity: Distance From X	Discontinuity: Distance From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

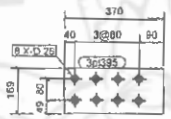
Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

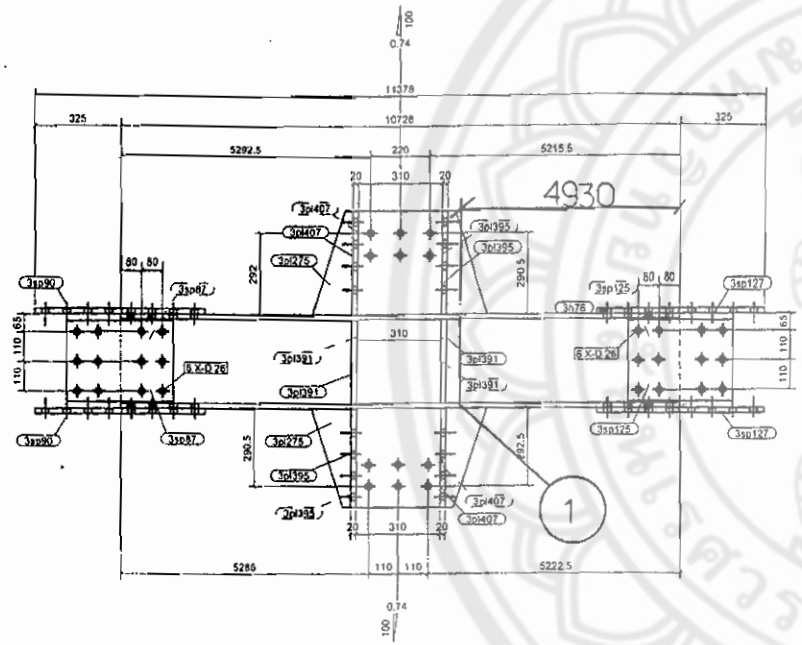
LOCATION LIST	
	COORDINATE
	DA-DB/1/+22500-+31980

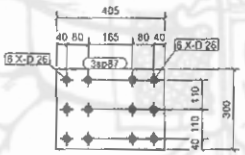


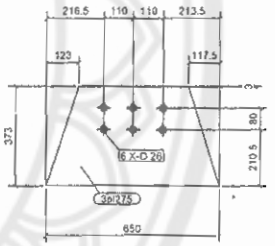


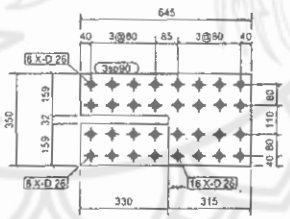


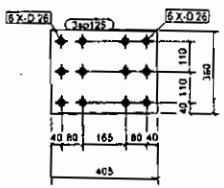


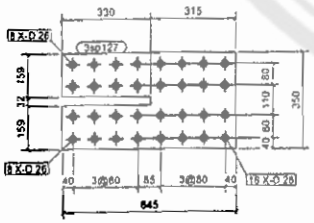












MATERIAL LIST FOR ONE ASSEMBLY MKD		FN-6VB39			1	No. Required
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
3h76	H-350X350X12X19	SS400	1	10728.1	21.69	1464.51
3pl275	PL12X373	SS400	2	650.0	0.83	45.67
3pl391	PL20X169	SS400	4	311.9	0.50	33.10
3pl395	PL20X169	SS400	4	370.1	0.59	39.28
3pl407	PL20X169	SS400	4	372.6	0.59	39.54
3sp87	PL10X300	SS400	2	405.0	0.51	19.08
3sp90	PL20X350	SS400	2	645.0	0.97	67.57
3sp125	PL10X300	SS400	2	405.0	0.51	19.08
3sp127	PL20X350	SS400	2	645.0	0.97	67.57
				Total	27.35	1795.40

BOLT LIST FOR ASSEMBLY		FN-6VB39			No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	6	0.54	FN-2C4 FN-6VB39
24		Site	75	6	0.54	FN-3C1 FN-6VB39
24		Site	75	12	0.54	FN-6VB39 FN-6VB39
24		Site	80	32	0.56	FN-2C4
24		Site	80	16	0.56	FN-3C1
24		Site	80	64	0.56	FN-6VB39
24		Site	85	16	0.58	FN-3C1

01 DEC 2006
ORIGINAL
CONTROLLED

KOBELCO KOBE STEEL, LTD.

CLIENT

[redacted]

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

89 MU 3 Bangna-Trad Rd., K.M 63.5 T.Klong-Tumru A. Mueang Chonburi 20000 Thailand

DRAWN	SDG	FURNACE TOWER
CHECKED		V-BRACING FN-6VB3
APPROVED		REFER DRAWING NO.

RAL NOTES:
1 Welding To Be In

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-6VB39

STP&I

Record No. : 146

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	9/1/2007
Job No. :	0754-0-1	Client	KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	12,19 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-6VB59		

SEE ATTACHED DRAWING SKETCH

Weld Identification

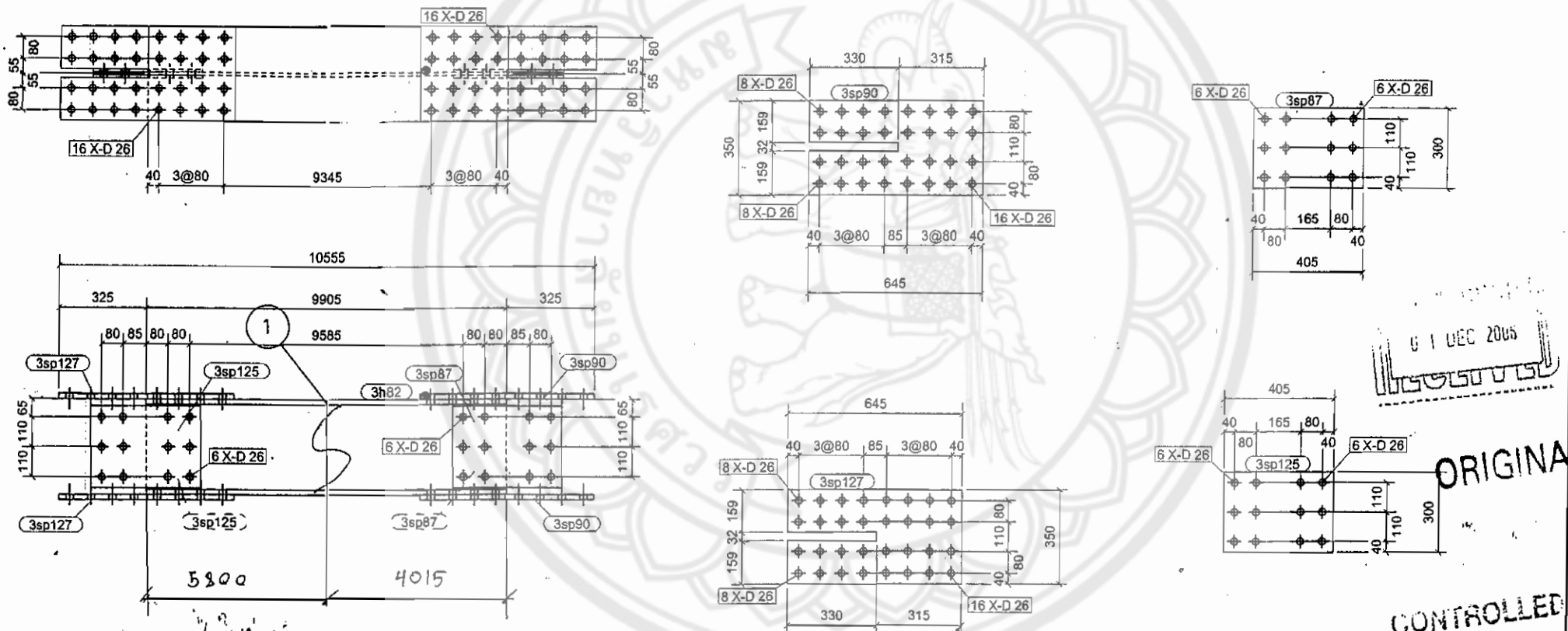
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Discontinuity: Distance From X	Discontinuity: Distance From Y	Discontinuity evaluation	REMARK
1TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHATAPHOL W.(ENG.QC)	K. UEDA
Date	1-6-07		

LOCATION LIST	
	COORDINATE
19	DF-DT/3/+22500-+31980

MATERIAL LIST FOR ONE ASSEMBLY MK'D			FN-6VB59		1	No. Required
Mark	Description	Grade	Q'ty	Length(mm	Area (m 2)	Weight (kg)
3h82	H-350X350X12X19	SS400	1	9905.1	20.21	1352.16
3sp87	PL16X300	SS400	2	405.0	0.51	19.06
3sp90	PL20X350	SS400	2	645.0	0.97	67.57
3sp125	PL10X300	SS400	2	405.0	0.51	19.06
3sp127	PL20X350	SS400	2	645.0	0.97	67.57
				Total	23.17	1525.45

BOLT LIST FOR ASSEMBLY			FN-6VB59			No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	6	0.54	FN-2C17 FN-6VB59
24		Site	75	12	0.54	FN-6VB59 FN-6VB59
24		Site	75	6	0.54	FN-6VB59 FN-6G20
24		Site	80	32	0.56	FN-2C17
24		Site	80	64	0.56	FN-6VB59
24		Site	80	32	0.56	FN-6G20



ORIGINAL

CONTROLLED

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-6VB59

AL NOTES:
Welding To Be In
ordance With AWS D1.1.
ches To Have 10 mm
dius At Internal Corners UON.

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
A	28/11/08	For Review	BJD		

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
89 MU 3 Bangna-Trad Rd., K.M. 33.5 T Klong-Tumru
A. Muang Chonburi 20000 Thailand

DRAWN	BJD	FURNACE TOWER V-BRACING FN-6VB5	
CHECKED			
APPROVED		REFER DRAWING NO.	
SCALE	NTS	DRAWING NO. 754-S- FN-6VB59	REV. A

STP&I

Record No. : 151

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 11/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	12.19 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-1VB34		

SEE ATTACHED DRAWING SKETCH

Weld Identification

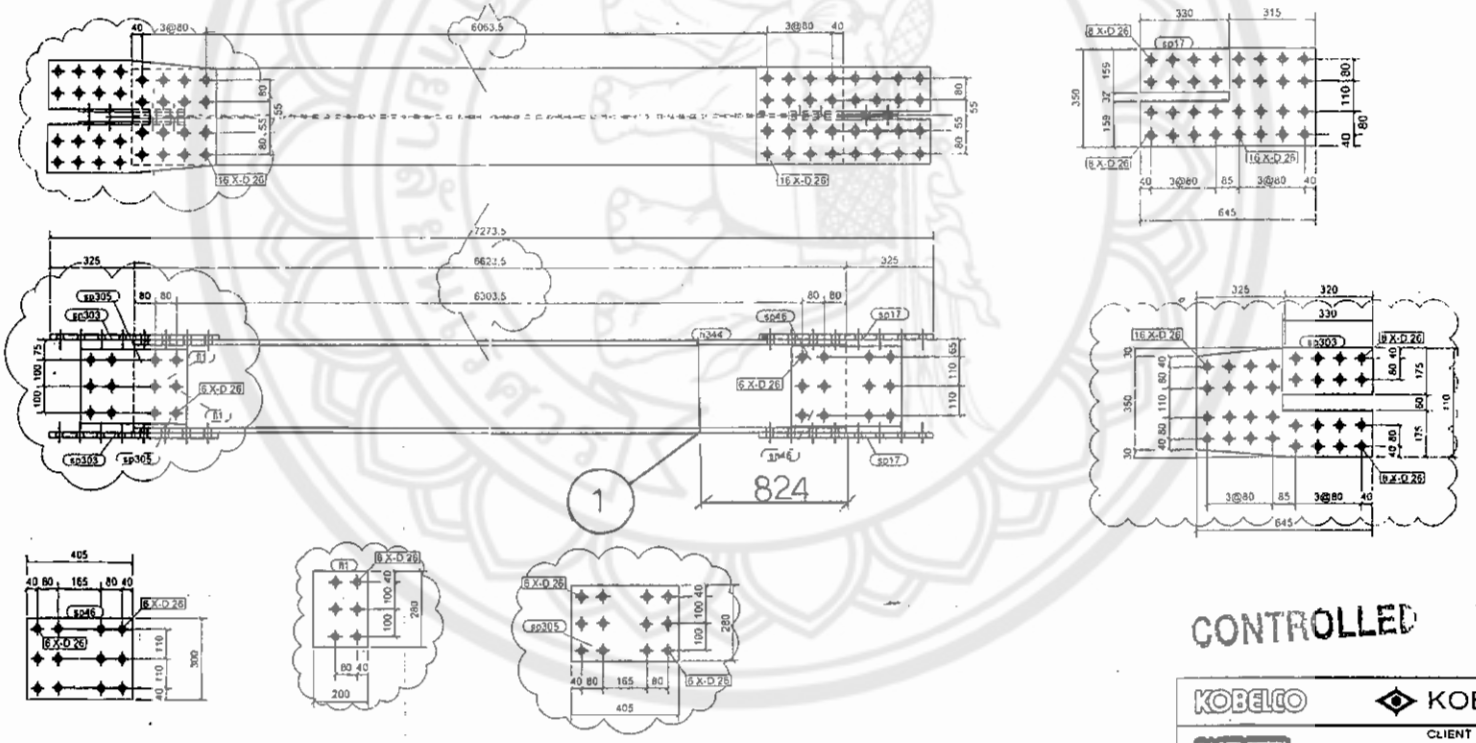
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHAYAPHOB W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
TOS.	COORDINATE
+4.238	DF-DT/3/+0.00-+5000

MATERIAL LIST FOR ONE ASSEMBLY MK'D			FN-1VB34			1 No. Required
Mark	Description	Grade	Q'ty	Length mm	Area (m2)	W (kg)
h344	H-350X350X12X19	SS400	1	6623.6	13.51	92.19
fl1	PL14X280	SS400	2	200.0	0.25	12.31
sp17	PL20X350	SS400	2	645.0	0.87	51.87
sp48	PL10X300	SS400	2	405.0	0.61	19.08
sp303	PL20X410	SS400	2	645.0	1.05	73.78
sp305	PL10X280	SS400	2	405.0	0.48	17.50
				Total	16.77	1094.71

BOLT LIST FOR ASSEMBLY			FN-1VB34			No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	8	0.54	FN-1G12 FN-1VB34
24		Site	75	8	0.54	FN-1VB34 FN-1VB34
24		Site	80	32	0.58	FN-1G17
24		Site	80	32	0.58	FN-1G17
24		Site	80	64	0.58	FN-1VB34
24		Site	100	8	0.63	FN-1G17 FN-1VB34
24		Site	100	8	0.63	FN-1VB34 FN-1VB34



REVISED

ORIGINAL

RECEIVED

2 5 DEC 2006

CONTROLLED

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1.
2. Notches To Have 10 mm Radius At Internal Corners UON.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-1VB34

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
C	22/12/06	Revised as per marks	SDD		
B	19/12/06	Revised as per marks	SDD		
A	23/11/06	For Review	SDD		

KOBELCO — KOBE STEEL, LTD.

CLIENT: HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
59 SOI 3 Bangna-Trad Rd., K.M. 53.5 T.Klong-Tumru, A. Muang Chonburi 20000 Thailand

DRAWN	SDD	FURNACE TOWER V-BRACING FN-1VB3	
CHECKED			
APPROVED		REFER DRAWING NO	
SCALE	NTS	DRAWING NO. 754-S- FN-1VB34	REV. C

STP&I

Record No. : 153

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 11/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	8,12 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-5VB32		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SOTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT. Q.C. STP&I DEPT.

LOCATION LIST	
TOS.	COORDINATE
+21.565	DF-DT/3/+19310-+22500

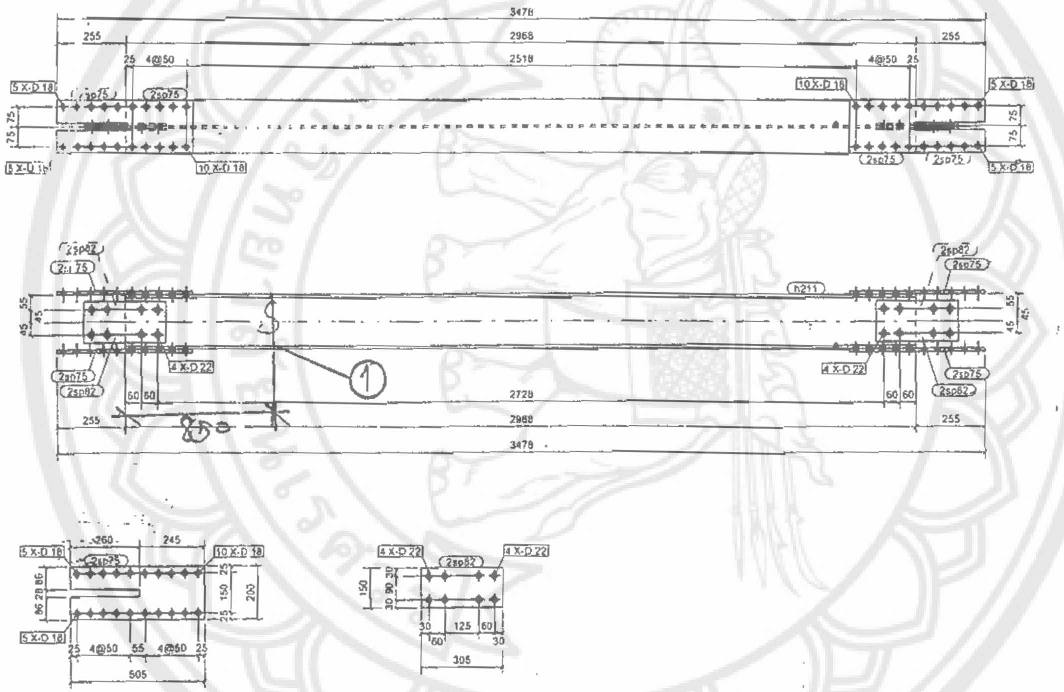
MATERIAL LIST FOR ONE ASSEMBLY MKD FN-5VB32 1 No Req.

Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
h211	H-200X200X8X12	SS400	1	2987.9	3.44	148.01
2sp75	PL12X200	SS400	4	505.0	0.84	35.30
2sp82	PL8X150	SS400	4	305.0	0.40	11.49
				Total	4.68	194.82

BOLT LIST FOR ASSEMBLY FN-5VB32 No 1

Diam	Grade	Type	Length	No	kg/set	Member
16		Site	50	10	0.23	FN-2C17
16		Site	50	10	0.23	FN-5G11
16		Site	50	20	0.23	FN-5VB32
16		Site	55	10	0.23	FN-2C17
16		Site	55	10	0.23	FN-5G11
16		Site	55	20	0.23	FN-5VB32
20		Site	55	4	0.27	FN-2C17 FN-5VB32
20		Site	55	4	0.27	FN-5G11 FN-5VB32
20		Site	55	8	0.27	FN-5VB32 FN-5VB32

CP 11-1A



CONTROLLED

ORIGINAL

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-5VB32

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1.
2. Notches To Have 10 mm

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
A	17/11/06	For Review	SOD		

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SOD	FURNACE TOWER V-BRACING FN-5VB3
CHECKED		
APPROVED		REFER DRAWING NO
SCALE	NTS	DRAWING NO. 754-S- FN-5VB32 REV.

STP&I

Page : 1 OF 1

Record No. : 154

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 11/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	8,12 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-5VB33		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUTEP T.	MR. CHATAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

Q.C. STP&I DEPT.

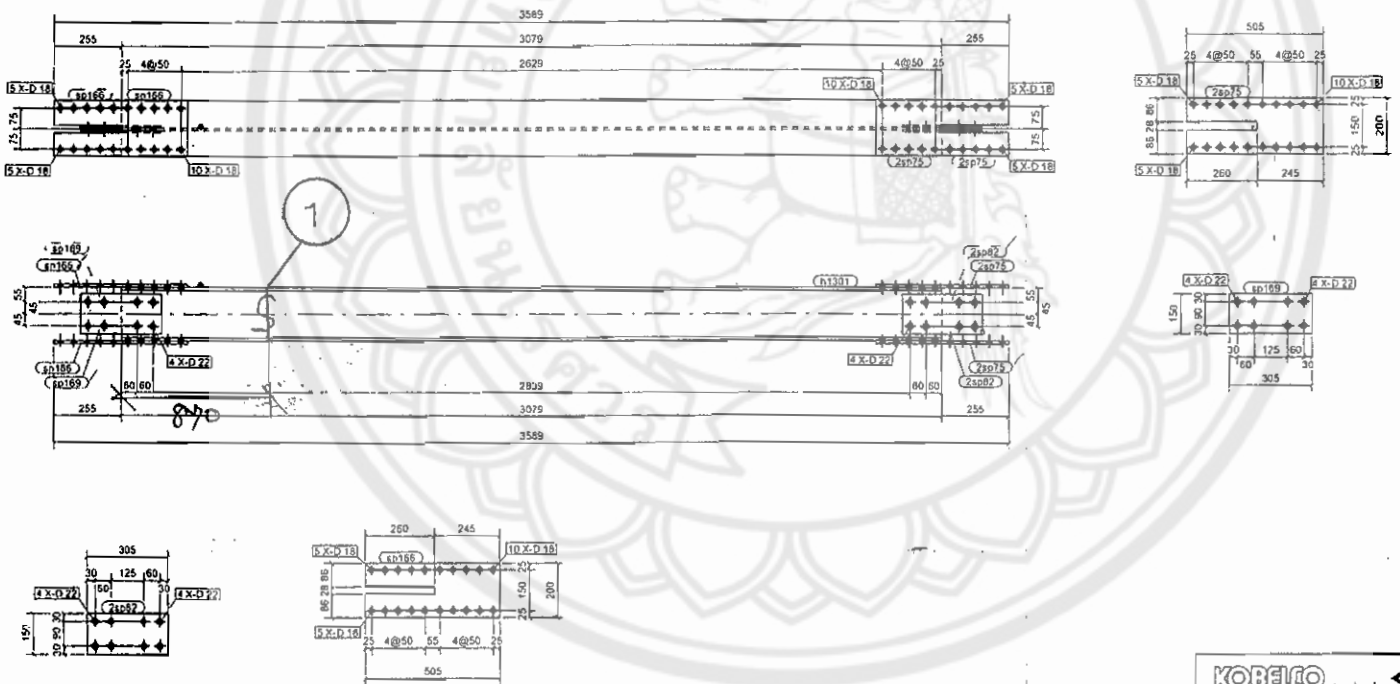
LOCATION LIST	
.	COORDINATE
33	DR-DT/3/+19310-+22500

MATERIAL LIST FOR ONE ASSEMBLY MK'D FN-5VB33 1 No. Required

Mark	Description	Grade	Q'ty	Length (mm)	Area (m2)	Weight (kg)
h1301	H-200X200X8X12	SS400	1	3079.0	3.57	153.55
2sp75	PL12X200	SS400	2	505.0	0.42	17.56
2sp82	PL8X150	SS400	2	305.0	0.20	5.75
sp166	PL12X200	SS400	2	505.0	0.42	17.56
sp169	PL8X150	SS400	2	305.0	0.20	5.75
				Total	4.81	200.36

BOLT LIST FOR ASSEMBLY FN-5VB33 No 1

Diam	Grade	Type	Length	No	kg/set	Member
16		Site	50	10	0.23	FN-5G11
16		Site	50	20	0.23	FN-5VB33
16		Site	50	10	0.23	FN-C17
16		Site	55	10	0.23	FN-5G11
16		Site	55	20	0.23	FN-5VB33
16		Site	65	10	0.23	FN-C17
20		Site	55	4	0.27	FN-5G11 FN-5VB33
20		Site	55	8	0.27	FN-5VB33 FN-5VB33
20		Site	55	4	0.27	FN-5VB33 FN-C17



1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-5VB33

NERAL NOTES:
All Welding To Be In Accordance With AWS D1.1.
Notches To Have 10 mm

A	17/11/06	For Review	SOD		
REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
89 Moo 3 Bangna-Trad Rd., K.M. 63.5 T.Klong-Tumru
A.Muang Chonburi 20000 Thailand

DRAWN	SOD	FURNACE TOWER	
CHECKED		V-BRACING FN-5VB3	
APPROVED		REFER DRAWING NO.	
SCALE	NTS	DRAWING NO. 754-S- FN-5VB33	REV. A

2 0 NOV 2006
CONTROLLED
ORIGINAL

STP & I

Record No. : 161

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 12/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness : 12,19 mm	
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-1VB33		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUTEP T	MR. CHAIYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

Q.C. STP&I DEPT.

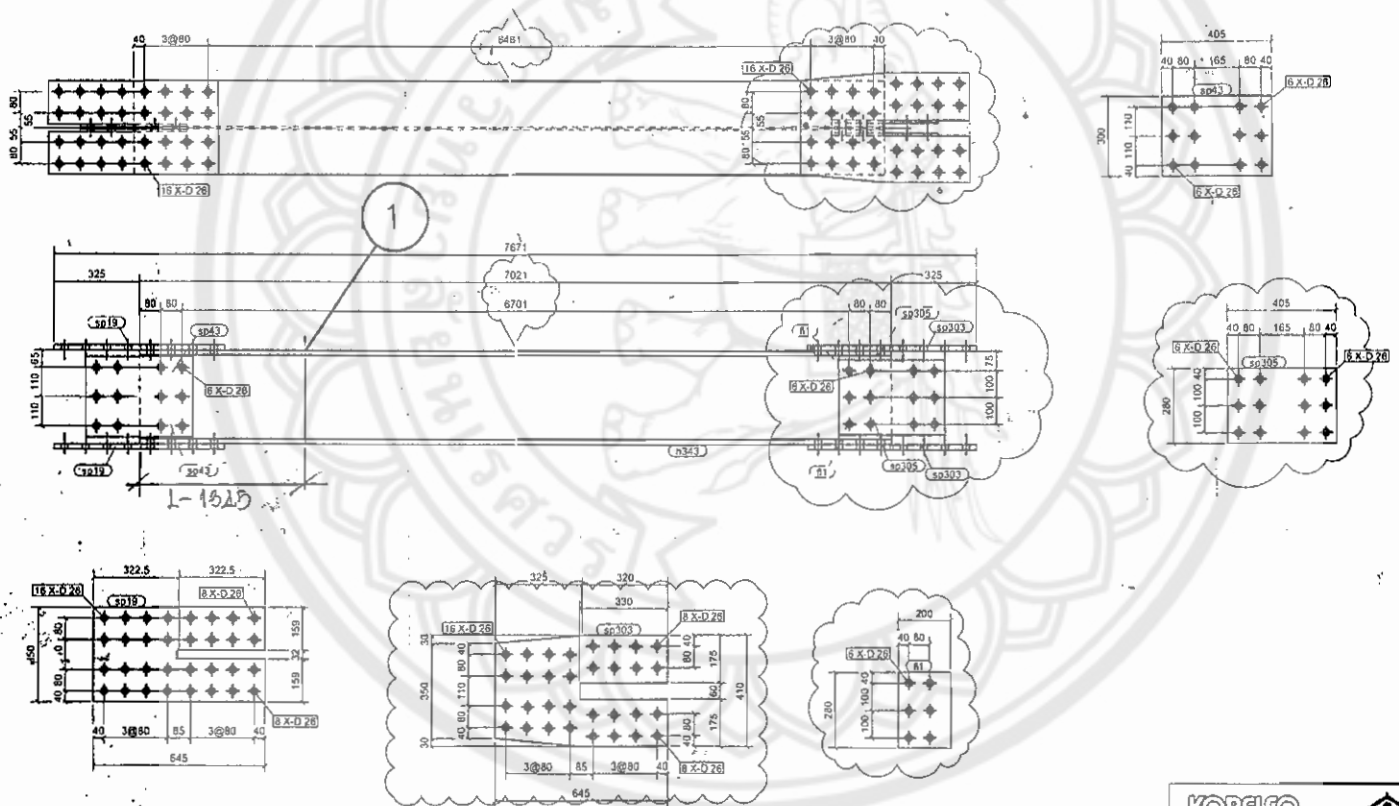
ATION LIST	
TOS.	COORDINATE
+4.100	5-DF/3/+0.00-+5000

MATERIAL LIST FOR ONE ASSEMBLY MK'D FN-1VB33 1 Required

Mark	Description	Grade	Q'ty	Length mm	Area (m2)	Weight (kg)
h343	H-350X350X12X19	SS400	1	7021.0	14.12	958.44
fl1	PL14X280	SS400	2	200.0	0.25	12.31
sp19	PL20X350	SS400	2	645.0	0.97	67.57
sp43	PL10X300	SS400	2	405.0	0.51	19.08
sp303	PL20X410	SS400	2	645.0	1.05	73.76
sp305	PL10X280	SS400	2	405.0	0.48	17.80
				Total	17.58	1148.96

BOLT LIST FOR ASSEMBLY FN-1VB33 No. 1

Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	8	0.54	FN-1C14 FN-1VB33
24		Site	75	8	0.54	FN-1VB33 FN-1VB33
24		Site	80	32	0.56	FN-1C14
24		Site	80	16	0.56	FN-1C17
24		Site	80	64	0.56	FN-1VB33
24		Site	85	16	0.58	FN-1C17
24		Site	100	8	0.63	FN-1C17 FN-1VB33
24		Site	100	8	0.63	FN-1VB33 FN-1VB33



GENERAL NOTES:

1. All Welding To Be In Accordance With AWS D1.1.
2. Notches To Have 10 mm Radius At Internal Corners UON.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-1VB33

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
C	22/12/06	Revised as per marks	SOD		
B	19/12/06	Revised as per marks	SOD		
A	23/11/06	For Review	SOD		

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
99 MU 3 Bangna-Trad Rd., KM 33.5 T.Klong-Tumru A. Muang Chonburi 20000 Thailand

DRAWN	SOD	FURNACE TOWER V-BRACING FN-1VB33	
CHECKED			
APPROVED		REFER DRAWING NO.	
SCALE	NTS	DRAWING NO. 754-S- FN-1VB33	REV. C

STP&I

Record No. : 173

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	27/12/2006
Job No. :	0754-0-1	Client	KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	13,21 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-2VB13		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Reference Level B	Attenuation factor C	Indication rating D	Discontinuity: Length	Sound path	Depth from "A" surface	Distance From X	Distance From Y	Discontinuity evaluation	REMARK
1TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	[illegible]	MR. CHATAPHOL W.(ENG.QC)	K. UEDA
Date			

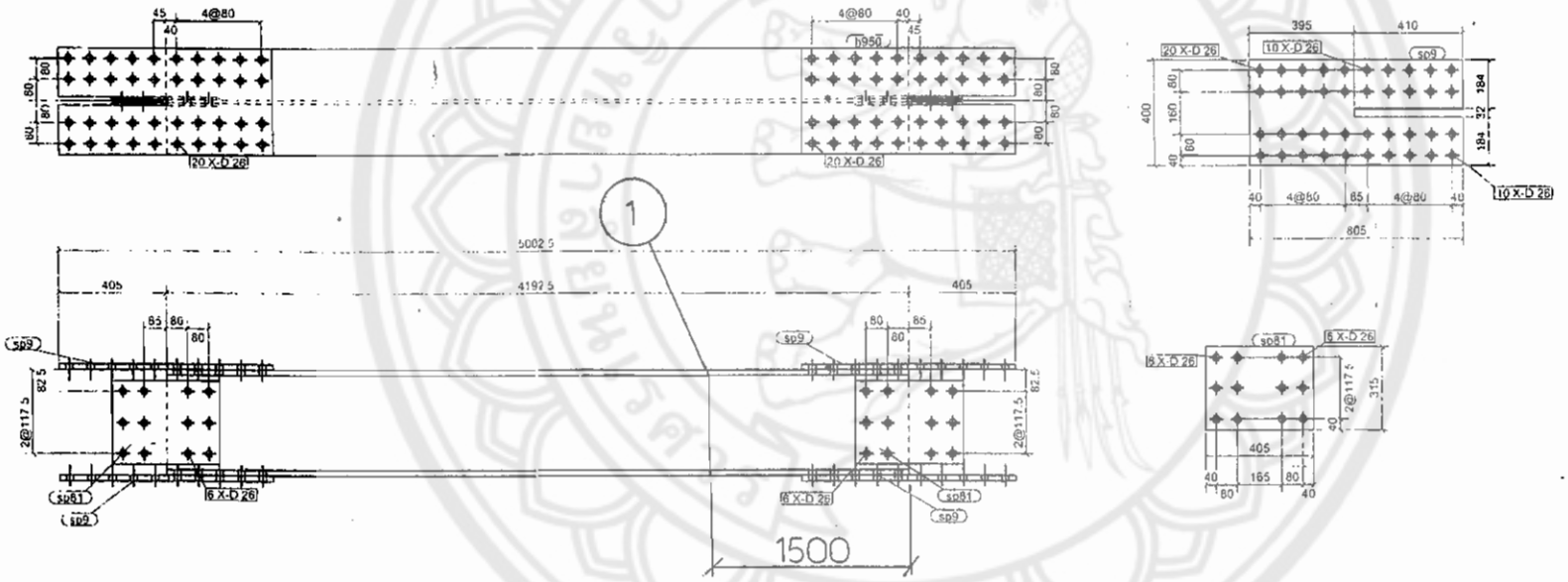
Q.C. STP&I DEPT.

Q.C. STP&I DEPT.

LOCATION LIST	
	COORDINATE
	DE/1.5-1.0/+5000-+10000

MATERIAL LIST FOR ONE ASSEMBLY MK'D			FN-2VB13		1	No Required
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
h950	H-400X400X13X21	SS400	1	4192.5	9.73	719.76
sp9	PL22X400	SS400	4	805.0	2.78	213.37
sp81	PL10X315	SS400	4	405.0	1.08	40.06
				Total	13.56	973.19

BOLT LIST FOR ASSEMBLY			FN-2VB13			No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	6	0.64	FN-1C12 FN-2VB13
24		Site	75	6	0.64	FN-1G26 FN-2VB13
24		Site	75	12	0.64	FN-2VB13 FN-2VB13
24		Site	85	40	0.68	FN-1C12
24		Site	85	40	0.58	FN-1G26
24		Site	85	80	0.58	FN-2VB13



NOV 2005
ORIGINAL
CONTROLLED

ERAL NOTES:
ll Welding To Be In
ccordance With AWS D1.1.
lotches To Have 10 mm
adius At Internal Corners UON.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-2VB13

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
A	08/11/06	For Review	SDO		

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDO	FURNACE TOWER V-BRACING FN-2VB1		
CHECKED				
APPROVED		REFER DRAWING NO.		
SCALE	NTS	DRAWING NO. 754-S- FN-2VB13	REV.	A

STP&I

Record No. : 180

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	29/12/2006
Job No. :	0754-0-1	Client	KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	12,19 mm
Weld Surface :	Smooth and grinding	Object	SINGLE BEVEL GROOVE, BUTT JOINT (Groove Design)
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN3VB36		

SEE ATTACHED DRAWING SKETCH

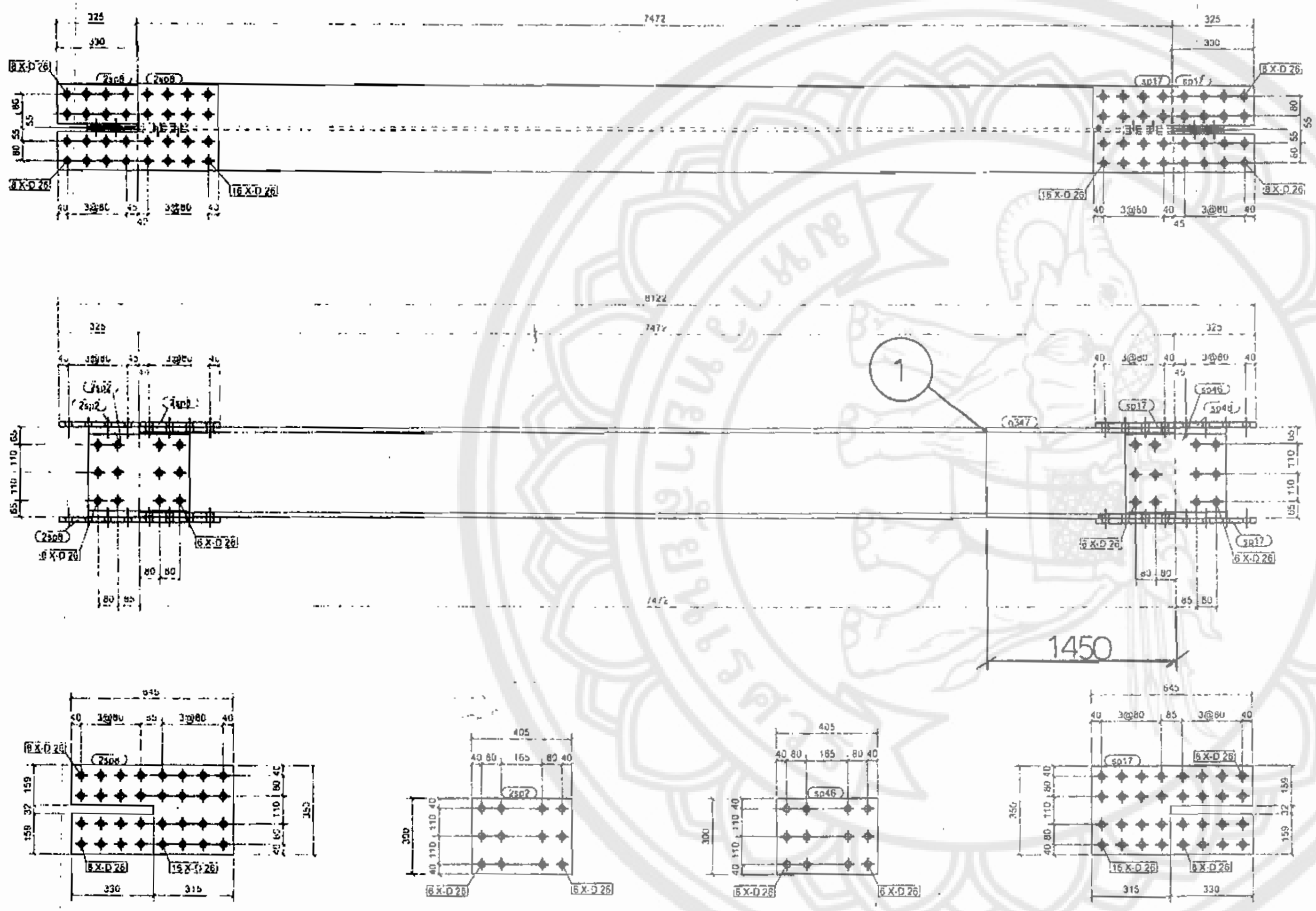
Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUTHIT	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

LOCATION LIST	
	COORDINATE
	DE-DF/3/+10000-+16261



MATERIAL LIST FOR ONE ASSEMBLY MK'D	FN-3VB36		1	No. Required		
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
h347	H-350X350X12X19	SS400	1	7472.2	15.24	1020.04
2sp2	PL10X300	SS400	2	405.0	0.51	19.08
2sp8	PL20X350	SS400	2	645.0	0.97	67.57
sp17	PL20X350	SS400	2	645.0	0.97	67.57
sp46	PL10X300	SS400	2	405.0	0.51	19.08
			Total		18.21	1193.33

BOLT LIST FOR ASSEMBLY			FN-3VB36			No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	6	0.54	FN-1C17 FN-3VB36
24		Site	75	6	0.54	FN-2C14 FN-3VB36
24		Site	75	12	0.54	FN-3VB36 FN-3VB36
24		Site	80	32	0.56	FN-1C17
24		Site	80	32	0.56	FN-2C14
24		Site	80	64	0.58	FN-3VB36

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3VB36

GENERAL NOTES
- All Welding To Be In Accordance With AWS D1.1.
- Notches To Have 10 mm Radius At Internal Corners UON.

A	17/11/06	For Review	SDD		
REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.

KOBELCO — KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER
CHECKED		V-BRACING FN-3VB3
APPROVED		REFER DRAWING NO.
SCALE	NTS	DRAWING NO. 754-S- FN-3VB36 — REV A

Record No. : 130

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT

Date 21/12/2006

Job No. : 0754-0-1

Client KOBE STEEL

Applied Standard	Method : Pulse Echo	
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)	
Material : Carbon Steel		Thickness : 16 mm
Weld Surface : Smooth and grinding		Object SINGLE BEVEL GROOVE, BUTT JOINT (Groove Design)
Apparatus : PANAMETRICS EPOCH 4		Probe : NDT SYSTEM AWS 0256
Frequency : 2.25 (MHz)		Sensitivity : HOLE Ø 1.5 (80 % FSH)
Standard Test Block : IIW BLOCK . V 1		Couplant : Starch Paste
Sketch of Examined Location P/M FN-3B277		

SEE ATTACHED DRAWING SKETCH

Weld Identification

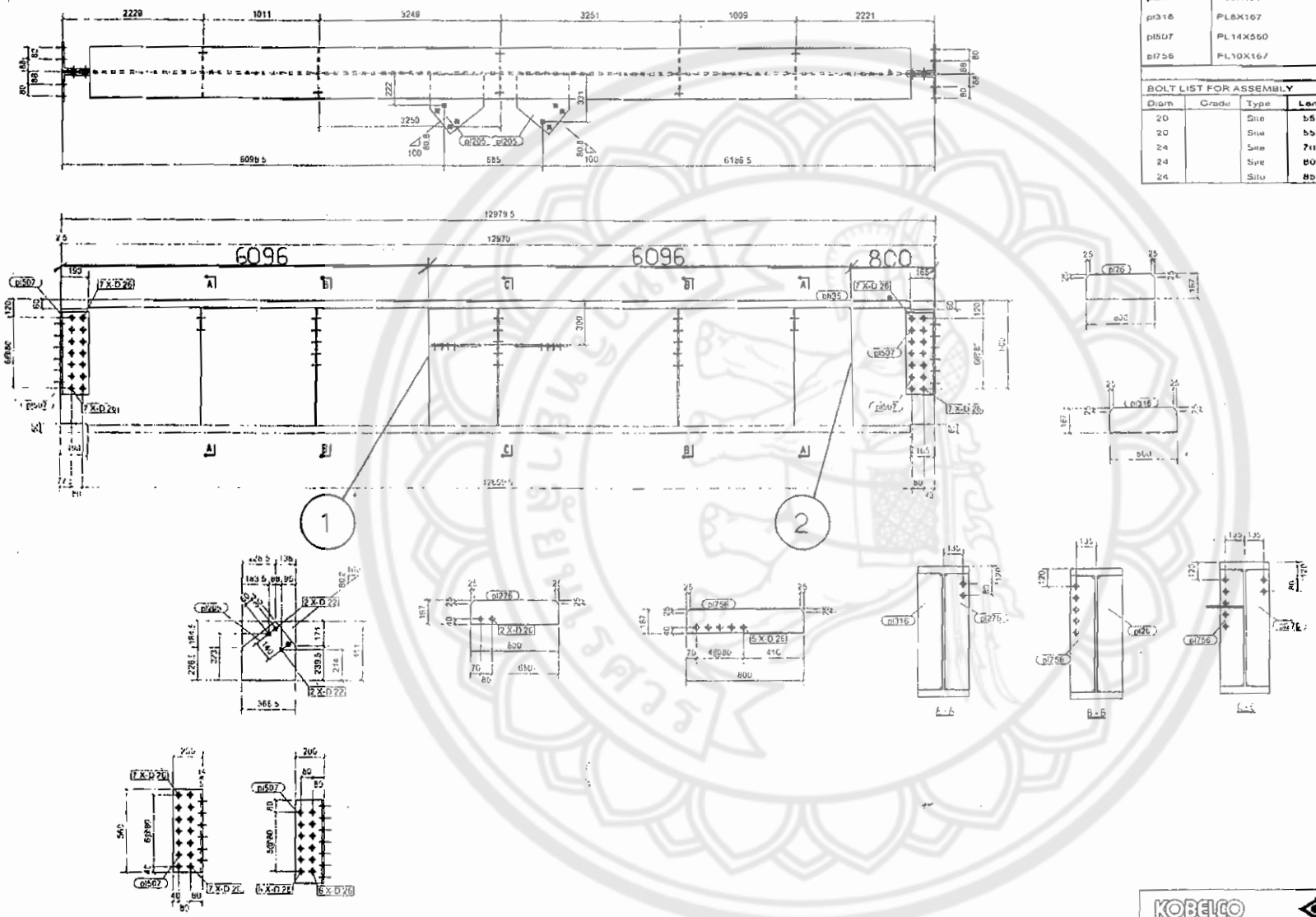
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels				Discontinuity					Discontinuity evaluation	REMARK
					Indication Level	Reference Level	Attenuation factor	Indication rating	Length	Sound path	Depth from "A" surface	Distance			
												From	From		
					A	B	C	D				X	Y		
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
2WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUPOT T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
TOS.	COORDINATE
10.000	DB-DE/1.5/+7500-+10000

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-3B277		1	No. Required	
Mark	Description	Grade	Q'ty	Length (mm)	Area (m 2)	Weight (kg)
bh35	BH-900X350X16X50	SS400	1	12970 0	40 63	4766 31
pl26	PL10X167	SS400	2	600 0	0 57	20.98
pl205	PL12X411	SS400	2	386 6	0 50	26 37
pl276	PL8X167	SS400	3	800 0	0 84	25.17
pl316	PL8X167	SS400	2	800 0	0.56	16 78
pl507	PL14X550	SS400	4	386 0	1 84	95 02
pl756	PL10X167	SS400	3	600 0	0 85	31.46
				Total	45 79	4986 09

BOLT LIST FOR ASSEMBLY		FN-3B277				No 1
Diam	Grade	Type	Length	No	kg/set	Member
20		Stu	55	4	0 27	FN-3HB30
20		Stu	55	4	0 27	FN-3HB32
24		Stu	70	24	0 52	FN-3G15
24		Stu	80	24	0 56	FN-3C8
24		Stu	85	24	0 55	FN-3B277 / FN-3B277



CANCELLED

ORIGINAL

RECEIVED
CONTROLLED 2006

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B277

:AL NOTES:
Welding To Be In
:ordance With AWS D1 1
:ches To Have 10 mm
:dius At Internal Corners UON.

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
A	10/11/05	For Review	SOO		

KOBELCO — KOBE STEEL, LTD.

CLIENT: HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SOO	FURNACE TOWER	
CHECKED		BEAM	FN-3B277
APPROVED		REFER DRAWING NO	
SCALE	NTS	DRAWING NO 754-S- FN-3B277	REV A

Record No. : 135

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT

Date 6/1/2007

Job No. : 0754-0-1

Client KOBE STEEL

Applied Standard	Method : Pulse Echo
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)
Material : Carbon Steel	Thickness : 18,11 mm
Weld Surface : Smooth and grinding	Object (Groove Design) SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus : PANAMETRICS EPOCH 4	Probe : NDT SYSTEM AWS 0256
Frequency : 2.25 (MHz)	Sensitivity : HOLE Ø 1.5 (80 % FSH)
Standard Test Block : IIW BLOCK . V 1	Couplant : Starch Paste
Sketch of Examined Location P/M FN-5B51	

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Reference Level B	Attenuation factor C	Indication rating D	Discontinuity: Length	Sound path	Depth from "A" surface	Distance: From X	From Y	Discontinuity evaluation	REMARK
1TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	[illegible]	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

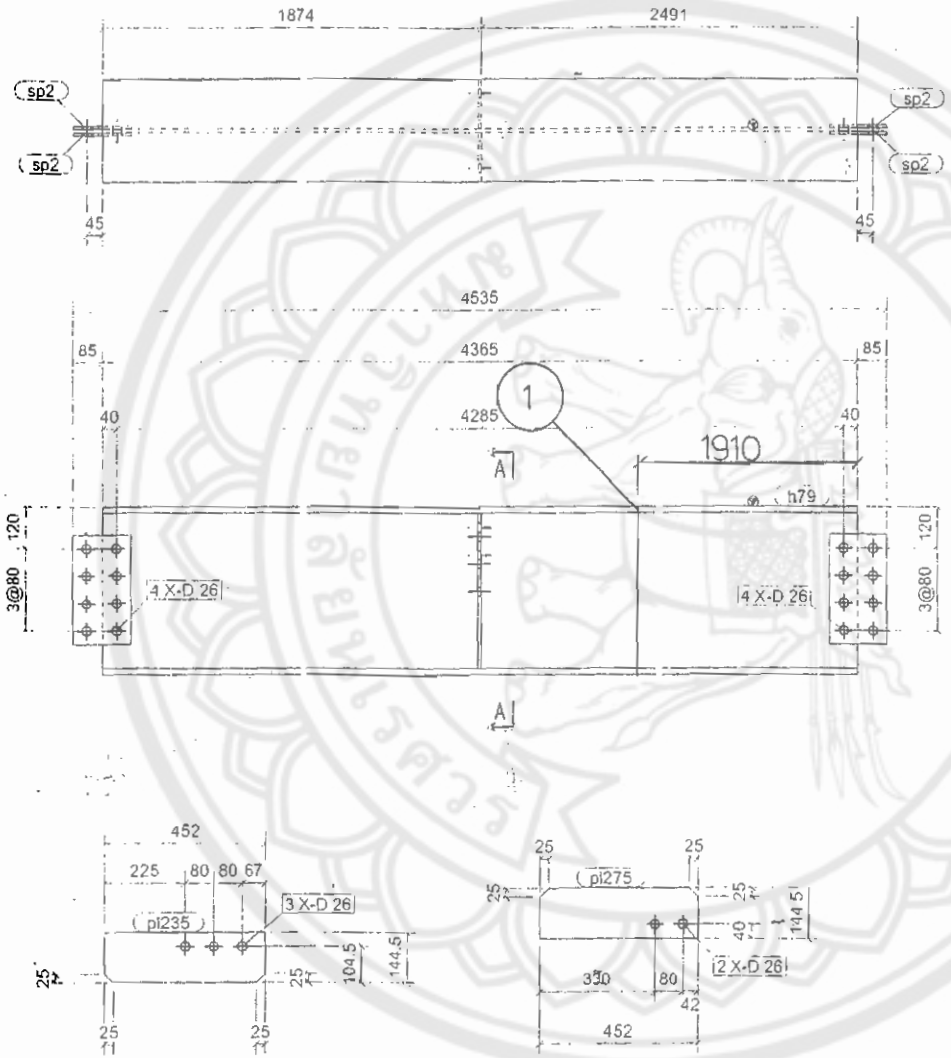
Q.C STP&I DEPT.

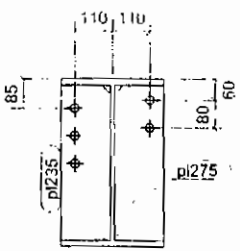
Q.C STP&I DEPT.

LOCATION LIST	
	COORDINATE
310	DB-DE/2.1-3/+19310

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-5B51			1 No Required	
Mark	Description	Grade	Q'ty	Length(mm)	Area (m²)	Weight (kg)
h79	H-488X300X11X18	SS400	1	4365.0	9.21	560.24
pl235	PL10X145	SS400	1	452.0	0.14	5.13
pl275	PL8X145	SS400	1	452.0	0.13	4.10
sp2	PL8X320	SS400	4	165.0	0.45	13.26
				Total	9.94	582.73

BOLT LIST FOR ASSEMBLY		FN-5B51			No 1	
Diam	Grade	Type	Length	No	Kg/set	Membur
24		Site	70	4	0.52	FN-5B18 FN-5B51
24		Site	70	4	0.52	FN-5B51 FN-5B51
24		Site	70	4	0.52	FN-5B51 FN-5G18





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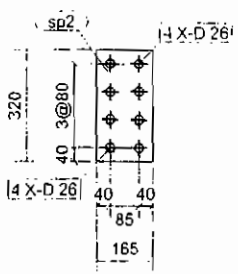


1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-5B51

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1
2. Notches To Have 10 mm

REV	DATE	DESCRIPTION	DRAWN	CHKD	APPROD
A	15/11-06	For Review	SDD		

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER BEAM FN-5B51		
CHECKED				
APPROVED		KEY BR DRAWING NO		
SCALE	NTS	DRAWING NO	754-S- FN-5B51	REV A

ORIGINAL

STP&I

Record No. : 139

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	9/1/2007
Job No. :	0754-0-1	Client	KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M; 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	25 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-1B18		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From (X)	Distance: From (Y)	Discontinuity evaluation	REMARK
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
2WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR.SUKIT	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

CP - 1 2 - 0 6

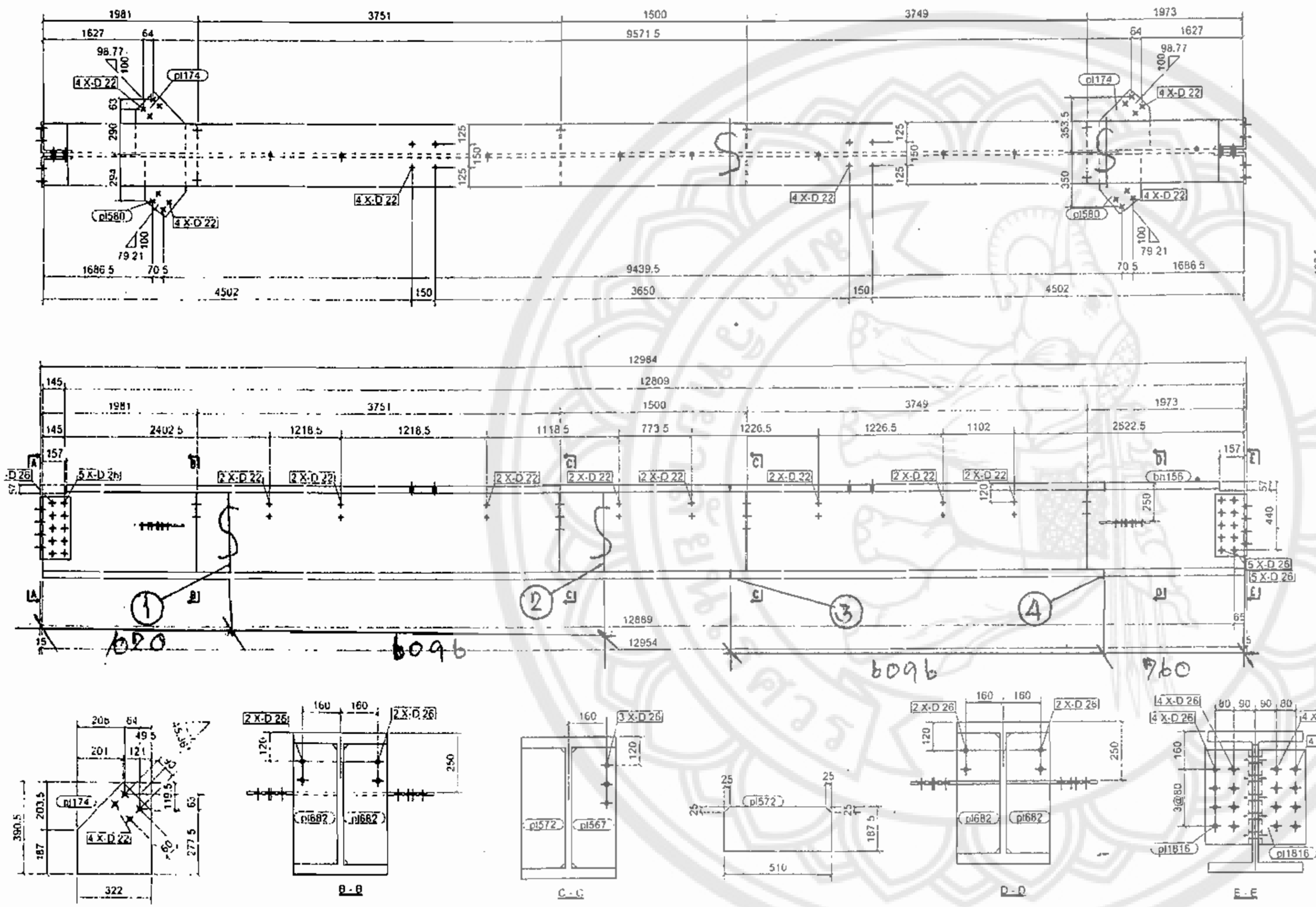
LOCATION LIST	
	COORDINATE
0	DB-DE/2-3/+0.00-+5000

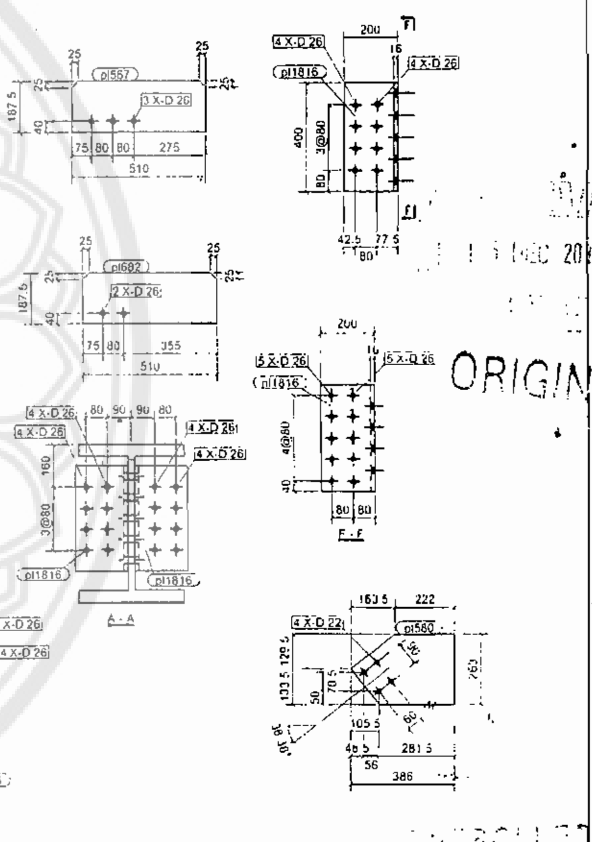
MATERIAL LIST FOR ONE ASSEMBLY MK'D FN-1B18 1 No Req.

Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
bh156	BH-600X400X25X45	SS400	1	12954.0	35.45	4912.23
pl174	PL12X390	SS400	2	321.5	0.42	23.60
pl567	PL10X188	SS400	2	510.0	0.41	15.01
pl572	PL10X188	SS400	2	510.0	0.41	15.0:
pl580	PL12X263	SS400	2	385.9	0.36	19.11
pl682	PL8X188	SS400	4	510.0	0.80	24.02
pl1816	PL10X400	SS400	4	384.0	1.33	77.17
				Total	39.18	5086.22

BOLT LIST FOR ASSEMBLY FN-1B18 No 1

Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	16	0.54	FN-1G10
24		Site	75	16	0.54	FN-1G18
24		Site	100	20	0.63	FN-1B18 FN-1B18





ORIGINAL

KOBELCO KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

FURNACE TOWER

BEAM FN-1B18

DRAWN	SDD
CHECKED	
APPROVED	

REFER DRAWING NO.

REV A

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-1B18

A	12/12/06	For Review	SDD

...AL NOTES:
...ing To Be In
...es With AWS D1.1.
...us At Inter. 10 mm

Record No. : 139-01

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 9/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1 D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	45 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-1B18		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	Front Face	Leg	Decibels: Indication Level A	Decibels: Reference Level B	Decibels: Attenuation factor C	Decibels: Indication rating D	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
3TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
3BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
4TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
4BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed Reviewed	Witnessed Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO..LTD
Signature			
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

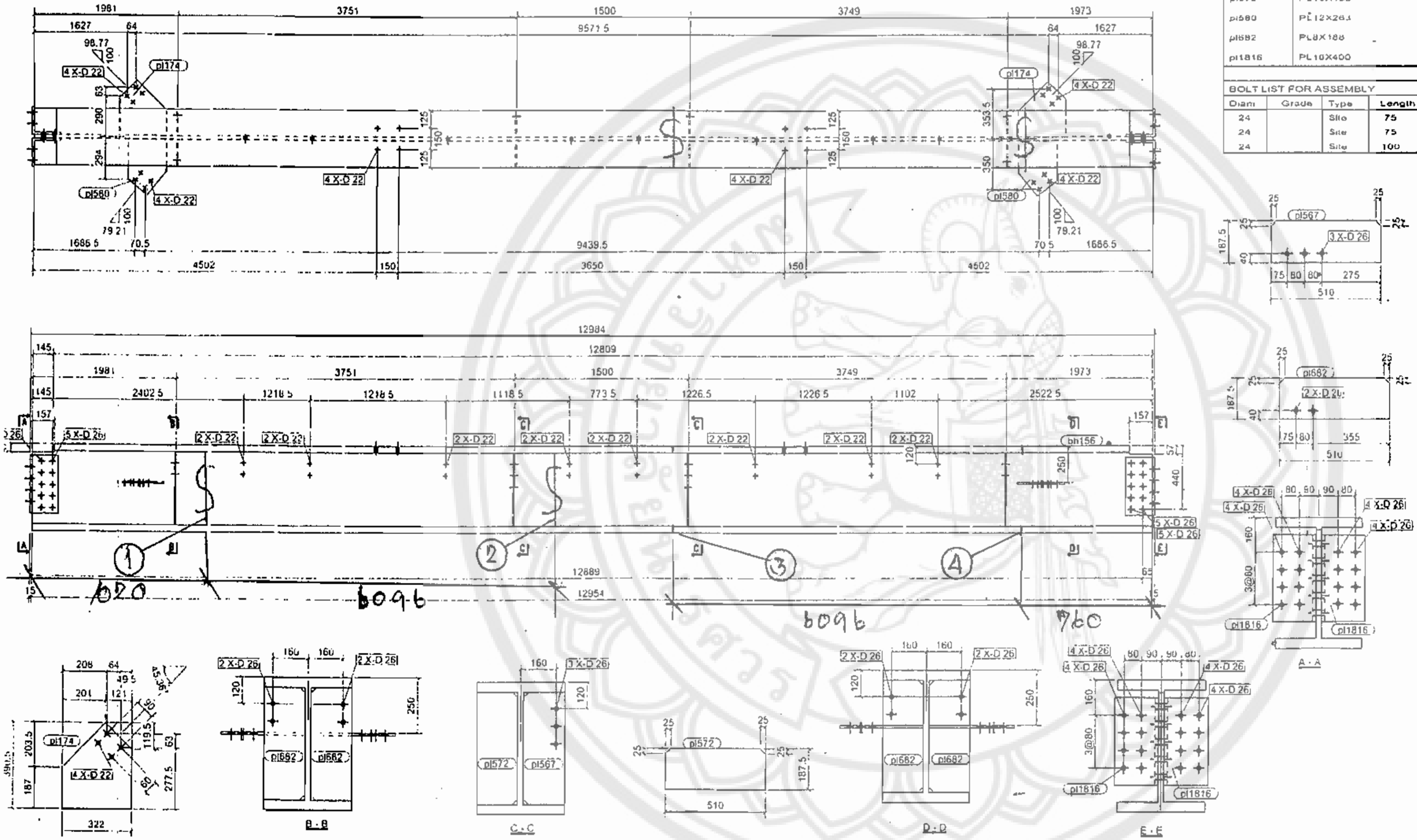
Q.C. STP&I DEPT.

LOCATION LIST	
	COORDINATE
	D8-DE/2-3/+0.00-+5000

CP - 12 - 06

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-1B18		1 No R. . . ired		
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
bh156	BH-600X400X25X45	SS400	1	12954 0	35 45	4512 23
pl174	PL12X390	SS400	2	321 8	0 42	23 66
pl567	PL10X188	SS400	2	510 0	0 41	15 01
pl572	PL10X188	SS400	2	510 0	0 41	15 01
pl580	PL12X263	SS400	2	385 9	0 36	19 11
pl682	PL8X188	SS400	4	510 0	0 80	24 02
pl1816	PL10X400	SS400	4	384 0	1 33	77 17
				Total	39 18	5088 22

BOLT LIST FOR ASSEMBLY		FN-1B18		No 1		
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	16	0 54	FN-1G10
24		Site	75	16	0 54	FN-1G18
24		Site	100	20	0 83	FN-1B18 FN-1B18



ORIGINAL

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-1B18

L NOTES:
...ing To Be In
...es With AWS D1.1.
...us At Inter. 10 mm
...ners UON.

A	12/12/06	For Review	SOD

KOBELCO KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SOD	FURNACE TOWER
CHECKED		BEAM FN-1B18
APPROVED		REFER DRAWING NO.

STP&I

Page : "1 OF 1

Record No. : 143

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 10/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness : 11,18 mm	
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-8B178		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Decibels: Reference Level B	Decibels: Attenuation factor C	Decibels: Indication rating D	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

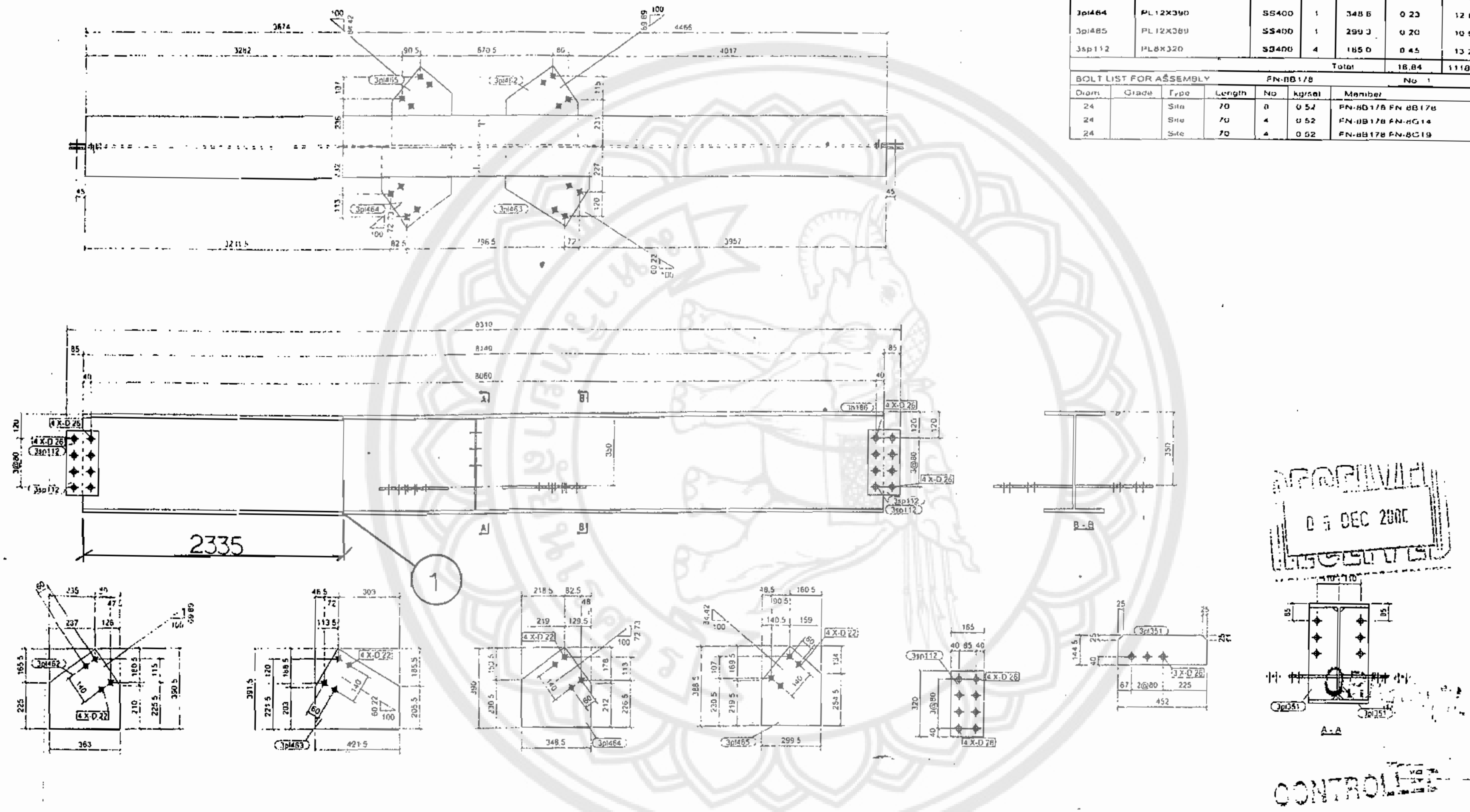
Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

LOCATION LIST	
	COORDINATE
0	DE-DF/2.1-3/+31980

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-8B178		1	No. Required	
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight
3h186	H-488X300X11X18	SS400	1	8140.0	17.18	1044.75
3pl351	PL8X145	SS400	2	452.0	0.28	8.20
3pl462	PL12X390	SS400	1	362.9	0.24	13.35
3pl463	PL12X391	SS400	1	421.7	0.27	15.55
3pl464	PL12X390	SS400	1	348.6	0.23	12.80
3pl485	PL12X389	SS400	1	299.3	0.20	10.96
3sp112	PL8X320	SS400	4	165.0	0.45	13.26
				Total	18.84	1118.86

BOLT LIST FOR ASSEMBLY		FN-8B178		No. 1		
Diam.	Grade	Type	Length	No	kg/set	Member
24		Site	70	8	0.52	FN-8B178 FN-8B178
24		Site	70	4	0.52	FN-8B178 FN-8G14
24		Site	70	4	0.52	FN-8B178 FN-8C19



1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-8B178

GENERAL NOTES:
All Welding To Be In Accordance With AWS D1.1.
Notches To Have 10 mm

REV.	DATE	DESCRIPTION	DRAWN	CHKD	APPROD.
A	30/11/06	For Review	SDD		

KOBELCO — KOBE STEEL, LTD.

CLIENT
Shadeed — HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
89 MU 3 Bangna-Trad Rd., K.M. 33.5 T.Klong-Tamru A.Muang Chonburi 20000 Thailand

DRAWN	SDD	FURNACE TOWER
CHECKED	1	BEAM FN-8B17
APPROVED		REFER DRAWING NO.
SCALE	NTS	DRAWING NO 754-S- FN-8B178 REV. A

STP&I

Record No. : 145

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 10/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness : 11,18 mm	
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-8B197		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Decibels: Reference Level B	Decibels: Attenuation factor C	Decibels: Indication rating D	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUPEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

Q.C. STP&I DEPT.

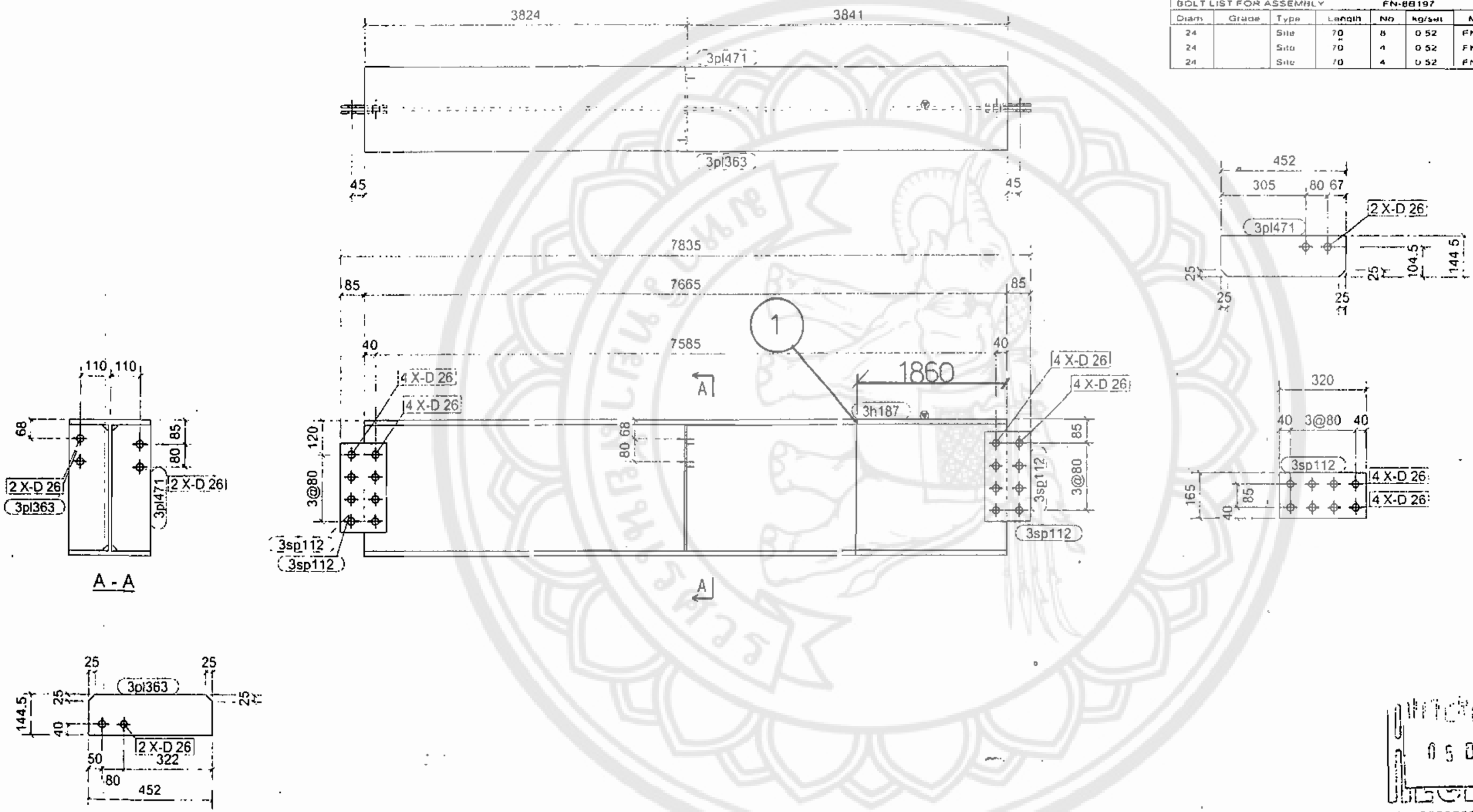
LOCATION LIST	
OS.	COORDINATE
31.980	DF-DT/2.1-3/+31980

MATERIAL LIST FOR ONE ASSEMBLY MK'D FN-8B197 1 No. Required

Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
3h187	H-488X300X11X18	SS400	1	7665.0	16.17	983.78
3pl363	PL8X145	SS400	1	452.0	0.14	4.10
3pl471	PL8X145	SS400	1	452.0	0.14	4.10
3sp112	PL8X320	SS400	4	165.0	0.45	13.26
				Total	16.90	1005.25

BOLT LIST FOR ASSEMBLY FN-8B197 No 1

Diam	Grade	Type	Length	No	kg/set	Member
24		Site	70	8	0.52	FN-8B197 FN-8B197
24		Site	70	4	0.52	FN-8B197 FN-8G19
24		Site	70	4	0.52	FN-8B197 FN-8G21



1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-8B197

ORIGINAL

05 DEC 2006

CONTROLL

KOBELCO KOBE STEEL, LTD.

CLIENT

Shadeed HDRI/HBI COMBINATION HOTLINK PLANT

STP&I STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER
CHECKED		BEAM FN-8B19
APPROVED		REFER DRAWING NO.
SCALE	NTS	DRAWING NO 754-S- FN-8B197 REV. A

A	30/11/06	For Review	SDD		
REV	DATE	DESCRIPTION	DRAWN	CHKD	APPROVD

GENERAL NOTES.
All Welding To Be In Accordance With AWS D1.1.
Notches To Have 10 mm Radius At Internal Corners UON.

Record No. : 147

STP&I

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT
Date 9/1/2007
Job No. : 0754-0-1
Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	9 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste

Sketch of Examined Location P/M FN-4B22

SEE ATTACHED DRAWING SKETCH

Weld Identification

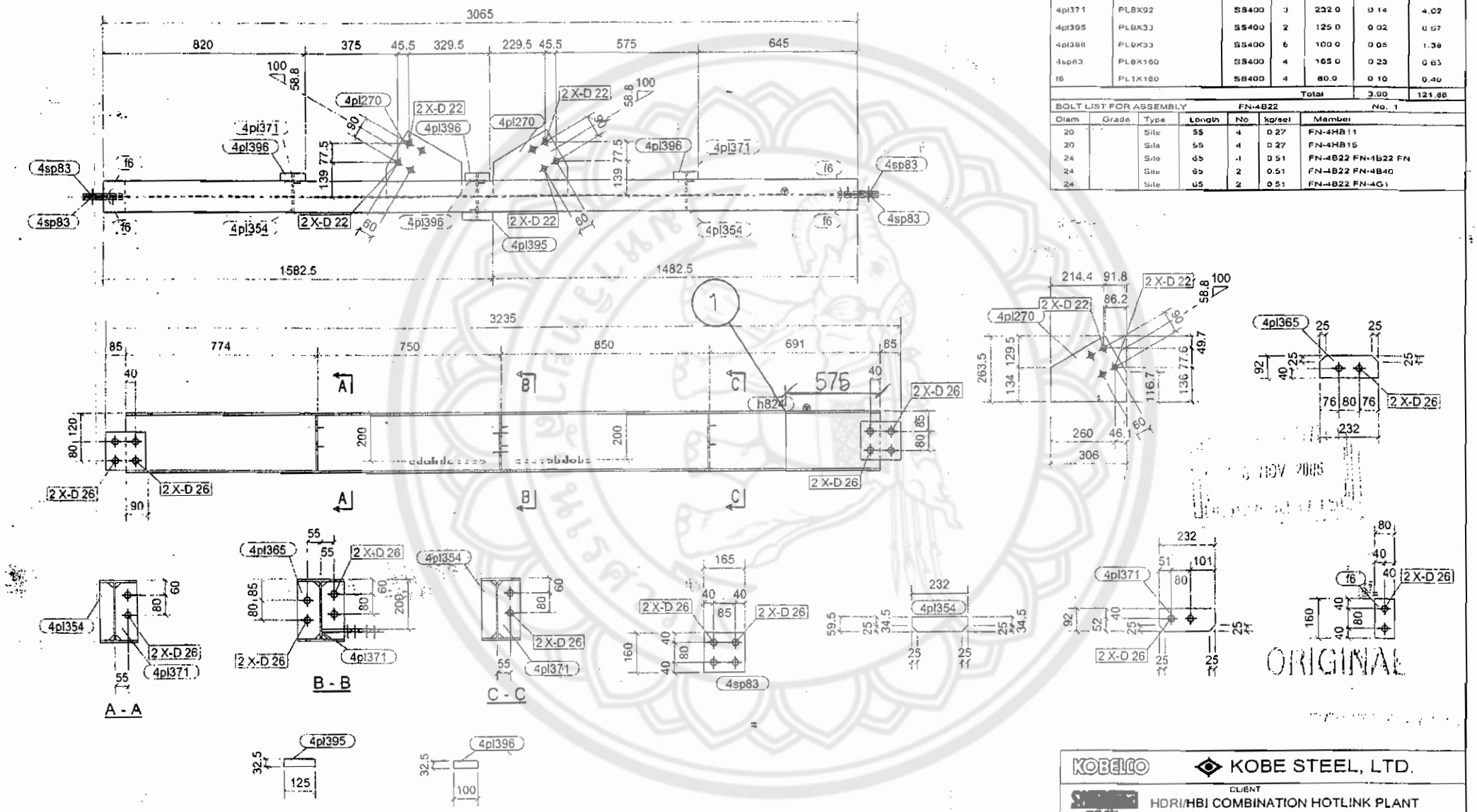
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Decibels: Reference Level B	Decibels: Attenuation factor C	Decibels: Indication rating D	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	[signature] Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR.SUPEP T.	MR. CHATAPHOL W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
TOS.	COORDINATE
+16.261	DP/2-3/+16261

MATERIAL LIST FOR ONE ASSEMBLY MK'D			FN-4B22		1	No Required
Mark	Description	Grade	Q'ty	Length(mm	Area (m2)	Weight (kg)
h824	H-250X125X6X9	SS400	1	3065.0	2.97	90.61
4pl270	PL12X283	SS400	2	306.2	0.26	15.19
4pl354	PL8X60	SS400	2	232.0	0.06	1.71
4pl365	PL6X92	SS400	1	232.0	0.05	1.34
4pl371	PL8X92	SS400	3	232.0	0.14	4.02
4pl395	PL8X33	SS400	2	125.0	0.02	0.67
4pl396	PL9X33	SS400	6	100.0	0.05	1.38
4sp83	PL8X160	SS400	4	165.0	0.23	6.83
f6	PL1X160	SS400	4	80.0	0.10	0.40
				Total	3.90	121.88

BOLT LIST FOR ASSEMBLY		FN-4B22				No. 1
Diam	Grade	Type	Length	No	kg/set	Member
20		Site	55	4	0.27	FN-4HB11
20		Site	55	4	0.27	FN-4HB15
24		Site	65	4	0.51	FN-4B22 FN-4B22 FN
24		Site	65	2	0.51	FN-4B22 FN-4B40
24		Site	65	2	0.51	FN-4B22 FN-4G1



1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-4B22

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1
2. Notches To Have 10 mm Radius At Internal Corners UON.

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
A	19/11/08	For Review	SDD		

KOBELCO KOBE STEEL, LTD.

CLIENT: HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
88 Moo 3 Bangna-Trad Rd., K.M. 33.5 T. Klong-Tumru, A. Muang Chonburi 20000 Thailand

DRAWN	SDD	FURNACE TOWER	
CHECKED		BEAM FN-4B22	
APPROVED		REFER DRAWING NO	
SCALE	NTS	DRAWING NO. 754-S- FN-4B22	REV. A

ORIGINAL

STP&I

Record No. : 148

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	9/1/2007
Job No. :	0754-0-1	Client	KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	,9 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-5B38		

SEE ATTACHED DRAWING SKETCH

Weld Identification

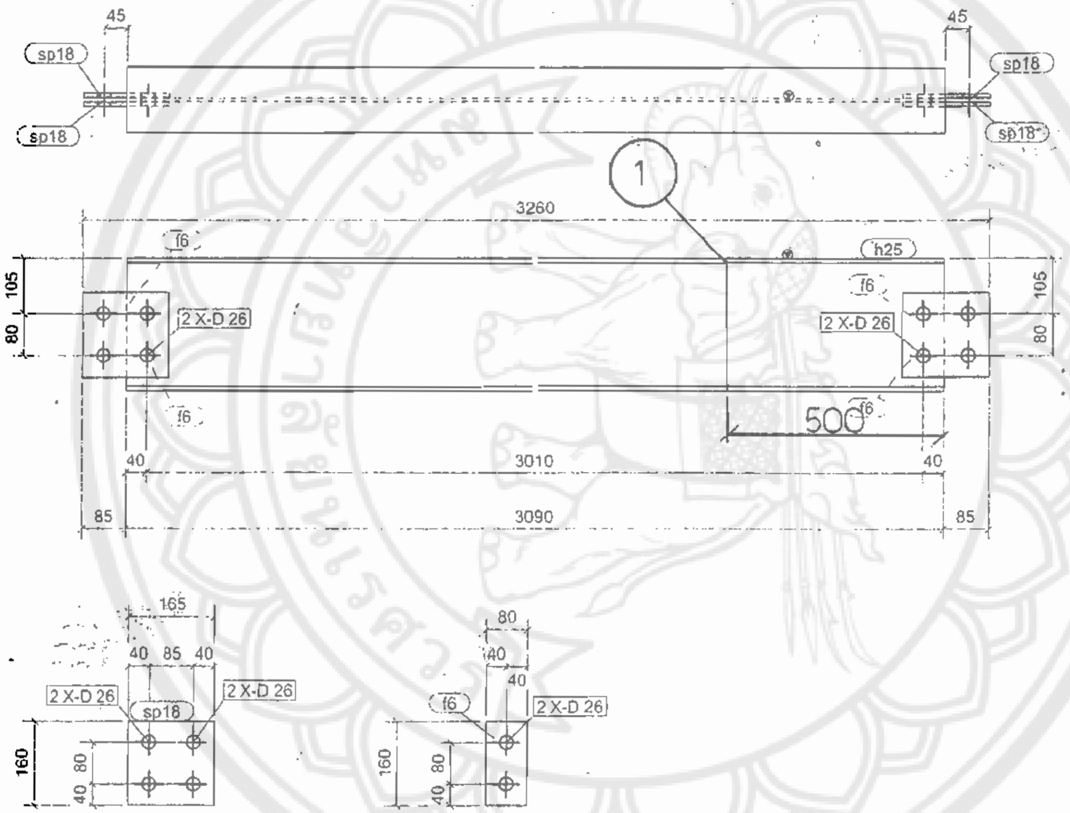
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Discontinuity: Distance From X	Discontinuity: Distance From Y	Discontinuity evaluation	REMARK
1TF	1	70	A	II	52	46	1	+5	12	36	5	+2	55	CLASS A	REJECT
1BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO..LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUKEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
OS.	COORDINATE
9.310	DB-DE/2-2.1/+19310

MATERIAL LIST FOR ONE ASSEMBLY MK'D	FN-5B38			1	No. Required	
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
h25	H-250X125X6X9	SS400	1	3090.0	3.00	91.35
f6	PL1X160	SS400	4	80.0	0.10	0.40
sp18	PL6X160	SS400	4	165.0	0.23	6.6_
				Total	3.33	98.38

BOLT LIST FOR ASSEMBLY			FN-5B38			No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	65	2	0.51	FN-5B17 FN-5B38
24		Site	65	2	0.51	FN-5B10 FN-5B38
24		Site	65	4	0.51	FN-5B38 FN-5B38 FN



1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-5B38

ORIGINAL

16 NOV 2005

GENERAL NOTES:
All Welding To Be In Accordance With AWS D1.1.
Notches To Have 10 mm Radius At Internal Corners UON.

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
A	15/11/05	For Revise			

KOBELCO ◆ KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER	
CHECKED		BEAM	FN-5B38
APPROVED		REFER DRAWING NO	
SCALE	NTS	DRAWING NO	754-S- FN-5B38 REV. A

STP&I

Record No. : 149

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 9/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004.STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	9 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-5B39		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Discontinuity: Distance From X	Discontinuity: Distance From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUCHART	MR. CHAYAPHOL W (ENG.QC)	K. UEDA
Date			

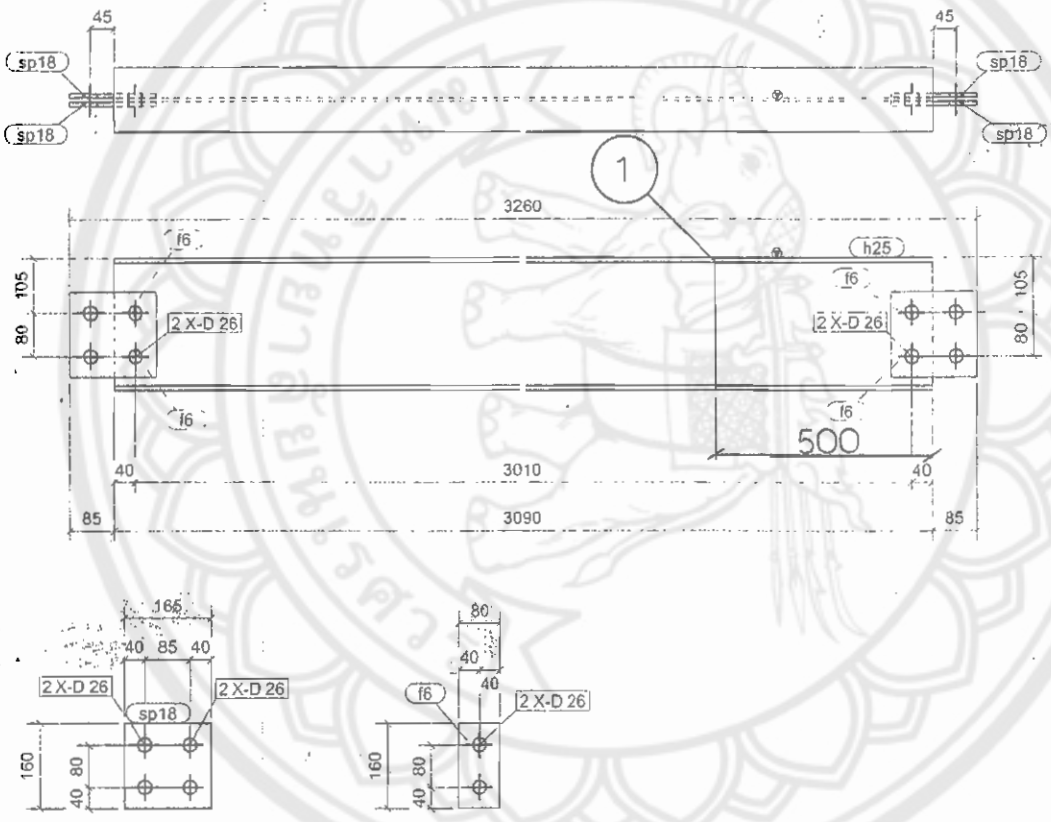
LOCATION LIST	
TOS.	COORDINATE
+19.310	DB-DE/2.1-3/+19310

MATERIAL LIST FOR ONE ASSEMBLY MK'D FN-5B39 1 No. Requires

Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
h25	H-250X125X6X9	SS400	1	3090.0	3.00	91.35
f6	PL1X160	SS400	4	80.0	0.10	0.40
sp18	PL6X160	SS400	4	165.0	0.23	6.63
				Total	3.33	98.38

BOLT LIST FOR ASSEMBLY FN-5B39 No. 1

Diam	Grade	Type	Length	No.	Kg/set	Member
24		Site	65	2	0.51	FN-5B17 FN-5B30
24		Site	65	2	0.51	FN-5B18 FN-5B39
24		Site	65	4	0.51	FN-5B39 FN-5B38 FN



1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-5B39

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1
2. Notches To Have 10 mm Radius At Internal Corners UON.

REV	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD
A	15/11/06	For Review			

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
69 Moo 3 Bangna-Trad Rd., K.M. 33.5 T. Klong-Tumru
A. Muang Chonburi 20000 Thailand

DRAWN	SDD	FURNACE TOWER	
CHECKED		BEAM FN-5B39	
APPROVED		REFER DRAWING NO	
SCALE	N.T.S	DRAWING NO 754-S- FN-5B39	REV A

15 NOV 2006
ORIGINAL

STP&I

Record No. : 150

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	9/1/2007
Job No. :	0754-0-1	Client	KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	12,20 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-6B10		

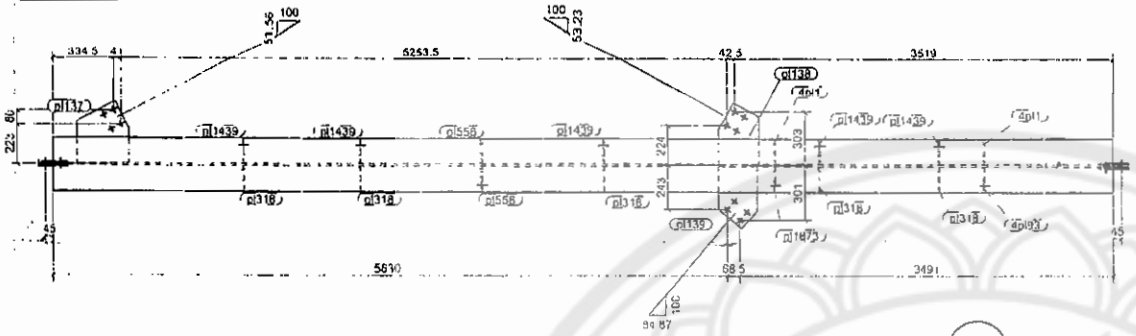
SEE ATTACHED DRAWING SKETCH

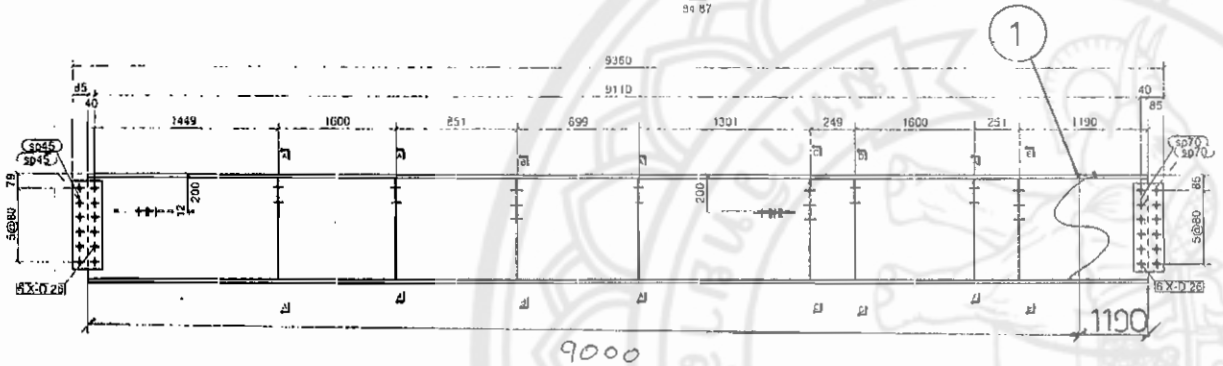
Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Discontinuity: Distance From X	Discontinuity: Distance From Y	Discontinuity evaluation	REMARK
1TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP	MR. CHATAPHOL W.(ENG.QC)	K. UEDA
Date			

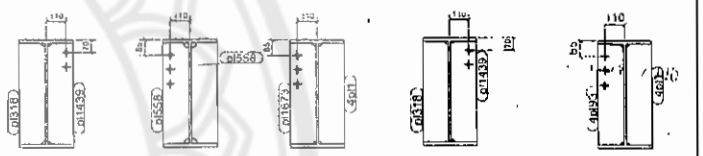
LOCATION LIST	
	COORDINATE
0	OA-DB/1.5-1.9/+19310-+22500

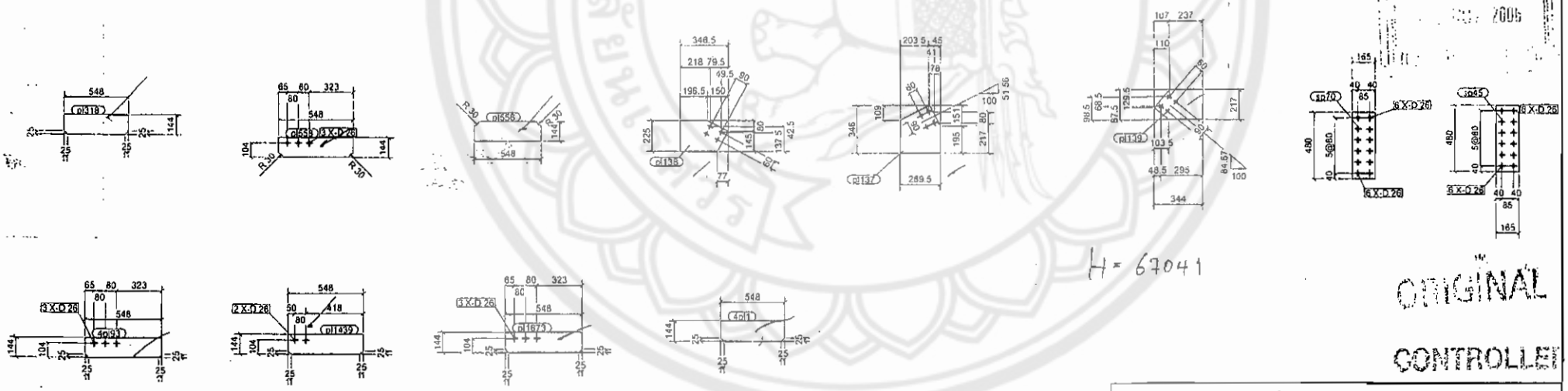




MATERIAL LIST FOR ONE ASSEMBLY MK'D			FN-6B10		1	No. Required	
Mark	Description	Grade	Qty	Length(mm)	Area (m2)	Weight (kg)
h1548	H-588X300X12X20	SS400	1	9190.0	21.14	1388.72
4pl1	PL10X144	SS400	2	548.0	0.34	12.39
4pl93	PL10X144	SS400	1	548.0	0.17	6.19
pl137	PL12X346	SS400	1	289.5	0.18	9.44
pl138	PL12X225	SS400	1	348.5	0.15	7.58
pl139	PL12X217	SS400	1	344.0	0.14	7.04
pl318	PL8X144	SS400	5	548.0	0.84	24.78
pl558	PL10X144	SS400	1	548.0	0.17	6.19
pl938	PL10X144	SS400	1	548.0	0.17	6.19
pl1439	PL8X144	SS400	5	548.0	0.84	24.78
pl1675	PL10X144	SS400	1	548.0	0.17	6.19
sp45	PL10X480	SS400	2	185.0	0.34	12.41
sp70	PL10X480	SS400	2	185.0	0.34	12.41
				Total	24.98	1524.14

BOLT LIST FOR ASSEMBLY		FN-6B10			No. 1	
Diam	Grade	Type	Length	No	kg/set	Number
24		Site	70	6	0.54	FN-6B10 FN-6B10
24		Site	70	6	0.52	FN-6B10 FN-6C1
24		Site	73	6	0.54	FN-6B10 FN-6B10
24		Site	75	6	0.54	FN-6B10 FN-6G6





H= 67041

ORIGINAL

CONTROLLED

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-6B10

RAL NOTES:
Welding To Be In
cordance With AWS D1.1.
ltchea To Have 10 mm
ndius At Internal Corners UON.

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
A	17/11/06	For Review	SOO		

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP.& I PUBLIC COMPANY LIMITED.
99 Moo 3 Bangna-Trad Rd., K.M 33.5 T.Klong-Tumru
A. Muang Chonburi 20000 Thailand

DRAWN	SOO	FURNACE TOWER	
CHECKED		BEAM	FN-6B10
APPROVED		REFER DRAWING NO.	
SCALE	NTS	DRAWING NO. 754-S- FN-6B10	REV. A

STP&I

Page : 1 OF 1

Record No. : 152

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 11/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	12,20 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-8B2		

SEE ATTACHED DRAWING SKETCH

Weld Identification

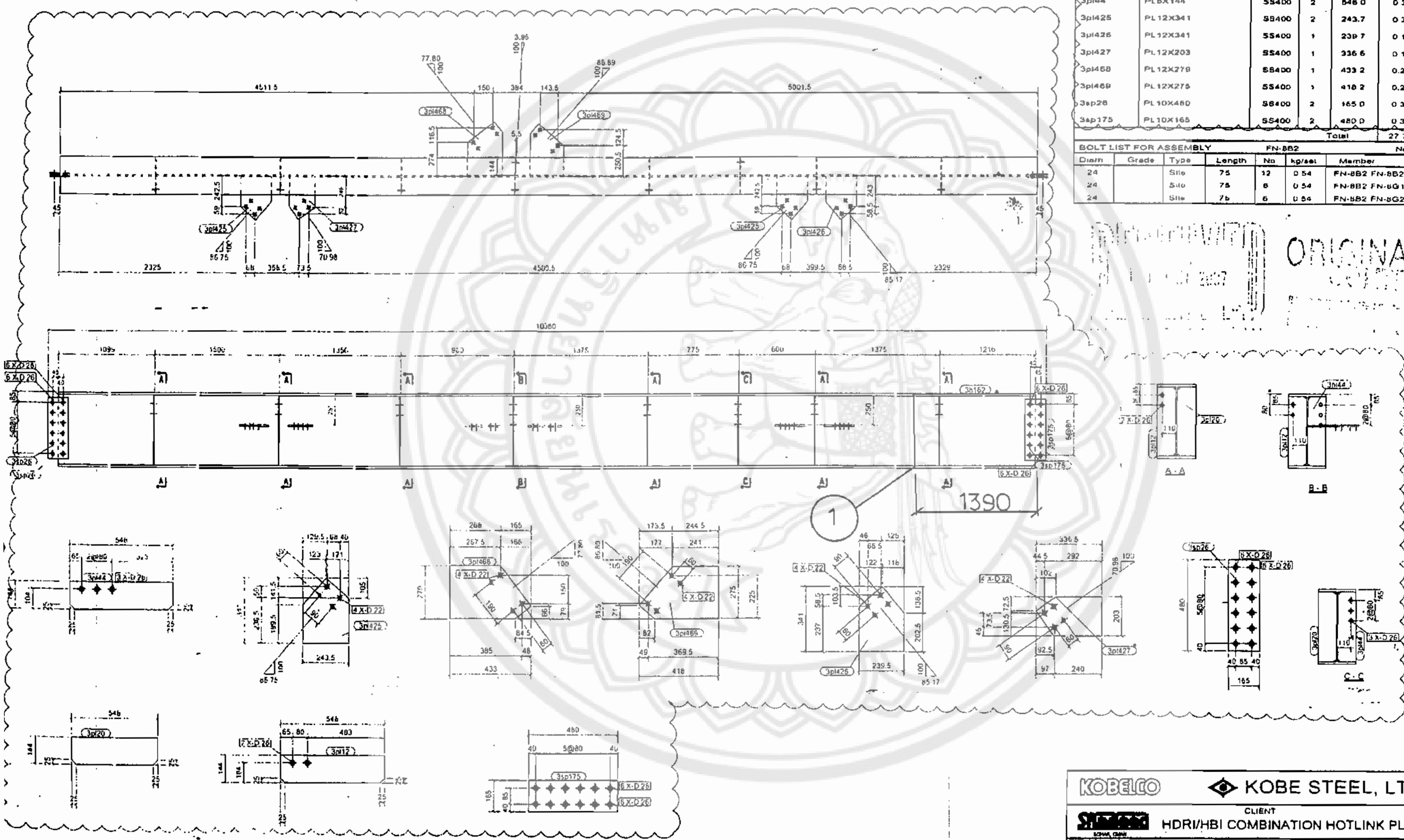
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHATAPHOL A.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
...S.	COORDINATE
...1.980	DA-DB/1-2/+25465-+31980

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-8B2		1	No. Required	
Mark	Description	Grade	Q'ty	Length (mm)	Area (m2)	Weight (kg)
3h162	H-686X300X12X20	SS400	1	10190 0	23 44	1539 84
3pl12	PL6X144	SS400	7	548 0	1.17	34 69
3pl20	PL6X144	SS400	7	548 0	1 17	34 69
3pl44	PL6X144	SS400	2	548 0	0 33	9.91
3pl425	PL12X341	SS400	2	243.7	0 30	15 66
3pl426	PL12X341	SS400	1	239 7	0 15	7 70
3pl427	PL12X203	SS400	1	336 6	0 13	6 44
3pl468	PL12X279	SS400	1	433 2	0.22	11 38
3pl469	PL12X275	SS400	1	418 2	0.20	10 83
3sp26	PL10X480	SS400	2	165 0	0 34	12 43
3sp175	PL10X165	SS400	2	480 0	0 34	12 43
				Total	27 79	1696.00

BOLT LIST FOR ASSEMBLY			FN-8B2		No 1	
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	12	0 54	FN-8B2 FN-8B2
24		Site	75	6	0 54	FN-8B2 FN-8G1
24		Site	75	6	0 54	FN-8B2 FN-8G2



ORIGINAL

...RAL NOTES.
...ll Welding To Be In Accordance With AWS D1.1.
...Notches To Have 10 mm Radius At Internal Corners UON.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-8B2

B	08/01/07	Revise as per marks	SDD
A	30/11/06	For Review	SDD

KOBELCO

KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER
CHECKED		BEAM FN-8B2
APPROVED		REFER DRAWING NO.

STP & I

Record No. : 156

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	11/1/2007
Job No. :	0754-0-1	Client	KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	11,18 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-5B55		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
1BF	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUTEP T.	MR. CHATAPHOL W.(ENG.QC)	K. UEDA
Date			

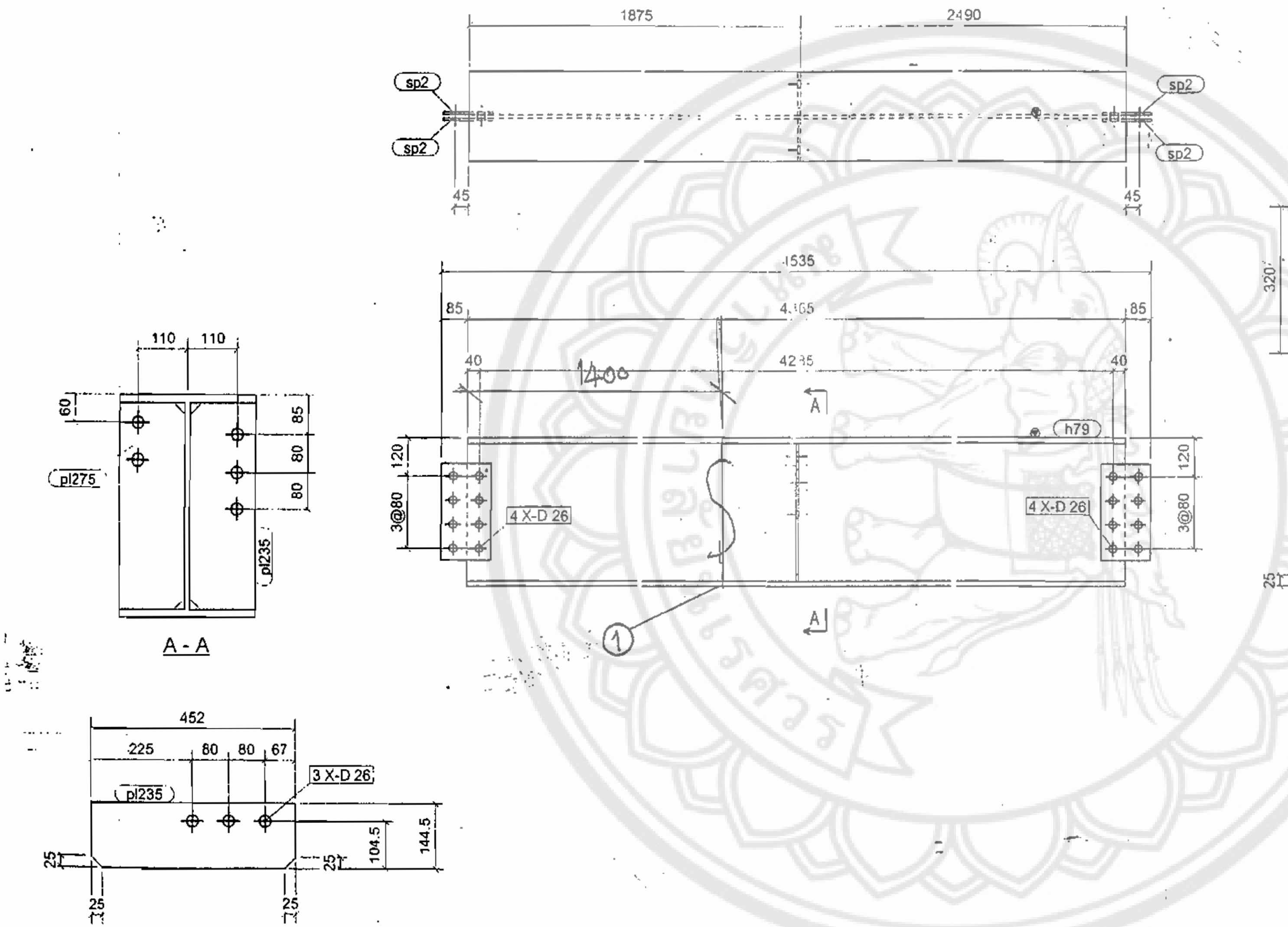
Q.C. STP&I DEPT.

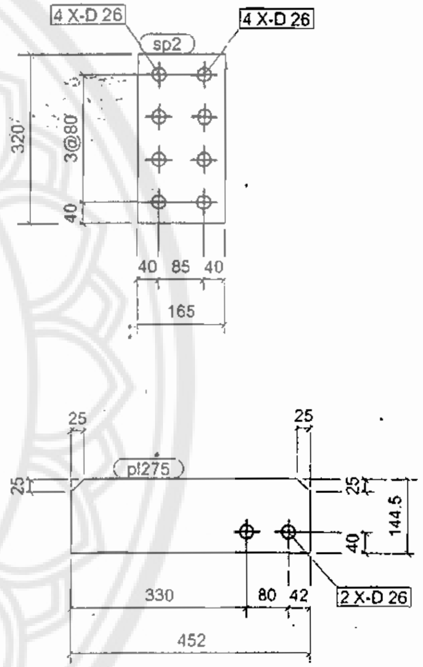
LOCATION LIST	
TOS.	COORDINATE
+19.310	DB-DE/2.1-3/+19310

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-5B55		1	No. Required	
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
h79	H-488X300X11X18	SS400	1	4365.0	9.21	560.24
pl235	PL10X146	SS400	1	452.0	0.14	5.13
pl275	PL8X145	SS400	1	452.0	0.14	4.10
sp2	PL8X320	SS400	4	165.0	0.45	13.26
				Total	9.94	582.73

BOLT LIST FOR ASSEMBLY		FN-5B55				No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	70	4	0.52	FN-5B18 FN-5B55
24		Site	70	8	0.52	FN-5B55 FN-5B55
24		Site	70	4	0.52	FN-5B55 FN-5G18

CP 11-18-1





1 NOV 2005

ORIGINAL

CONTROLLED

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-5B55

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1.
2. Notches To Have 10 mm Radius At Internal Corners UON.

A	15/11/05	For Review	SDD		
REV	DATE	DESCRIPTION	DRAWN	CHKD	APPROD

KOBELCO — KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER
CHECKED		BEAM FN-5B55
APPROVED		REFER DRAWING NO.
SCALE	NTS	DRAWING NO. 754-S- FN-5B55 REV. A

STP&I

Record No. : 158

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	19/12/2006
Job No. :	0754-0-1	Client	KOBE STEEL

Applied Standard	Method : Pulse Echo Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	20 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-9B1		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Decibels: Reference Level B	Decibels: Attenuation factor C	Decibels: Indication rating D	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Discontinuity: Distance From X	Discontinuity: Distance From Y	Discontinuity evaluation	REMARK
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	[illegible]	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

Q.C. STP&I DEPT.

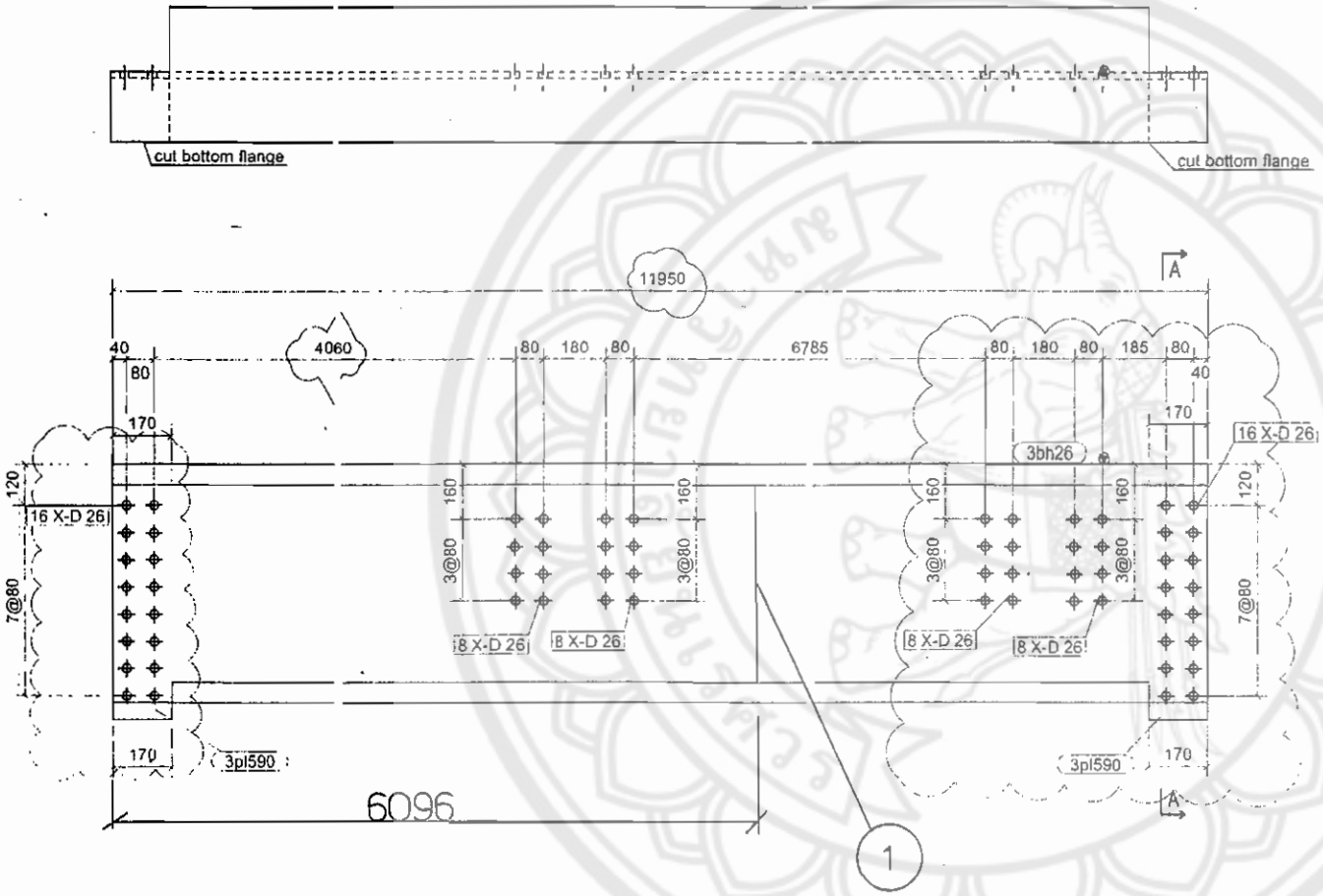
LOCATION LIST	
	COORDINATE
30	DB-DE/2-3/+31980-+34930

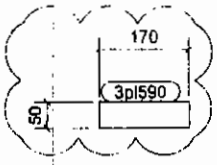
MATERIAL LIST FOR ONE ASSEMBLY MK'D FN-9B1 1 No. Required

Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
3bh26	BH-700X400X20X60	SS400	1	11950.0	35.10	5499.65
3pl590	PL20X50	SS400	2	170.0	0.05	2.67
				Total	35.16	5502.32

BOLT LIST FOR ASSEMBLY FN-9B1 No. 1

Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	16	0.54	FN-3C6
24		Site	75	16	0.54	FN-3C6





1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-9B1

. NOTES:
elding To Be In
rdance With AWS D1.1.

B	08/01/07	Revise as per marks	SDO

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN SDO
CHECKED
APPROVED

FURNACE TOWER
BEAM FN-9B1

STP & I

Page : "1 OF 1

Record No. : 160

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 12/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	8,13 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-5B69		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

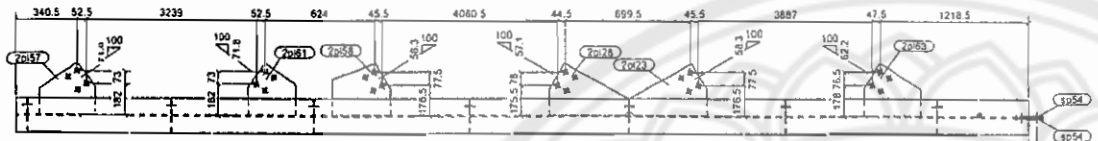
Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

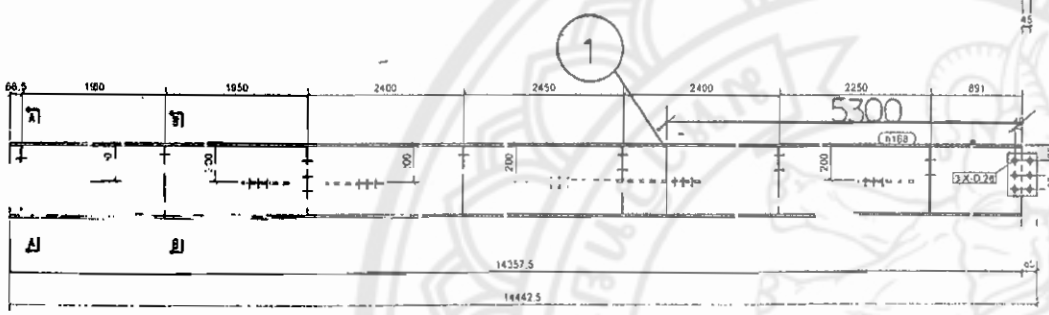
Q.C. STP&I DEPT.

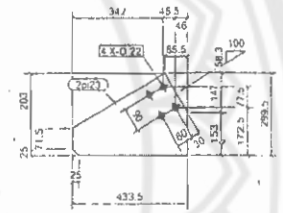
LOCATION LIST	
'OS.	COORDINATE
19.310	DE-DP/<1-2/+19310

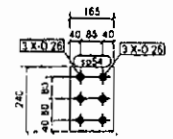
MATERIAL LIST FOR ONE ASSEMBLY MK'D			FN-5B69			1 No Required
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
h168	H-400X200X8X13	SS400	1	14357.5	22.40	948.09
2pl23	PL12X300	SS400	1	433.5	0.19	12.24
2pl28	PL12X299	SS400	1	440.1	0.19	12.31
2pl37	PL12X301	SS400	1	310.7	0.15	8.61
2pl58	PL12X300	SS400	1	332.5	0.18	9.39
2pl61	PL12X301	SS400	1	273.2	0.14	7.74
2pl63	PL12X300	SS400	1	325.4	0.18	9.20
pl72	PL8X98	SS400	7	374.0	0.54	15.78
pl268	PL8X98	SS400	2	374.0	0.16	4.51
pl270	PL8X98	SS400	4	374.0	0.31	9.02
pl470	PL8X98	SS400	1	374.0	0.08	2.25
sp54	PL8X240	SS400	2	165.0	0.17	4.97
				Total	24.68	1044.42

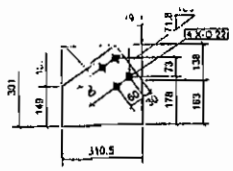
BOLT LIST FOR ASSEMBLY			FN-5B69			No 1
Diam	Grade	Type	Length	No	Kg/set	Member
24		Site	65	3	0.51	FN-5B69 FN-5B69 -
24		Site	85	3	0.51	FN-5B69 FN-5B65

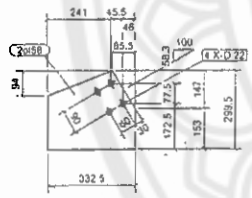


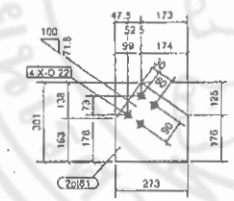


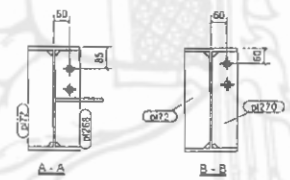


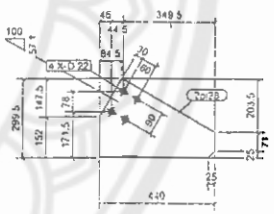


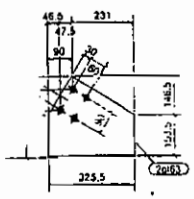


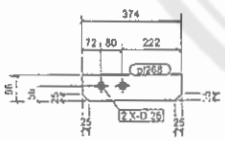


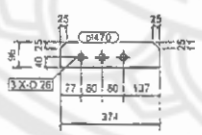


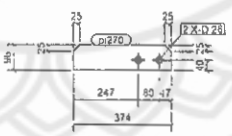


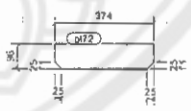












ORIGINAL

RECEIVED 01 DEC 2006

CONTROLLED

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1.
2. Notches To Have 10 mm

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-5B69

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
A	23/11/05	For Review	SDO		

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
65 MU 3 Bangna-Trad Rd., K.M. 63.5 T.Klong-Tumru, A. Muang Chonburi 20000 Thailand

DRAWN	SDO	FURNACE TOWER	
CHECKED		BEAM FN-5B69	
APPROVED		REFER DRAWING NO.	
SCALE	NTS	DRAWING NO. 754-S-FN-5B69	REV. A

STP & I

Record No. : 163

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 20/12/2006

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	16 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-3B1		

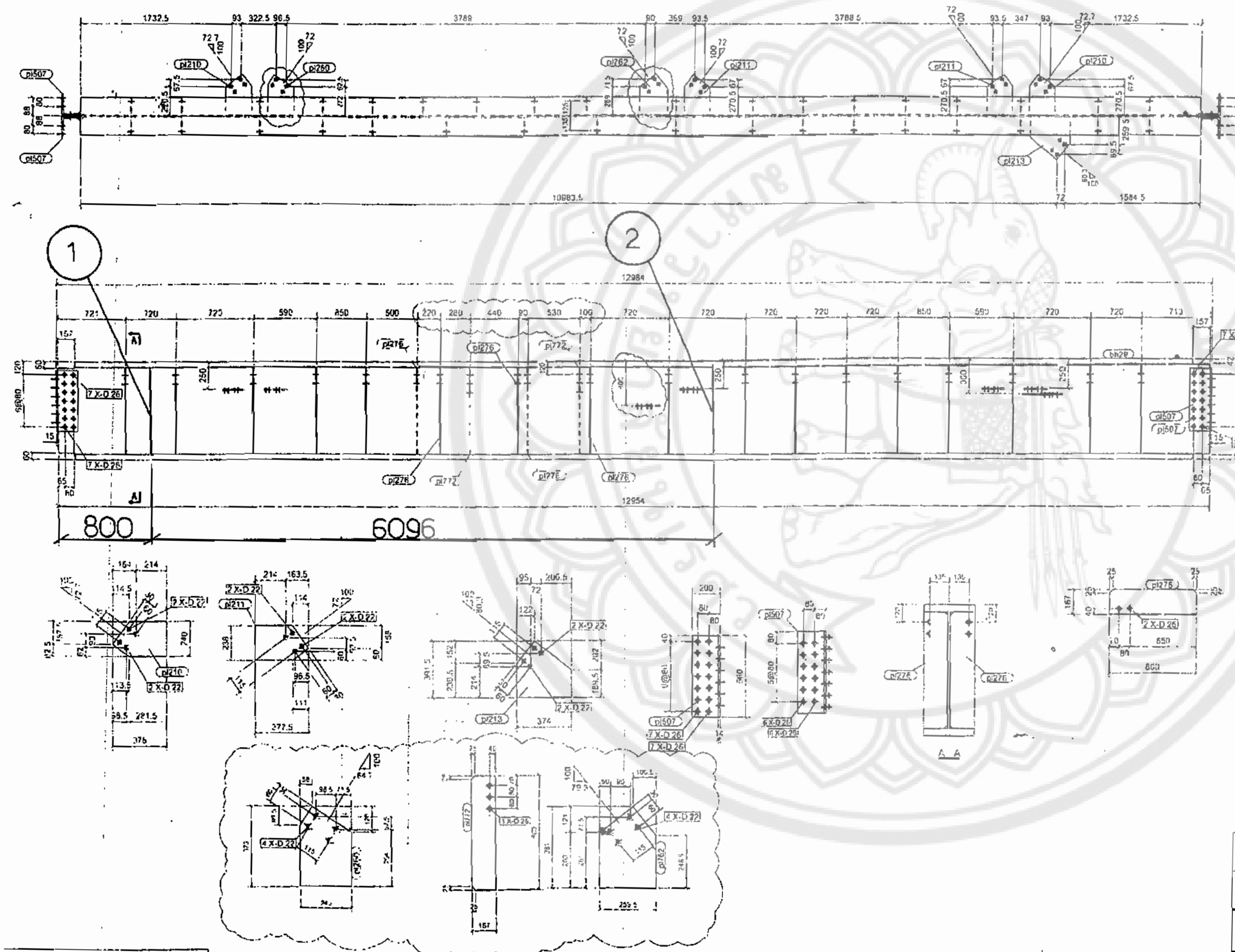
SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
2WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
TOS.	COORDINATE
+10.000	DA-DB/2-3/+7500-+10000



MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-3B1		1	No. Required	
Mark	Description	Grade	Q'ty	Length (mm)	Area (m2)	Weight (kg)
bh29	BH-900X350X10X60	SS400	1	12954.0	40.65	4774.08
pl210	PL12X240	SS400	2	377.8	0.33	17.09
pl211	PL12X238	SS400	2	377.5	0.33	16.94
pl213	PL12X391	SS400	1	373.8	0.24	13.78
pl260	PL12X243	SS400	1	373.2	0.17	8.55
pl278	PL8X167	SS400	33	800.0	9.28	276.87
pl507	PL14X560	SS400	4	386.0	1.64	95.02
pl782	PL12X259	SS400	1	381.0	0.18	9.31
pl772	PL8X167	SS400	2	800.0	0.56	16.78
				Total	53.57	5228.41

BOLT LIST FOR ASSEMBLY			FN-3B1		No 1	
Diam	Grade	Type	Length	No	kg/set	Member
20		Site	55	4	0.27	FN-3HB1
20		Site	55	4	0.27	FN-3HB2
20		Site	55	4	0.27	FN-3HB5
20		Site	55	4	0.27	FN-3HB7
20		Site	55	4	0.27	FN-3HB13
24		Site	70	24	0.52	FN-3G3
24		Site	85	26	0.58	FN-3B1 FN-3B1

APPROVED 2006

ORIGINAL

REVISED

CONTROLLED

GENERAL NOTES

1. All Welding To Be In ...

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B1

C	12/12/06	Revised as per marks	SDD
B	20/11/06	Revised as per marks	SDD

KOBELCO — KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER	
CHECKED		BEAM	FN-3B1
APPROVED		REFER DRAWING NO	

STP&I

Page : "1 OF 1

Record No. : 164

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 21/12/2006

Job No. : 0754-0-1 Client KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	20 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-3B115		

SEE ATTACHED DRAWING SKETCH

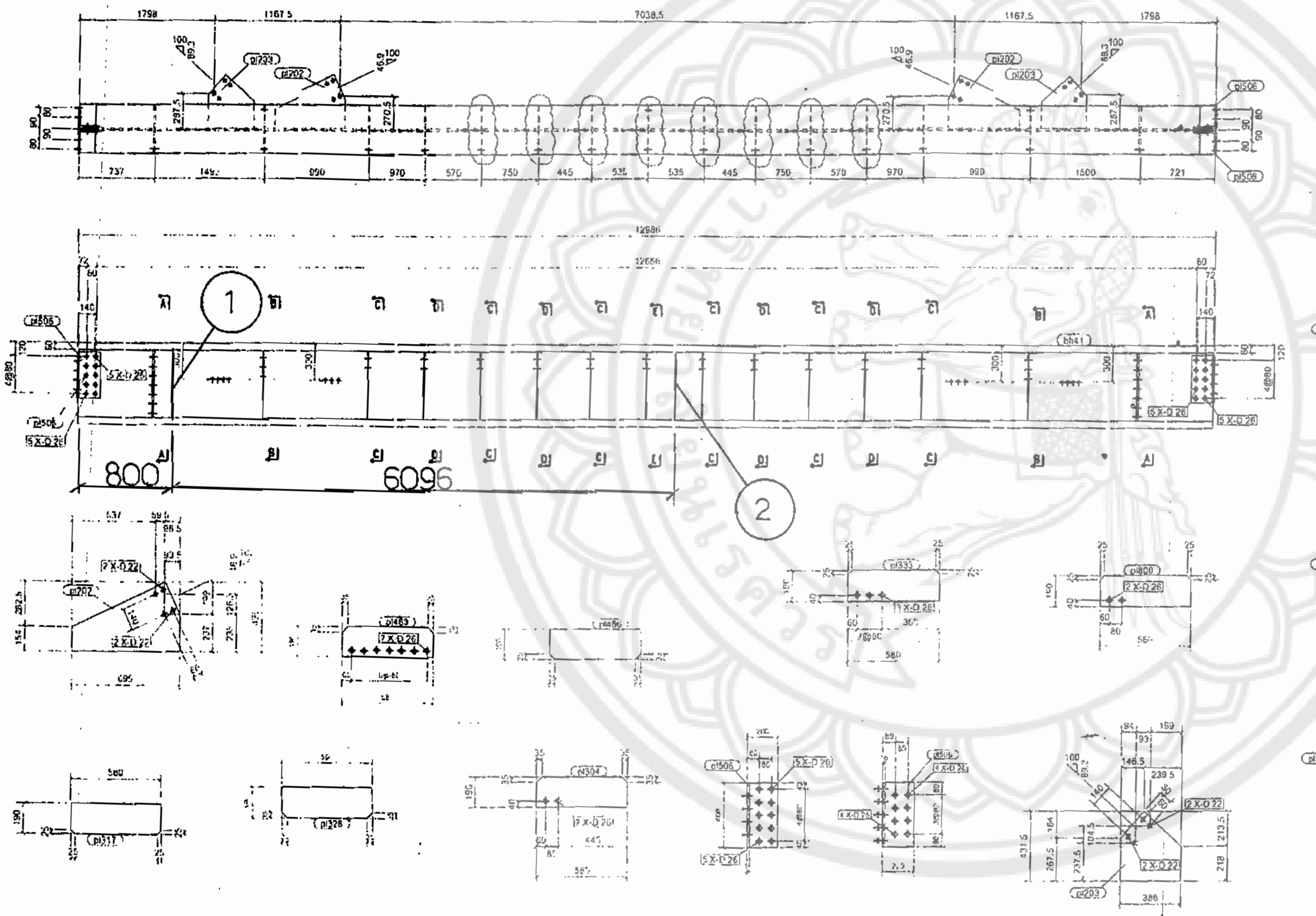
Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC
2WEB	_	70	AB	I,II	_	46	_	_	_	_	_	_	_	_	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUTEP T	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

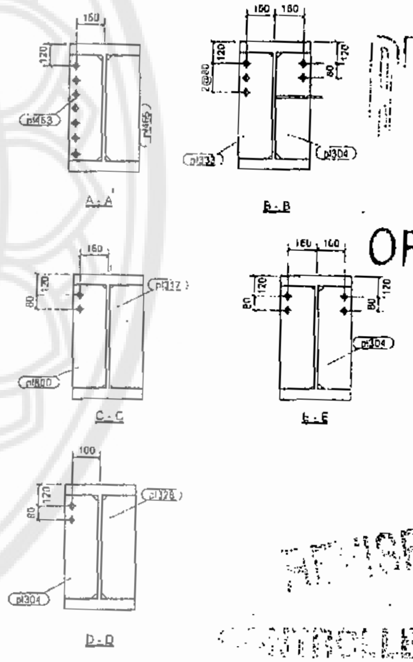
Q.C. STP&I DEPT.

LOCATION LIST	
OS.	COORDINATE
0.000	DB-DE/3.1-4/47500-+10000



MATERIAL LIST FOR ONE ASSEMBLY MK'D	FN-3B115			1	No Required	
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
bh41	BH-700X400X20X60	SS400	1	12970.0	38.26	6015.39
pl202	PL 12X436	SS400	2	694.8	0.08	57.06
pl203	PL 12X432	SS400	2	385.9	0.55	31.36
pl304	PL8X190	SS400	7	580.0	1.61	48.44
pl317	PL8X190	SS400	6	580.0	1.38	41.52
pl328	PL8X190	SS400	4	580.0	0.92	27.68
pl333	PL8X190	SS400	2	580.0	0.46	13.84
pl463	PL16X190	SS400	2	580.0	0.46	27.66
pl466	PL16X190	SS400	2	580.0	0.46	27.68
pl506	PL16X400	SS400	4	384.0	1.33	77.17
pl800	PL8X190	SS400	7	580.0	1.62	48.44
				Total	47.89	6416.32

BOLT LIST FOR ASSEMBLY		FN-3B115			No 1	
Diam	Grade	Type	Length	No	kg/set	Member
20		Site	55	4	0.27	FN-3HB25
20		Site	55	4	0.27	FN-3HB26
20		Site	55	4	0.27	FN-3HB27
20		Site	55	4	0.27	FN-3HB28
24		Site	70	16	0.52	FN-3G6
24		Site	70	16	0.52	FN-3G13
24		Site	95	20	0.59	FN-3B115 FN-3B115



RECEIVED 1 DEC 2006

ORIGINAL

APPROVED

CONTROLLED

GENERAL NOTES.
1.All Welding To Be In Accordance With AWS D1.1

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B115

B	12/12/06	Revised as per marks	SDD
A	10/11/06	For Review	SDD

KOBELCO — KOBE STEEL, LTD.

CLIENT
[redacted] HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER	
CHECKED		BEAM	FN-3B11
APPROVED		REFER DRAWING NO	
SCALE	NTS	DRAWING NO 754-S- FN-3B115	REV. B

STP&I

Record No. : 165

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	25/12/2006
Job No. :	0754-0-1	Client	KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	45 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste

Sketch of Examined Location P/M FN-3B209

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Discontinuity: Distance From X	Discontinuity: Distance From Y	Discontinuity evaluation	REMARK
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC
2WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
2WEB	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUPER T.	MR. CHATAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

Q.C. STP&I DEPT.

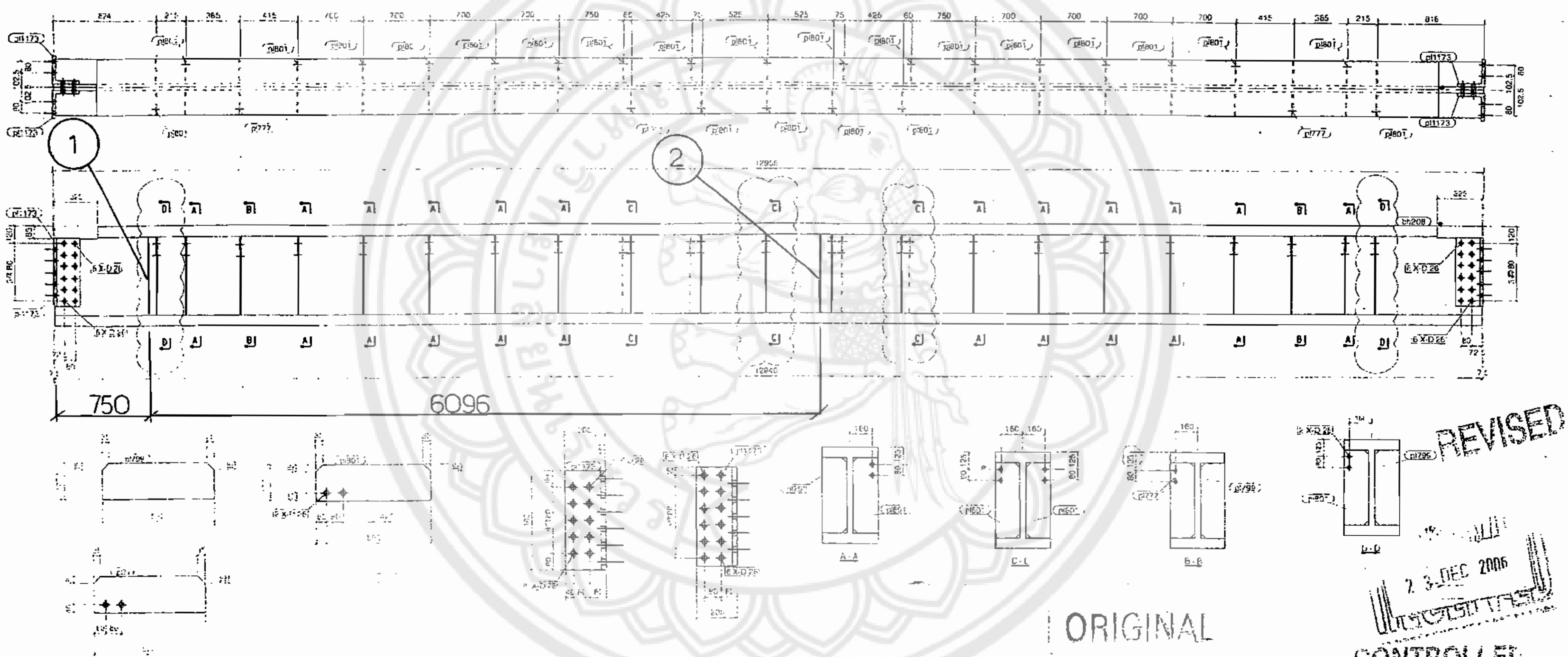
LOCATION	
TOS	COORDINATE
10.000	D2-D5/2.1 3/17500-41000

MATERIAL LIST FOR ONE ASSEMBLY MK'D FN-3B209 — 1 No. Req.

Mark	Description	Grade	Q'ty	Length (mm)	Area (m2)	Weight
bh208	BH-700X400X45X75	SS400	1	12940.0	37.25	8453
pl777	PL8X178	SS400	2	550.0	0.41	[illegible]
pl799	PL8X178	SS400	16	550.0	3.27	58[illegible]
pl801	PL8X178	SS400	24	550.0	4.90	147
pl1173	PL25X480	SS400	4	375.0	1.61	141
				Total	47.44	8852

BOLT LIST FOR ASSEMBLY FN-3B209 — No. 1

Diam	Grade	Type	Length	No	kg/set	Member
24		Site	110	20	0.67	FN-3G7
24		Site	110	20	0.67	FN-3G14
24		Site	135	24	0.72	FN-3B209 FN-3B209



REVISED

23 DEC 2006

ORIGINAL

CONTROLLED

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1.
2. Notches To Have 10 mm. Radius At Internal Corners UON.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B209

REV	DATE	DESCRIPTION	DRAWN	CHKD	APPROD.
C	22/12/06	Revised as per marks	SS		
B	12/12/06	Revised as per marks	SS		
A	10/11/06	For Review	SS		

KOBELCO — KOBE STEEL, LTD.

CLIENT
SOHAR, OMAN
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
69 Moo 3 Bangna-Trad Rd., K.M. 55 S.T.Klong-Tumru A. Muang Chonburi 20000 Thailand

DRAWN	SDD	FURNACE TOWER BEAM FN-3B209	
CHECKED			
APPROVED		REFER DRAWING NO.	
SCALE	NTS	DRAWING NO.	754-S- FN-3B209
		REV.	

STP&I

Record No. : 166

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 20/12/2006

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	45 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK , V 1	Coupiant :	Starch Paste
Sketch of Examined Location	P/M FN-3B219		

SEE ATTACHED DRAWING SKETCH

Weld Identification

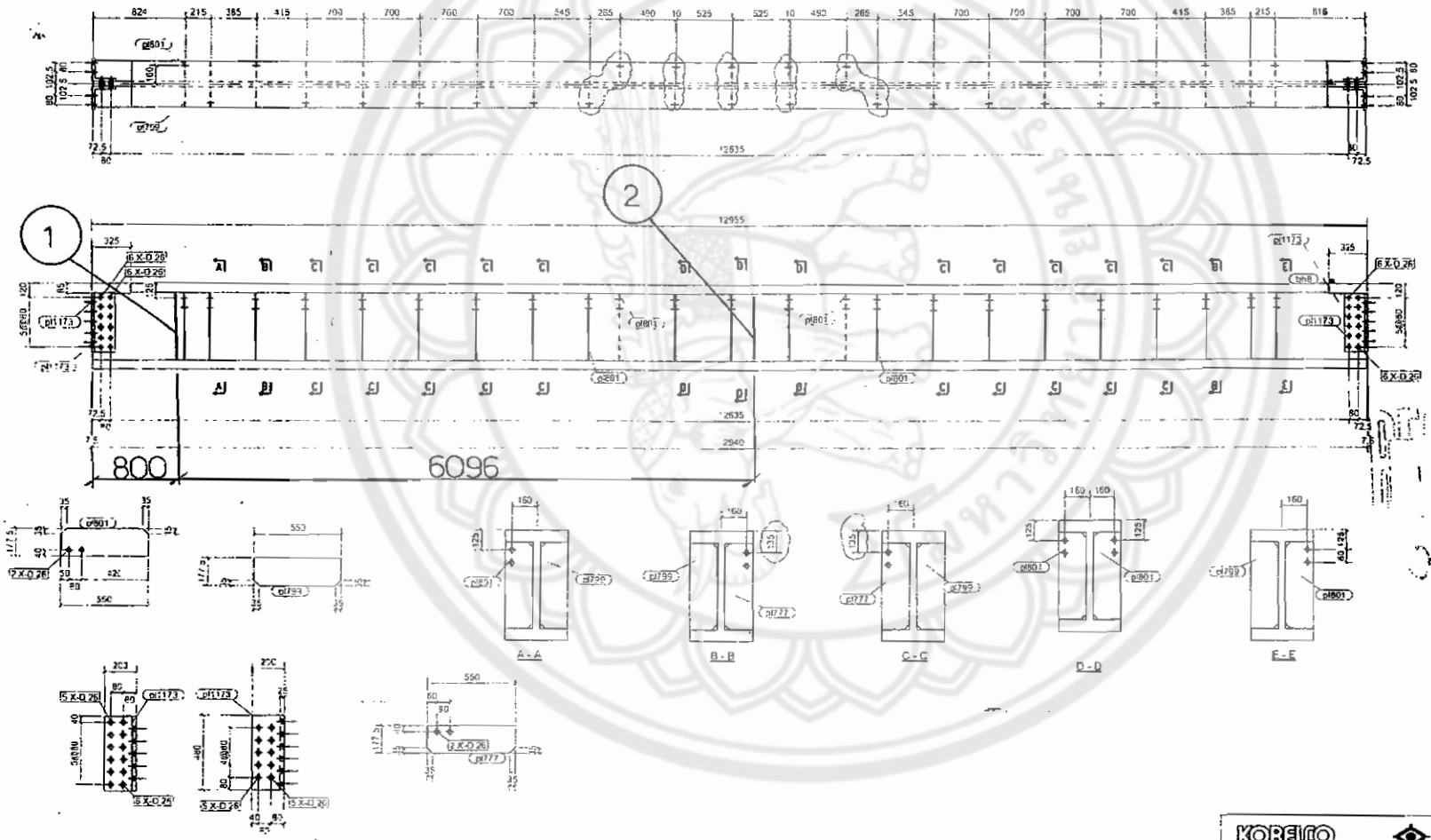
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC
2WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
2WEB	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. [illegible]	MR. CHAYAPHOL [illegible] (ENG.QC)	K. UEDA
Date	[illegible]	[illegible]	

LOCATION LIST	
TOS.	COORDINATE
+10,000	DB-DE/2 1-3/+7500-+10000

MATERIAL LIST FOR ONE ASSEMBLY MK'D			FN-3B219		1	No. Required
Mark	Description	Grade	Qty	Length(mm)	Area (m2)	Weight (kg)
bh8	BH-700X400X45X75	SS400	1	12940.0	37.25	8453.46
pl777	PL8X178	SS400	12	550.0	2.45	73.67
pl799	PL8X178	SS400	18	550.0	3.27	98.09
pl801	PL8X178	SS400	14	550.0	2.86	85.83
pl1173	PL35X480	SS400	4	375.0	1.61	141.30
				Total	47.44	8852.24

BOLT LIST FOR ASSEMBLY "			FN-3B219			No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	110	20	0.67	FN-3G7
24		Site	110	20	0.67	FN-3G14
24		Site	135	24	0.72	FN-3B219 FN-3B219



ARCHIVED
15 DEC 2006
ORIGINAL
CONTROLLED

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B219

B	12/12/06	Revised as per marks	SC

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
99 MU 3 Bangna-Trad Rd., KM 33.5 T Klong-Tamru
A. Muang Chonburi 20000 Thailand

DRAWN	SDO	FURNACE TOWER
CHECKED		BEAM FN-3B219
APPROVED		

STP & I

Record No. : 167

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 21/12/2006

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	20 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-3B243		

SEE ATTACHED DRAWING SKETCH

Weld Identification

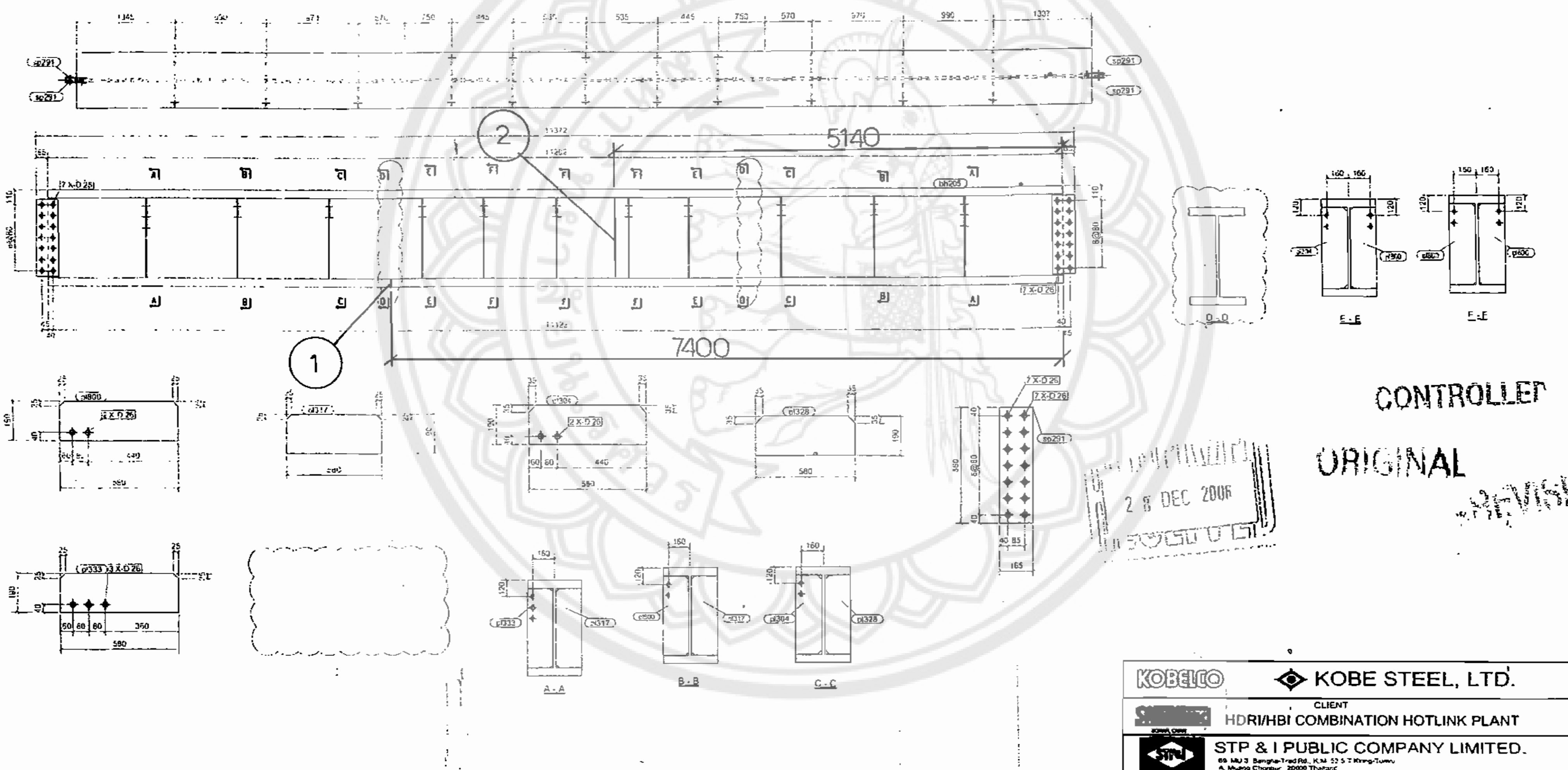
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
2WEB	-	70	AB	I,II	-	46	-	-	-	-	-	-	-	-	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
OS.	COORDINATE
10 000	DB-DE/1 9/+7500-+10000

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-3B243		1 No Required		
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
bh205	BH-700X400X20X60	SS400	1	11202.0	33 28	5240 97
pl304	PL8X190	SS400	4	580 0	0 92	27 68
pl317	PL8X190	SS400	4	580.0	0 92	27.68
pl328	PL8X190	SS400	2	580 0	0 46	13 84
pl333	PL8X190	SS400	2	580.0	0 46	13.84
pl800	PL8X190	SS400	10	580 0	2 31	69.21
sp291	PL10X560	SS400	4	165.0	0 80	29.01
				Total	39.15	5422.23

BOLT LIST FOR ASSEMBLY		FN-3B243			No. 1	
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	80	14	0 56	FN-3B243 FN-3B243
24		Site	80	7	0 56	FN-3B243 FN 3B244
24		Site	80	7	0 56	FN-3B243 FN-3B264



ERAL NOTES:
ll Welding To Be In Accordance With AWS D1.1.
Notches To Have 10 mm Radius At Internal Corners UON.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B243

REV	DATE	DESCRIPTION	DRAWN	CHKD	APPROD
C	20/12/06	Revised as per marks	SDD		
B	18/12/06	Revised as per marks	SDD		
A	10/11/06	For Review	SDD		

KOBELCO — KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER	
CHECKED		BEAM	FN-3B24
APPROVED		REFER DRAWING NO	
SCALE	NTS	DRAWING NO	754-S- FN-3B243 REV. C

STP&I

Record No. : 167-01

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 21/12/2006

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	60 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-3B243		

SEE ATTACHED DRAWING SKETCH

Weld Identification

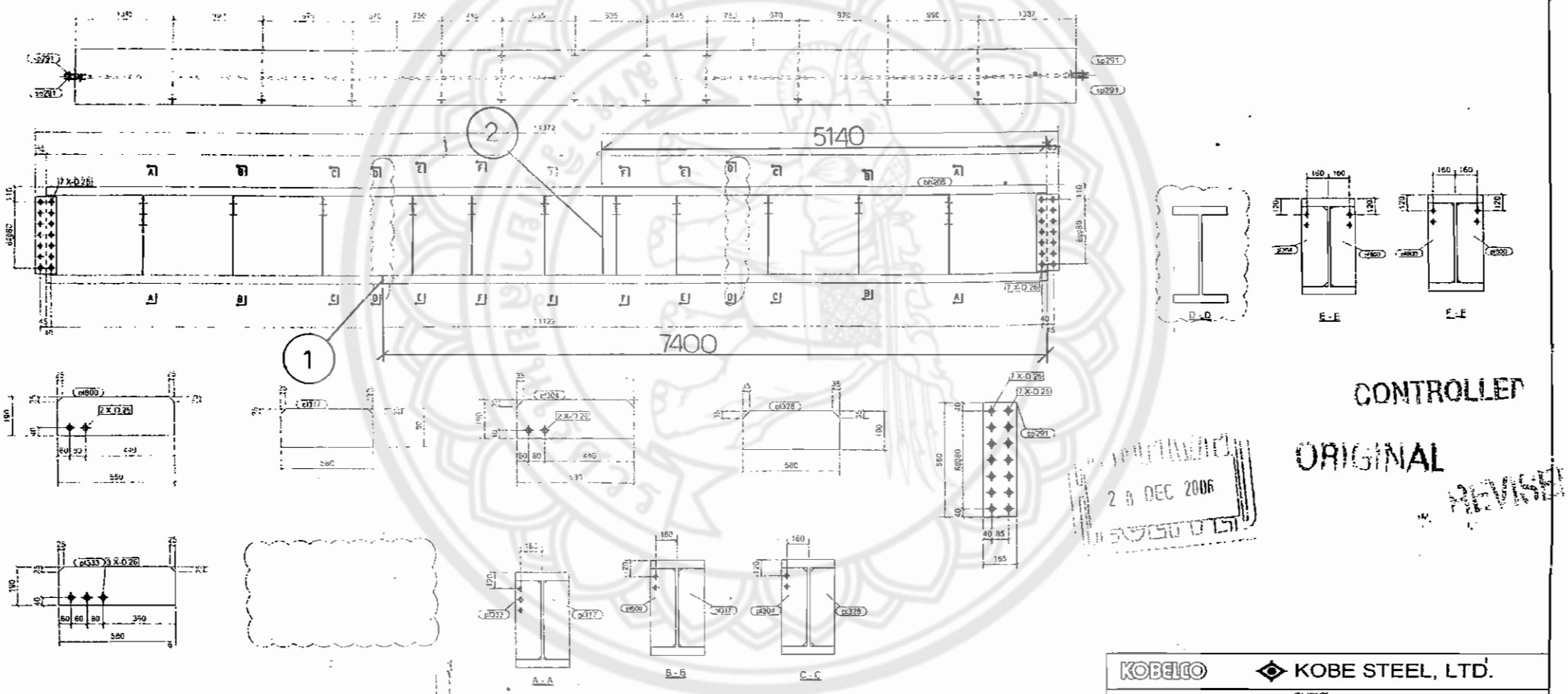
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
TOS.	COORDINATE
+10.000	DB-DE/1 9/47500-+10000

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-3B243			1 No. Required	
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
bh205	BH-700X400X20X60	SS400	1	11202.0	33.28	5240.97
pl304	PL8X100	SS400	4	580.0	0.92	27.68
pl317	PL8X190	SS400	4	580.0	0.92	27.68
pl328	PL8X190	SS400	2	580.0	0.46	13.84
pl333	PL8X190	SS400	2	580.0	0.46	13.84
pl800	PL8X190	SS400	10	580.0	2.31	69.21
sp291	PL10X560	SS400	4	165.0	0.80	29.01
				Total	39.15	5422.23

BOLT LIST FOR ASSEMBLY		FN-3B243				No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	80	14	0.56	FN-3B243 FN-3B243
24		Site	80	7	0.56	FN-3B243 FN-3B244
24		Site	80	7	0.56	FN-3B243 FN-3B264



CONTROLLED

ORIGINAL

2 5 DEC 2006

GENERAL NOTES:

1. All Welding To Be In Accordance With AWS D1.1.
2. Notches To Have 10 mm Radius At Internal Corners UON.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B243

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
C	20/12/06	Revised as per marks	SDD		
B	16/12/06	Revised as per marks	SDD		
A	10/11/06	For Review	SDD		

KOBELCO — KOBE STEEL, LTD.

CLIENT: HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER	
CHECKED		BEAM FN-3B24	
APPROVED		REFER DRAWING NO.	
SCALE	NTS	DRAWING NO. 754-S- FN-3B243	REV. C

STP&I

Record No. : 168

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 25/12/2006

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	16 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-3B330		

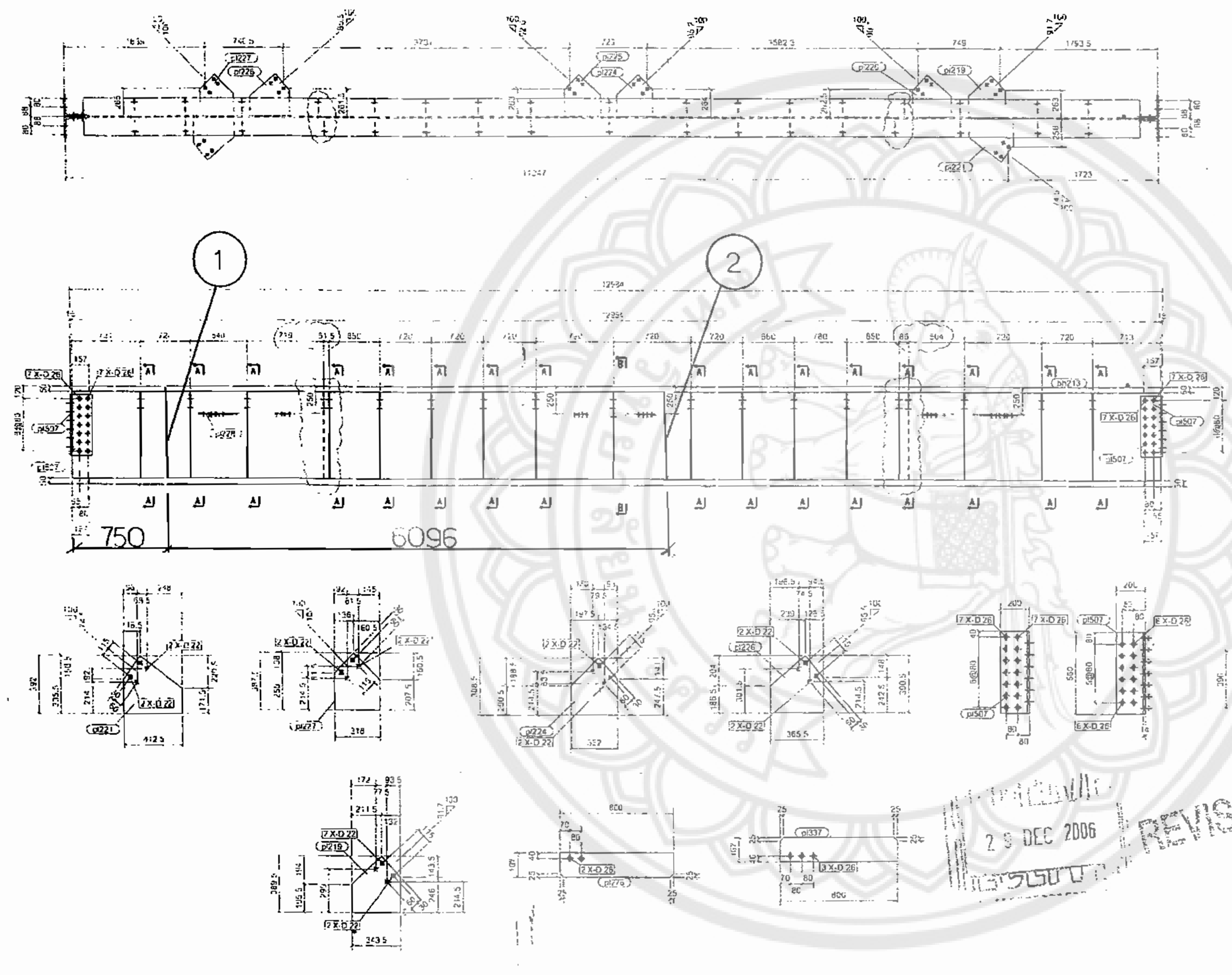
SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
2WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

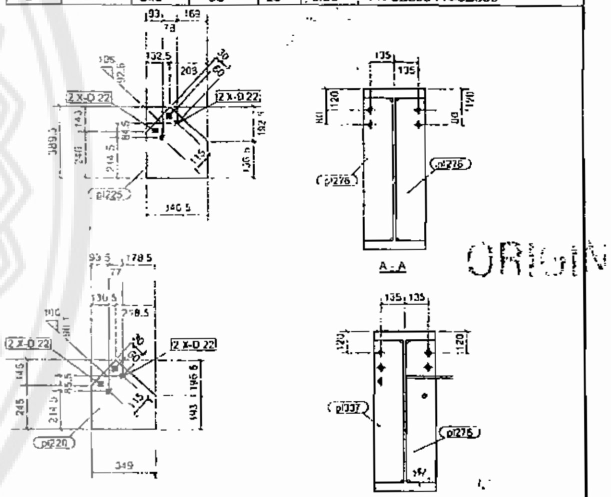
Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHATAPHOL W.(ENG.QC)	K. UEDA
Date	25/12/06	25/12/06	

LOCATION	
TOS.	COORDINATE
-10.000	DE-DP/2-3I-7500-+10000



MATERIAL LIST FOR ONE ASSEMBLY MKD			FN-3B330		1	No Req'd	
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
bh213	BH-900X350X16X50	SS400	1	12954.0	40.85	4774.46
pl219	PL12X389	SS400	1	343.3	0.22	12.[illegible]
pl220	PL12X390	SS400	1	348.9	0.23	12.81
pl221	PL12X392	SS400	1	412.8	0.26	15.24
pl224	PL12X389	SS400	1	332.2	0.22	12.16
pl225	PL12X389	SS400	1	340.5	0.22	12.49
pl226	PL12X391	SS400	1	365.5	0.23	13.45
pl227	PL12X398	SS400	1	318.2	0.21	11.82
pl228	PL12X391	SS400	1	382.2	0.24	14.09
pl276	PL8X167	SS400	33	800.0	9.28	276.87
pl337	PL8X167	SS400	1	800.0	0.28	8.39
pl507	PL14X560	SS400	4	366.0	1.84	95.02
				Total	53.88	5259.19

BOLT LIST FOR ASSEMBLY		FN-3B330			No. 1	
Diam	Grade	Type	Length	No	kg/set	Member
20		Site	55	4	0.27	FN-3HB41
20		Site	55	4	0.27	FN-3HB42
20		Site	55	4	0.27	FN-3HB45
20		Site	55	4	0.27	FN-3HB47
20		Site	55	4	0.27	FN-3HB49
20		Site	55	4	0.27	FN-3HB51
20		Site	55	4	0.27	FN-3HB53
20		Site	55	4	0.27	FN-3HB54
24		Site	70	24	0.52	FN-1C12
24		Site	70	24	0.52	FN-1C14
24		Site	85	28	0.58	FN-3B330 FN-3B330



ORIGIN

CONTROLLED

REVISED

2 9 DEC 2006

ENERAL NOTES:

1. All Welding To Be In Accordance With AWS D1.1
2. Notches To Have 10 mm Radius At Internal Corners UON.

1 . No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B330

REV	DATE	DESCRIPTION	DRAWN	CHKD	APPROD.
C	20/12/06	Revised as per marks	SOD		
B	20/11/06	Revised as per marks	SOD		
A	17/11/06	For Review	SOD		

KOBELCO — KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SOD	FURNACE TOWER	
CHECKED	1	BEAM FN-3B33	
APPROVED		REFER DRAWING NO.	
SCALE	NTS	DRAWING NO. 754-S- FN-3B330	REV. C

STP&I

ULTRASONIC TESTING RECORD

Page : 1 OF 1

Record No. : 179

Project : 1.5 MTPY SHADEED HOTLINK PLANT — Date 29/12/2006

Job No. : 0754-0-1 — Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	16 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN4B18		

SEE ATTACHED DRAWING SKETCH

Weld Identification

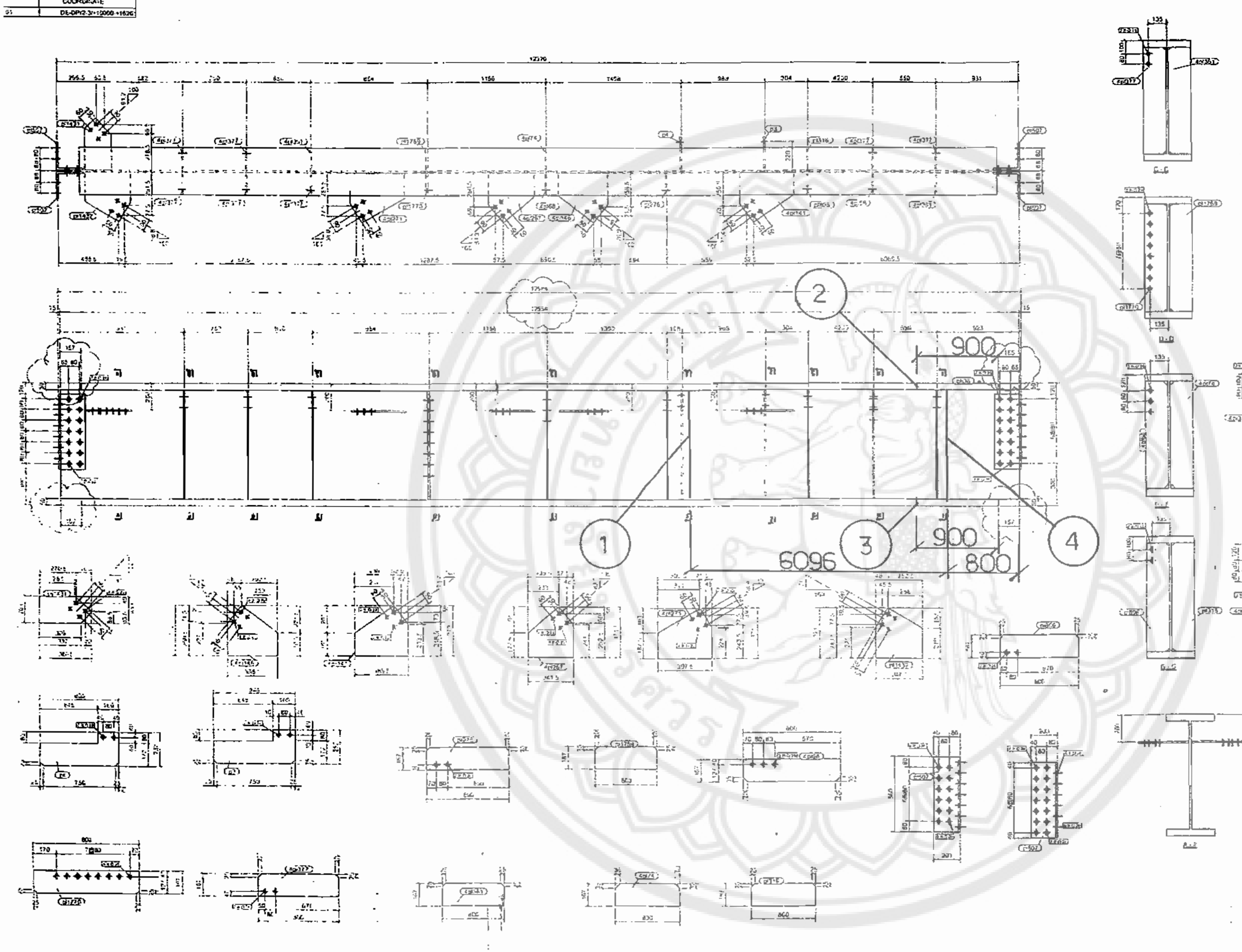
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Decibels: Reference Level B	Decibels: Attenuation factor C	Decibels: Indication rating D	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Discontinuity: Distance From X	Discontinuity: Distance From Y	Discontinuity evaluation	REMARK
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
4WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUKIT T.	MR. CHATAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

Q.C. STP&I DEPT.

LOCATION LIST	
	COORDINATE
G1	DL-DPY2-3/+10000 +1626

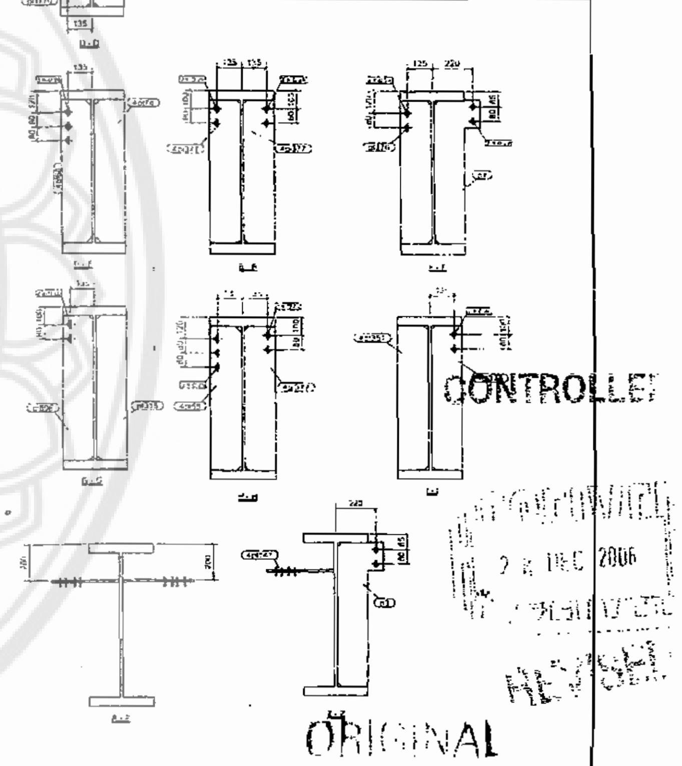


MATERIAL LIST FOR ONE ASSEMBLY MRKD FN-4B18 1 No. Required

Mark	Description	Grade	Qty	Length(mm)	Area (m2)	Weight (kg)
bc38	BH-900X350X16X50	SS400	1	12354.0	40.63	4774.48
4p28	PL6X187	SS400	2	800.0	0.56	13.75
4p74	PL8X187	SS400	1	965.0	0.28	8.39
4p144	PL12X272	SS400	1	[illegible]	0.25	13.57
4p146	PL12X272	SS400	1	[illegible]	0.32	[illegible]
4p267	PL12X272	SS400	1	341.7	[illegible]	[illegible]
4p271	PL12X271	SS400	1	357.4	[illegible]	[illegible]
4p361	PL8X187	SS400	2	800.0	[illegible]	[illegible]
4p377	PL8X187	SS400	7	[illegible]	[illegible]	58.73
p3	PL12X262	SS400	1	[illegible]	0.32	[illegible]
p4	PL12X262	SS400	1	635.0	0.32	[illegible]
p075	PL8X167	SS400	1	800.0	[illegible]	[illegible]
p078	PL8X157	SS400	1	800.0	[illegible]	8.31
p207	PL14X500	SS400	4	[illegible]	[illegible]	[illegible]
p886	PL8X157	SS400	[illegible]	[illegible]	[illegible]	[illegible]
p1721	PL12X203	SS400	1	[illegible]	[illegible]	7.40
p1722	PL12X273	SS400	1	[illegible]	0.42	[illegible]
p1724	PL16X187	SS400	1	[illegible]	0.35	[illegible]
p1775	PL14X507	SS400	1	600.0	0.30	[illegible]
				Total	40.20	5138.72

BOLT LIST FOR ASSEMBLY FN-4B18 No. 1

Diam	Grade	Type	Length	No	kg/set	Member
20		Std	55	4	0.27	FN-4HB15
20		Std	55	4	0.27	FN-4HB15
24		Std	70	24	0.42	FN-4G1
24		Std	70	24	[illegible]	FN-4G3
24		Std	65	20	0.53	FN-4B18 FN-4B16



CONTROLLED

2 8 DEC 2006

ORIGINAL

1 No REQUIRED AS DRAWN FOR PIECE MARK NO FN-4B18

GENERAL NOTES
Welding To Be In Accordance With AWS D1.1.
Notches To Have 10 mm.

Rev	Date	Description	By
B	20/12/06	Revised as per marks	SCD
A	23/11/06	For Review	SCD

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN: SCD
CHECKED
APPROVED

FURNACE TOWER
BEAM FN-4B18

STP&I

Page : 1 OF 1

Record No. : 179-01

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	29/12/2006
Job No. :	0754-0-1	Client	KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	50 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN4B18		

SEE ATTACHED DRAWING SKETCH

Weld Identification

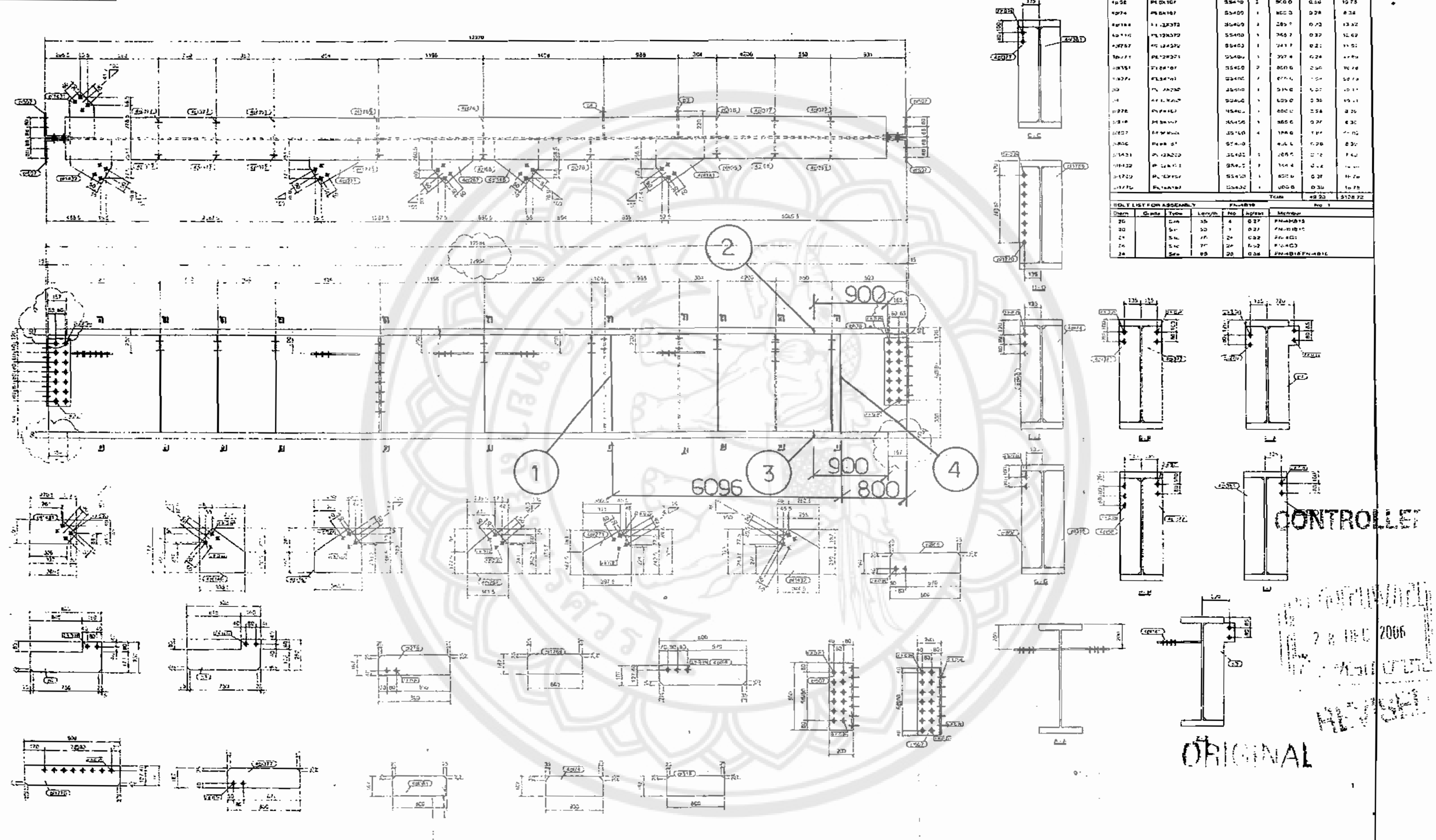
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Reference Level B	Attenuation factor C	Indication rating D	Discontinuity: Length	Sound path	Depth from "A" surface	Distance: From X	From Y	Discontinuity evaluation	REMARK
2TF	-	70	AB	I,II	-	46	-	-	-	-	-	-	-	-	ACC
2TF	-	60	AB	I,II	-	44	-	-	-	-	-	-	-	-	ACC
3BF	-	70	AB	I,II	-	46	-	-	-	-	-	-	-	-	ACC
3BF	-	60	AB	I,II	-	44	-	-	-	-	-	-	-	-	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. S[illegible]PT.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

Q.C. STP&I DEPT.

LOCATION LIST	
	COORDINATE
61	DE-DPQ-3/+10000+1625



MATERIAL LIST FOR ONE ASSEMBLY MKD	FN-4B18		1	No. Required		
Mark	Description	Grade	Qty	Length	Area	Weight
w136	BH-900X350X16X30	SS400	1	12954.0	40.85	[illegible]
4p58	PL [illegible]	SS400	2	900.0	[illegible]	15.75
[illegible]	[illegible]	SS400	1	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	[illegible]	[illegible]	0.73	13.32
[illegible]	[illegible]	SS400	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	1	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	[illegible]	[illegible]	0.24	[illegible]
[illegible]	[illegible]	SS400	2	800.0	[illegible]	[illegible]
[illegible]	[illegible]	SS400	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	1	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	4	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	SS400	[illegible]	[illegible]	0.3?	[illegible]
[illegible]	[illegible]	SS400	[illegible]	[illegible]	0.30	[illegible]
				Total	49.23	5128.72

BOLT LIST FOR ASSEMBLY		FN-4B18			No. 1	
Diam	Grade	Type	Length	No	kg/set	Member
20		[illegible]	55	4	0.27	FN-4B18
20		[illegible]	55	1	0.27	[illegible]
24		[illegible]	[illegible]	24	0.52	FN-4G1
24		[illegible]	75	24	[illegible]	FN-4G3
24		[illegible]	65	20	0.56	FN-4B18 FN-4B16

NOTES
Welding To Be In Accordance With AWS D1.1.
[illegible] To Have 10 mm

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO FN-4B18

B	20/12/06	Revised as per marks	SDD
A	23/11/06	For Review	SDD

KOBELCO
KOBE STEEL, LTD.
CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT
STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER
CHECKED		BEAM FN-4B18
APPROVED		[illegible]

STP & I

Record No. : 181

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	27/12/2006
Job No. :	0754-0-1	Client	KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	45 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN3B146		

SEE ATTACHED DRAWING SKETCH

Weld Identification

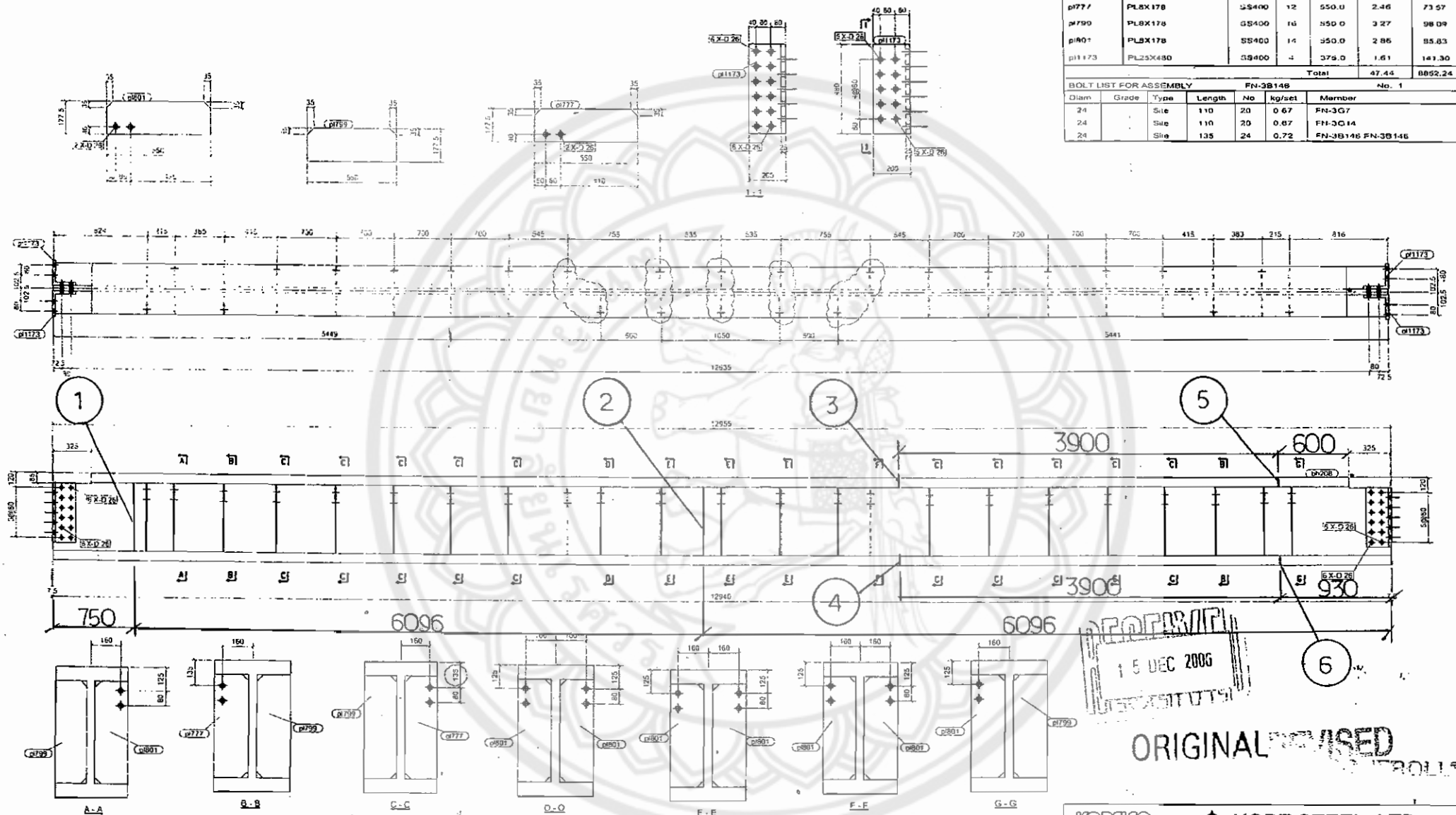
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1WEB	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC
2WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
2WEB	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO..LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date	27/12/06.		

LOCATION LIST	
TOS	COORDINATE
+10.000	DB-DE/2.1-3/+7500-+10000

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-3B146		1	No. Required	
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
bh208	BH-700X400X45X75	SS400	1	12940.0	37.25	8453.15
pl777	PL8X178	SS400	12	550.0	2.46	73.57
pl799	PL8X178	SS400	16	550.0	3.27	98.09
pl801	PL8X178	SS400	14	550.0	2.86	85.83
pl1173	PL25X480	SS400	4	379.0	1.61	141.30
				Total	47.44	8852.24

BOLT LIST FOR ASSEMBLY		FN-3B146				No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	110	20	0.67	FN-3G7
24		Site	110	20	0.67	FN-3G14
24		Site	135	24	0.72	FN-3B146 FN-3B146



GENERAL NOTES.
All Welding To Be In Accordance With AWS D1.1.
Notches To Have 10 mm Radius At Internal Corners UON.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B146

REV	DATE	DESCRIPTION	DRAWN	CHKD	APPROD.
B	12/12/06	Revised as per marks	SDD		
A	10/11/06	For Review	SDD		

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER
CHECKED		BEAM FN-3B14
APPROVED		REFER DRAWING NO.
SCALE	NTS	

RECEIVED 15 DEC 2006
ORIGINAL

STP & I

Page : "1 OF 1

Record No. : 181-01

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 27/12/2006

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	75 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN 3B146		

SEE ATTACHED DRAWING SKETCH

Weld Identification

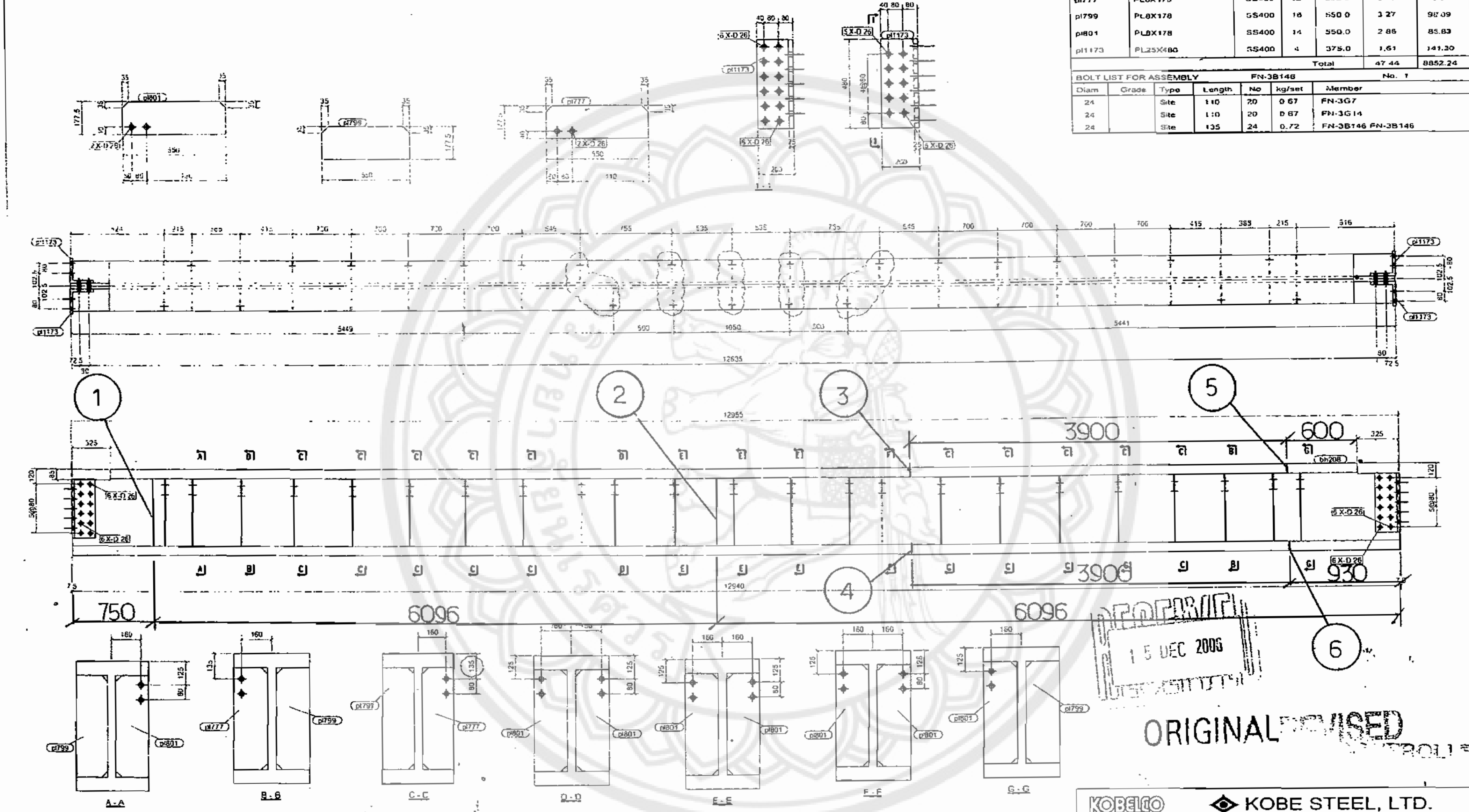
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
3TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
3TF	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC
4BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
4BF	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC
5TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
5TF	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC
6BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
6BF	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
TOS	COORDINATE
+10.000	DB-DE/2.1-3/+7500-+10000

MATERIAL LIST FOR ONE ASSEMBLY MK'D	FN-3B146		1	No. Required		
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
bh208	BH-700X400X45X75	SS400	1	12940.0	37.25	8453.45
pl777	PL8X178	SS400	12	550.0	2.45	73.57
pl799	PL8X178	SS400	16	550.0	3.27	98.09
pl801	PL8X178	SS400	14	550.0	2.86	85.83
pl1173	PL25X480	SS400	4	375.0	1.61	141.30
				Total	47.44	8852.24

BOLT LIST FOR ASSEMBLY		FN-3B146			No. 1	
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	110	20	0.67	FN-3G7
24		Site	110	20	0.67	FN-3G14
24		Site	135	24	0.72	FN-3B146 FN-3B146



GENERAL NOTES:
All Welding To Be In Accordance With AWS D1.1.
Notches To Have 10 mm Radius At Internal Corners UON.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B146

REV	DATE	DESCRIPTION	DRAWN	CHKD	APPROD.
B	12/12/06	Revised as per marks	SOD		
A	10/11/06	For Review	SOD		

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SOD	FURNACE TOWER
CHECKED		BEAM FN-3B14
APPROVED		REFER DRAWING NO.
SCALE	NTS	

STP&I

Page : "1 OF 1

Record No. : 182

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 9/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	20 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN 3B116		

SEE ATTACHED DRAWING SKETCH

Weld Identification

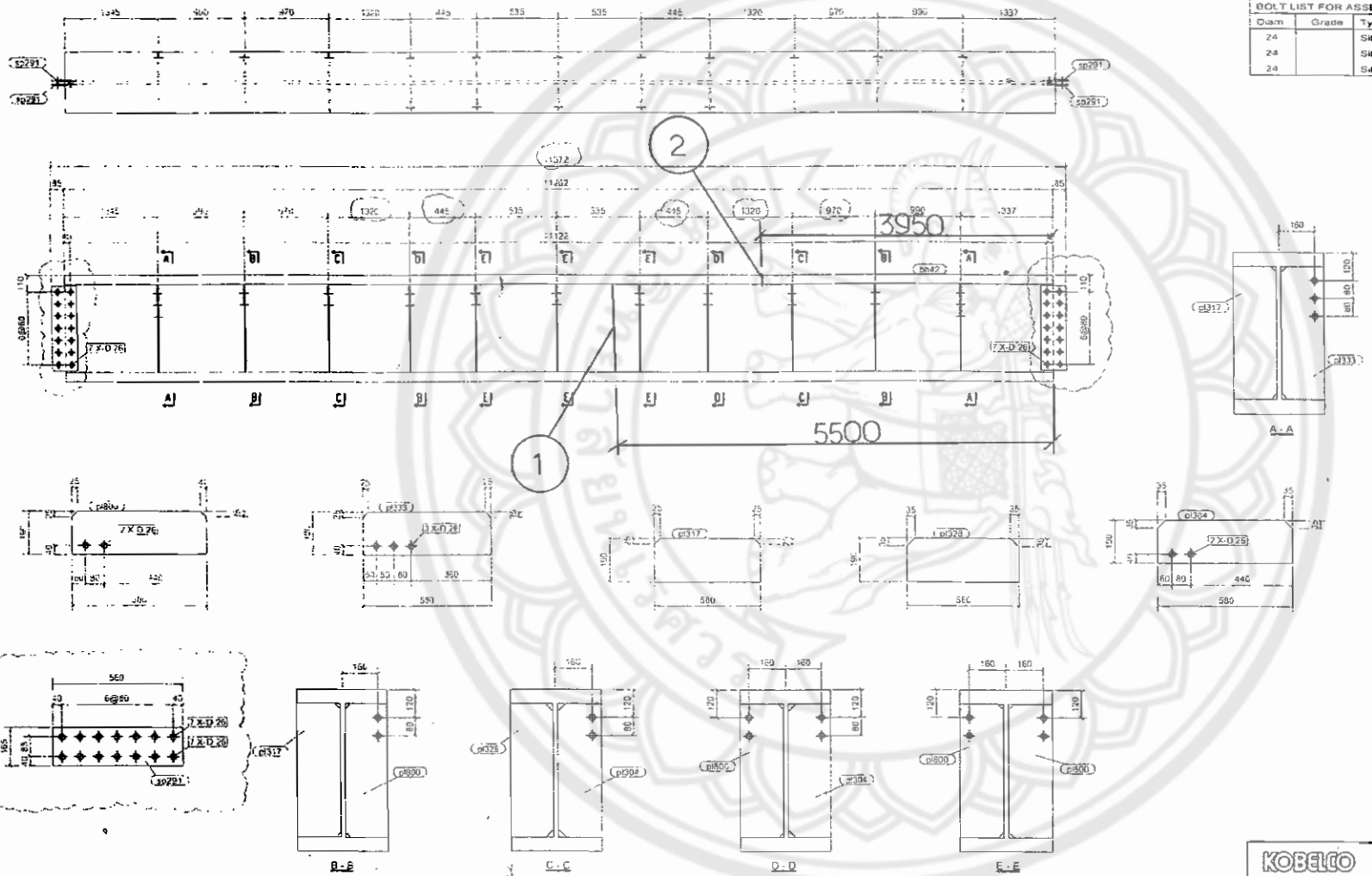
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Decibels: Reference Level B	Decibels: Attenuation factor C	Decibels: Indication rating D	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date	9/1/07	9/1/07	

LOCATION LIST	
TOS.	COORD-NATE
-10 000	DE-DE/3-3 ::-7500-+10000

MATERIAL LIST FOR ONE ASSEMBLY MK'D			FN-3B116		t	No. Required
Mark	Description	Grade	Qty	Length(mm)	Area (m²)	Weight (kg)
bh42	BH-700X400X20X60	SS400	1	11202.0	33.28	5240.97
pl304	PL8X190	SS400	4	590.0	0.92	27.68
pl317	PL8X190	SS400	4	580.0	0.92	27.68
pl328	PL8X190	SS400	2	580.0	0.46	13.84
pl335	PL8X190	SS400	2	580.0	0.46	13.84
pl800	PL8X190	SS400	16	580.0	2.31	69.21
sp291	PL10X560	SS400	4	165.0	0.80	29.01
				Total	39.15	5422.23

BOLT LIST FOR ASSEMBLY		FN-3B116			No. 1	
Diam	Grade	Type	Length	No	kg/set	Member
24		Sile	50	7	0.56	FN-3B89 FN-3B116
24		Sile	80	7	0.56	FN-3B112 FN-3B116
24		Sile	80	11	0.56	FN-3B118 FN-3B116



CONTROLLED
ORIGINAL
REVISED

GENERAL NOTES:
1 All Welding To Be In Accordance With AWS D1.1
2 Notches To Have 10 mm Radius At Internal Corners UON.

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B116

REV	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
B	18/12/06	Revised as per marks	SDD		
A	10/11/06	For Review	SDD		

KOBELCO — KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
88 MU 3 Bangna-Trad Rd., K.M. 33.5 T.Klong-Tamru A.Muang Chonburi 20000 Thailand

DRAWN	SDD	FURNACE TOWER	
CHECKED		BEAM FN-3B11	
APPROVED		REFER DRAWING NO.	
SCALE	MTS	DRAWING NO. 754-S- FN-3B116	REV. B

STP & I

Page : "1 OF 1

Record No. : 182-01

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 9/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	60 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN 3B116		

SEE ATTACHED DRAWING SKETCH

Weld Identification

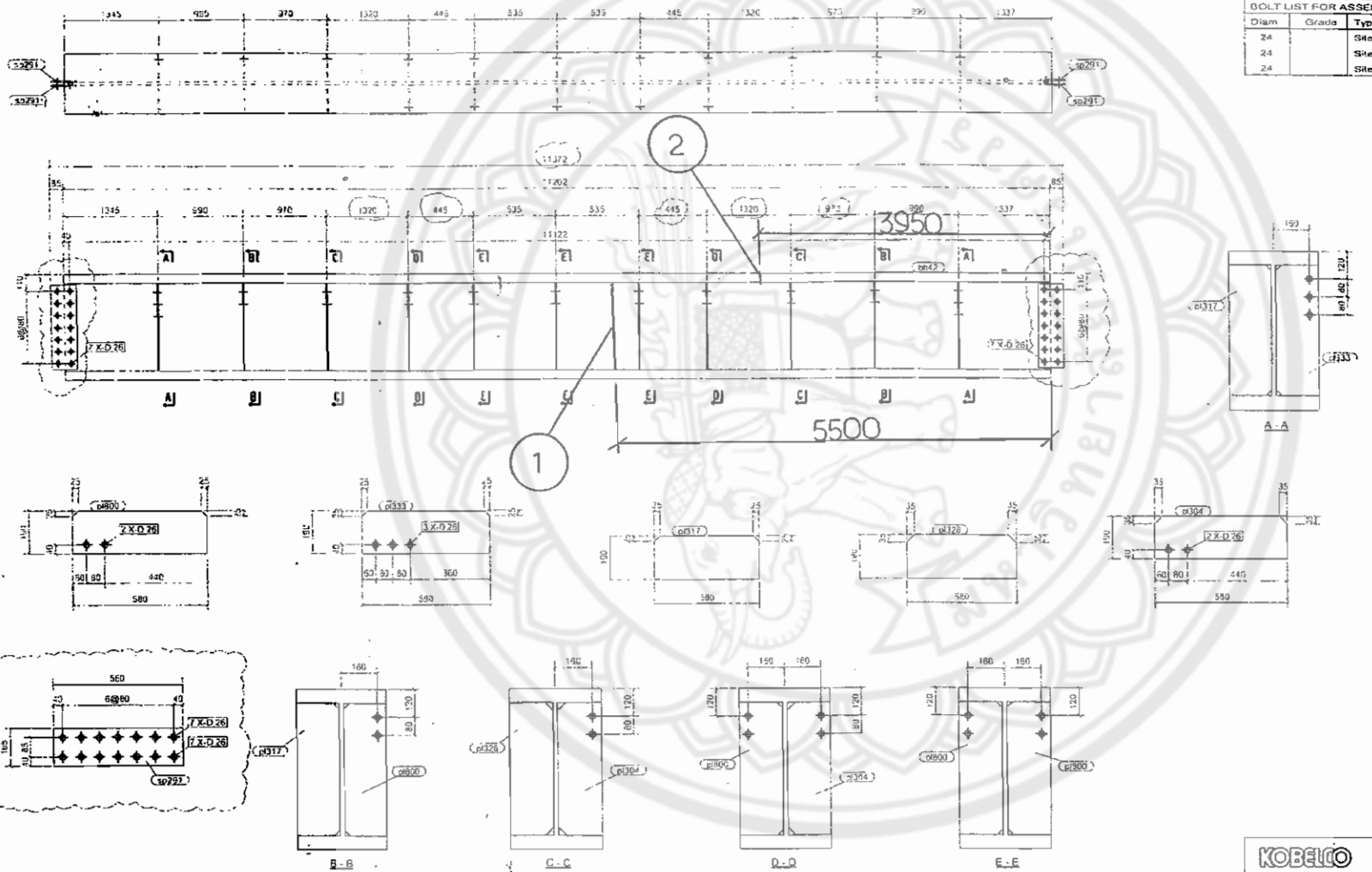
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
2TF	1	70	A	I	50	46	3	0	15	58	20	0	20	CLASS B	ACC
2TF	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
TOS.	COORDINATE
+10.000	DB-DE/3-3 1/+7500-+10000

MATERIAL LIST FOR ONE ASSEMBLY MKD			FN-3B116		1	No. Required
Mark	Description	Grade	Q'ty	Length (mm)	Area (m2)	Weight (kg)
bh42	BH-700X400X20X50	SS400	1	11202.0	33.28	5240.97
pl304	PL8X190	SS400	4	580.0	0.92	27.68
pl317	PL8X190	SS400	4	580.0	0.92	27.68
pl328	PL8X190	SS400	2	580.0	0.46	13.84
pl333	PL8X190	SS400	2	580.0	0.46	13.84
pl800	PL8X110	SS400	10	540.0	2.31	69.21
sp291	PL10X90	SS400	1	165.0	0.80	29.01
				Total	39.15	5422.23

BOLT LIST FOR ASSEMBLY		FN-3B116				No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	90	7	0.56	FN-3B69 FN-3B116
24		Site	80	7	0.50	FN-3B112 FN-3B116
24		Site	80	14	0.56	FN-3B118 FN-3B116



CONTROLLED

ORIGINAL

REVISED

GENERAL NOTES.

1 All Welding To Be In Accordance With AWS D1.1

2 Plates To Have 10 mm Radius At Internal Corners UON

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B116

B	18/12/06	Revised as per marks	SP		
A	10/11/06	For Review			

KOBELCO — KOBE STEEL, LTD.

CLIENT: HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.
89 Moo 3 Bangna-Trad Rd., K.M. 33.5 T. Klong Tumru, A. Muang Chonburi 20000 Thailand

DRAWN	SDD	FURNACE TOWER	
CHECKED		BEAM	FN-3B116
APPROVED		REFER DRAWING NO.	

STP&I

Record No. : 183

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 9/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied	Method : Pulse Echo		
Standard	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	45 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN 3B156		

SEE ATTACHED DRAWING SKETCH

Weld Identification

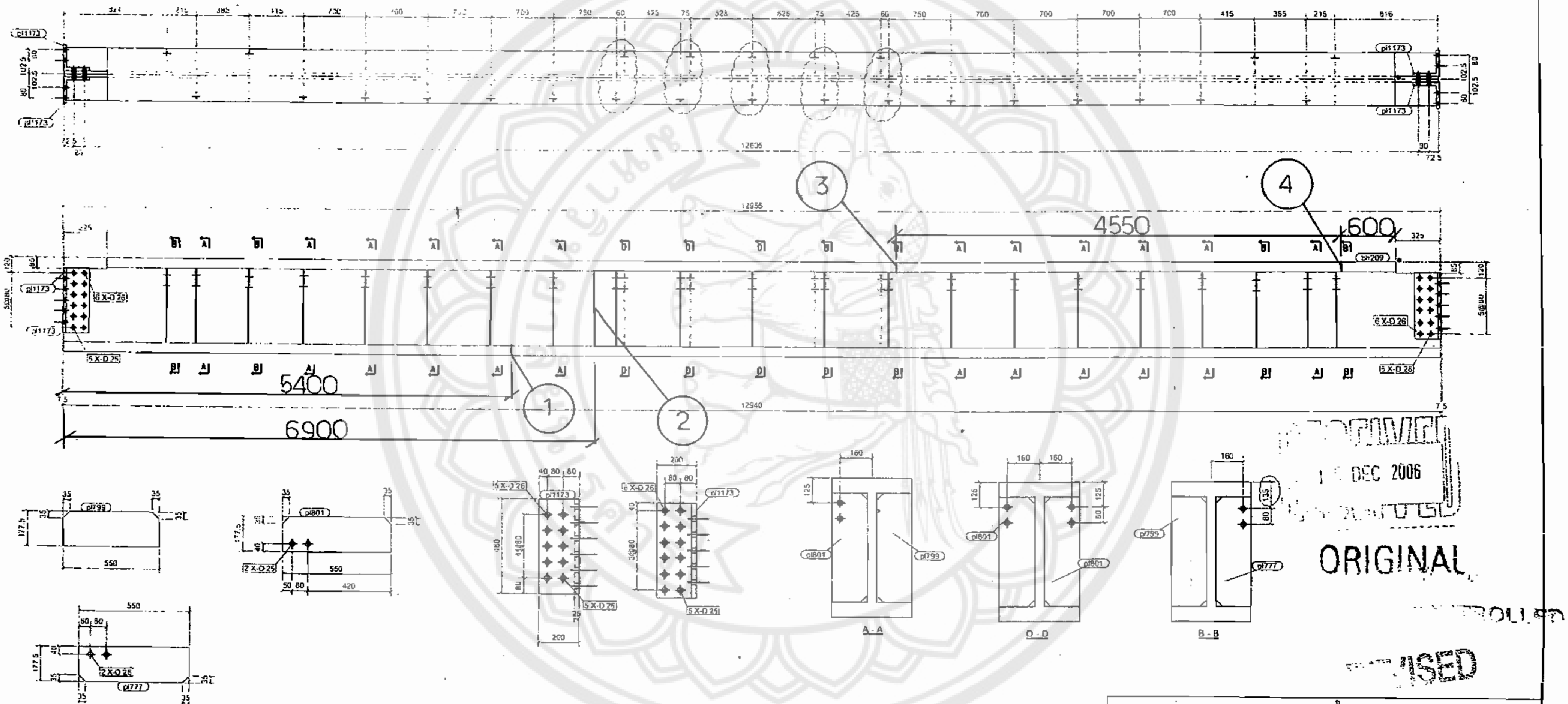
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
2WEB	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
2WEB	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST	
TOS	COORDINATE
+10.000	DB-DE/2.1-3/+7500-+10000

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-3B156			1	No. Required
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
bh209	BH-700X490X45X75	SS400	1	12940.0	37 25	8453.45
pl777	PL8X178	SS400	2	550 0	0 41	12 26
pl799	PL8X178	SS400	16	550 0	3 27	98 09
pl801	PL8X178	SS400	24	550 0	4 90	147 14
pl1173	PL25X480	SS400	4	375 0	1 61	141.30
				Total	17 44	8852.24

BOLT LIST FOR ASSEMBLY			FN-3B156			No. 1
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	110	20	0 67	FN-3G7
24		Site	110	20	0 67	FN-3G14
24		Site	135	24	0.72	FN-3B156 FN-3B156



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DEC 2006
ORIGINAL
CONTROLLED
REVISED

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B156

GENERAL NOTES:
All Welding To Be In Accordance With AWS D1.1.
Notches To Have 10 mm Radius At Internal Corners UON.

REV.	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
B	12/12/06	Revised as per marks	SDD		
A	10/11/06	For Review	SDD		

KOBELCO — KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER
CHECKED		BEAM FN-3B15
APPROVED		REFER DRAWING NO.
SCALE	NTS	DRAWING NO. -754-S- FN-3B156 REV. B

Record No. : 183-01

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 9/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	75 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN 3B156		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1BF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
1BF	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC
3TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
3TF	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC
4TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC
4TF	–	60	AB	I,II	–	44	–	–	–	–	–	–	–	–	ACC

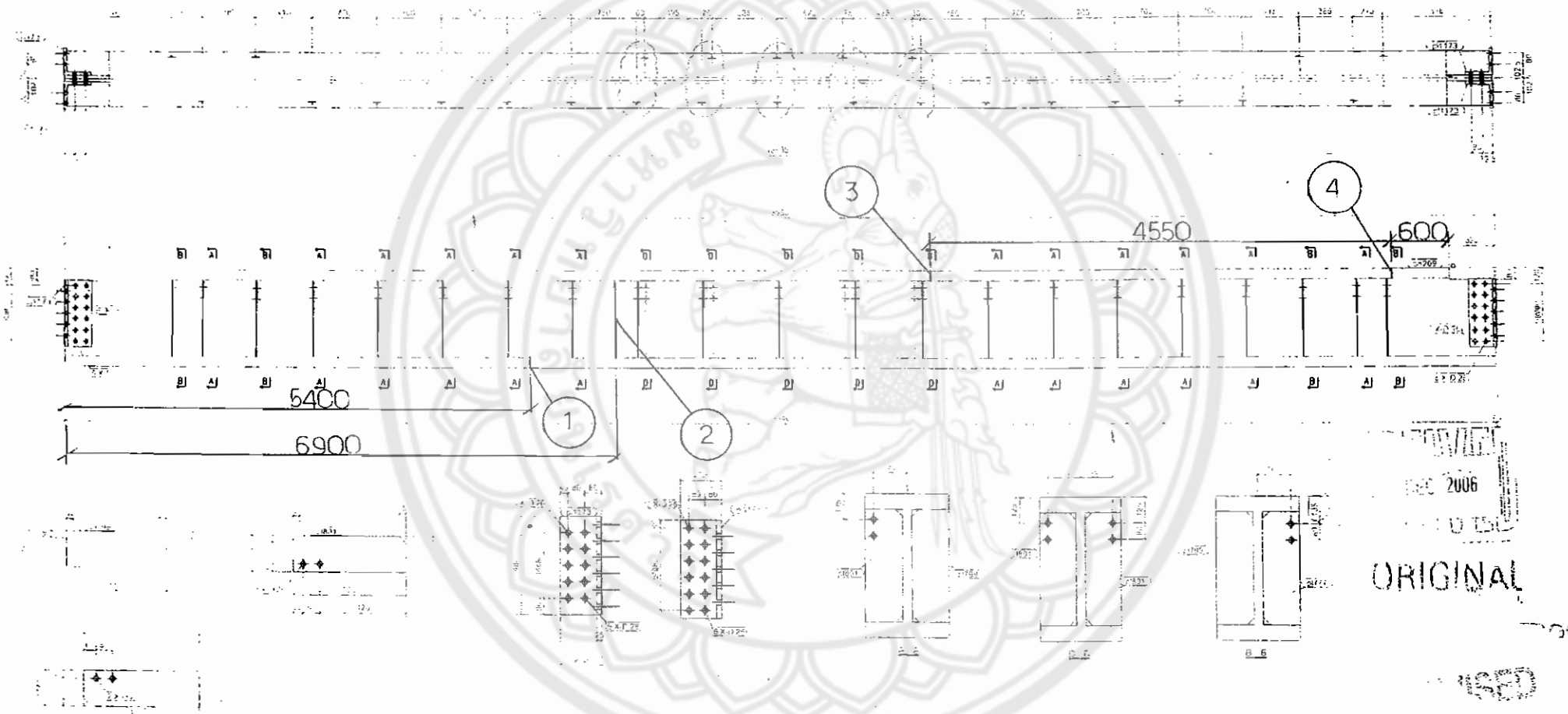
Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	MR. SUTEPT T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

LOCATION LIST	
TOS	COORDINATE
[illegible]	[illegible]

MATERIAL LIST FOR ONE ASSEMBLY MKD	FN-3B156				1 No. Required	
Mark	Description	Grade	Qty	Length (mm)	Area (m2)	Weight (kg)
[illegible]	BH 750X400X45X75	[illegible]	1	12340.0	37.25	8453.45
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				Total	37.44	8852.24

BOLT LIST FOR ASSEMBLY	FN-3B156					No. 1
Diam	Grade	Type	Length	No.	Kg/set	Member
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



2006
ORIGINAL

GENERAL NOTES
- All Welding To Be In Accordance With AWS D1.1
- Notches To Have 10 mm Radius At Internal Corners UON

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-3B156

REV.	DATE	DESCRIPTION	DRAWN	CHKD	APPROD
B	12/12/06	Revised as per marks	SDD		
A	10/11/06	For Review	SDD		

KOBELCO KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER	
CHECKED		BEAM FN-3B15	
APPROVED		REFER DRAWING NO.	
SCALE	N/S	DRAWING NO. 754-S- FN-3B156	REV D

STP&I

Record No. : 134-R1

ULTRASONIC TESTING RECORD

Project : 1.5 MTPY SHADEED HOTLINK PLANT Date 6/1/2007

Job No. : 0754-0-1 Client KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	13,21 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-6VB22		

SEE ATTACHED DRAWING SKETCH

Weld Identification

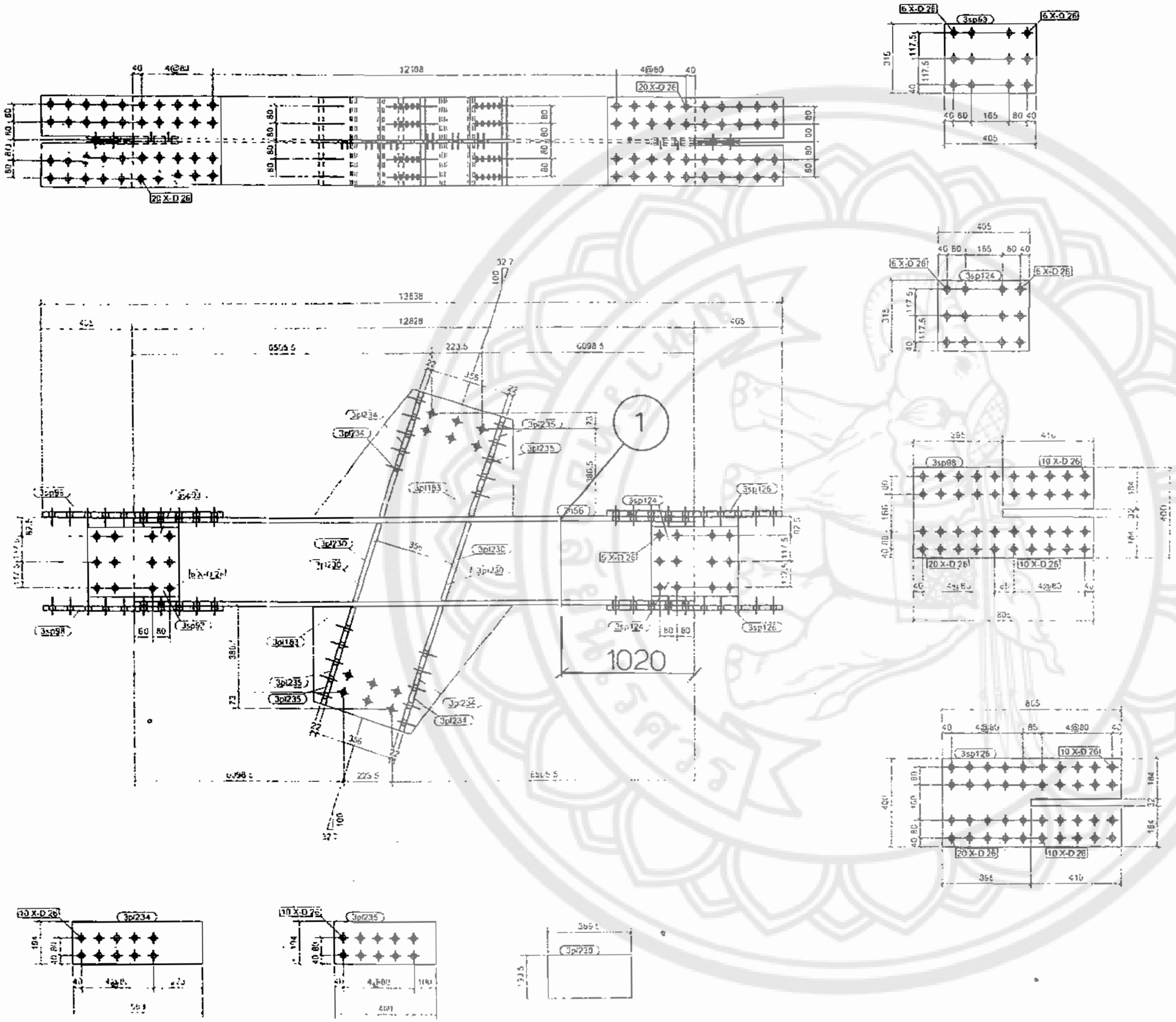
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

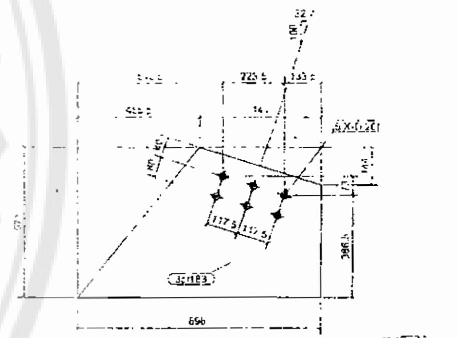
Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date	6-9		

LOCATION LIST	
S.	COORDINATE
743	DE/2-3/+22500-+31980

MATERIAL LIST FOR ONE ASSEMBLY MK'D		FN-6VB22		1	No. Requ...	
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
3h56	H-400X400X13X21	SS400	1	12027.8	29.76	2202.2
3pl183	PL12X571	SS400	2	897.8	1.46	96.61
3pl230	PL22X183.5	SS400	4	365.4	0.67	49.38
3pl234	PL22X194	SS400	4	588.2	1.04	78.16
3pl235	PL22X194	SS400	4	459.8	0.83	61.62
3sp93	PL10X315	SS400	2	405.0	0.54	20.03
3sp98	PL22X400	SS400	2	805.0	1.38	106.65
3sp124	PL10X315	SS400	2	405.0	0.54	20.00
3sp126	PL22X400	SS400	2	805.0	1.38	106.69
			Total		37.60	2741.46

BOLT LIST FOR ASSEMBLY			FN-6VB22		No. 1	
Diam	Grade	Type	Length	No	kg/set	Member
24		Site	75	6	0.54	FN-2C14 FN-6VB22
24		Site	75	8	0.54	FN-3C12 FN-6VB22
24		Site	75	12	0.54	FN-6VB22 FN-6VB22
24		Site	85	40	0.58	FN-2C14
24		Site	85	40	0.58	FN-3C12
24		Site	85	80	0.58	FN-6VB22





RECEIVED 01 DEC 2006

ORIGINAL

CONTROLLED

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-6VB22

ERAL NOTES
-ll Welding To Be In ccordance With AWS D1.1
Notches To Have 10 mm Radius At Internal Corners UON.

KOBELCO — KOBE STEEL, LTD.

CLIENT
HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDD	FURNACE TOWER
CHECKED		V-BRACING FN-6VB2
APPROVED		REFER DRAWING NO.
SCALE	NTS	DRAWING NO 754-S- FN-6VB22 REV A

REV	DATE	DESCRIPTION	DRAWN	CHKD	APPROD
A	28/11/06	For Review	SDD		

Record No. : 136-R1

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	8/1/2007
Job No. :	0754-0-1	Client	KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	12,19 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-6VB42		

SEE ATTACHED DRAWING SKETCH

Weld Identification

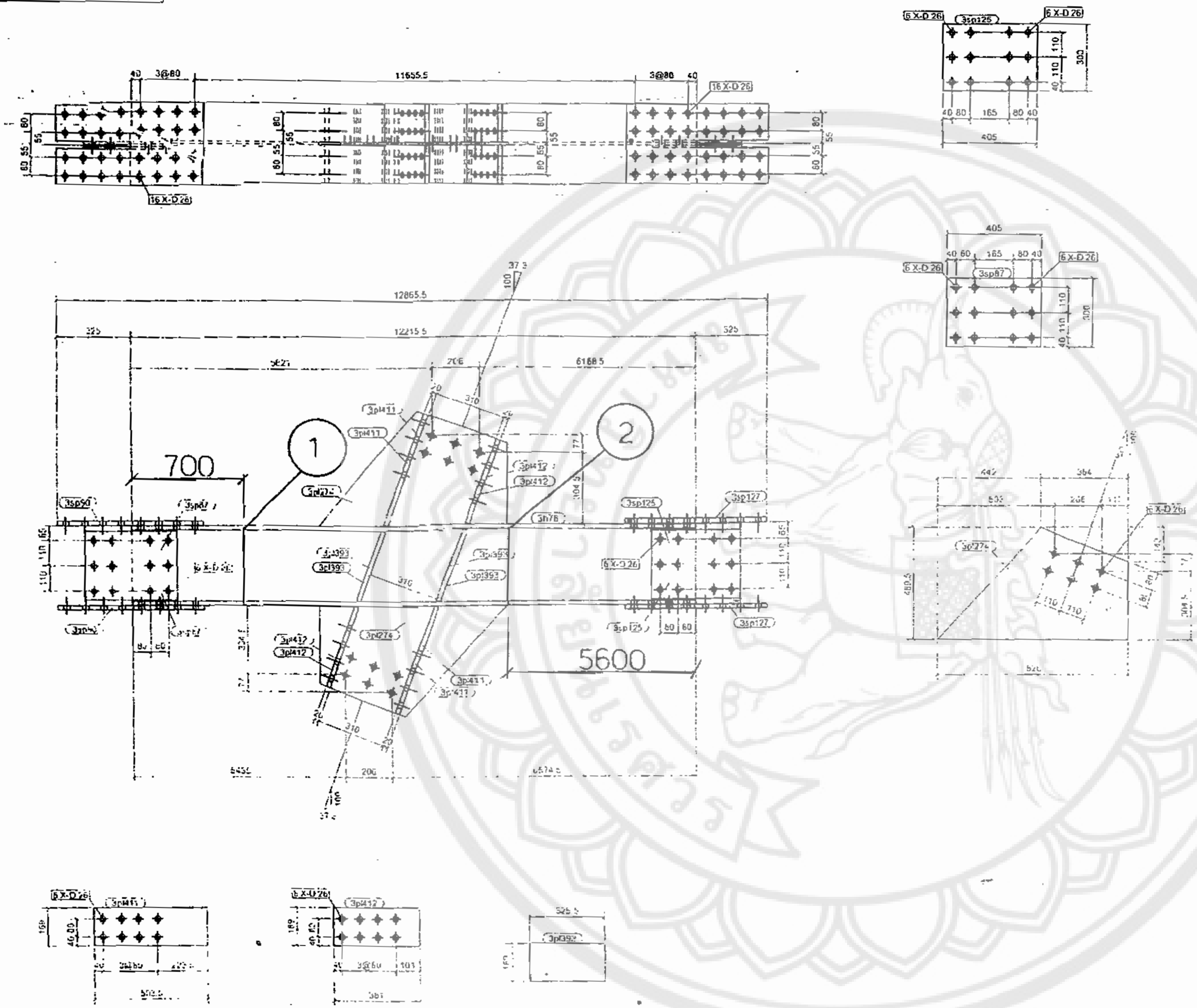
Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level A	Decibels: Reference Level B	Decibels: Attenuation factor C	Decibels: Indication rating D	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Discontinuity: Distance From X	Discontinuity: Distance From Y	Discontinuity evaluation	REMARK
1TF	-	70	AB	I,II	-	46	-	-	-	-	-	-	-	-	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature			
Name	SRISUT	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

Q.C. STP&I DEPT.

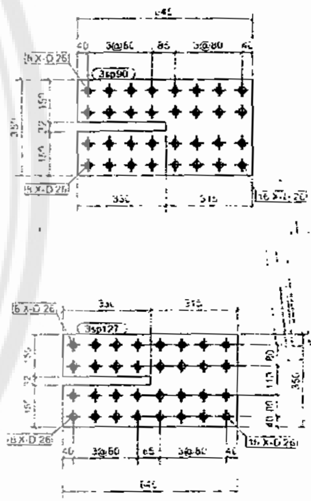
Q.C. STP&I DEPT.

LOCATION LIST	
OS.	COORDINATE
3 078	DB-DE/1/+22500-+31980



MATERIAL LIST FOR ONE ASSEMBLY MK'D	FN-6VB42			1 No. Required		
Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (Kg)
3h78	H-350X350X12X19	SS400	1	12215.6	24.92	1667.57
3pl274	PL12X489	SS400	2	826.0	1.13	76.17
3pl393	PL20X169	SS400	4	325.5	0.52	34.55
3pl411	PL20X169	SS400	4	503.7	0.79	53.46
3pl412	PL20X169	SS400	4	380.8	0.60	40.42
3sp87	PL10X300	SS400	2	405.0	0.51	19.08
3sp90	PL20X350	SS400	2	645.0	0.97	67.57
3sp125	PL10X300	SS400	2	405.0	0.51	19.08
3sp127	PL20X350	SS400	2	645.0	0.97	67.57
				Total	30.92	2045.45

BOLT LIST FOR ASSEMBLY		FN-6VB42				No. 1
Diam	Grade	Type	Length	No	Kg/set	Member
24		Site	75	6	0.54	FN-2C10 FN-6VB42
24		Site	75	6	0.54	FN-3C4 FN-6VB42
24		Site	75	12	0.54	FN-6VB42 FN-6VB42
24		Site	80	32	0.56	FN-2C10
24		Site	80	32	0.56	FN-3C4
24		Site	80	64	0.56	FN-6VB42



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ORIGINAL

CONTROLLED

GENERAL NOTES

1. All Welding To Be In Accordance With AWS D1.1
2. Notches To Have 10 mm

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-6VB42

REV	DATE	DESCRIPTION	DRAWN	CHKD.	APPROD.
A	28/11/06	For Review	SDC		

KOBELCO KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN	SDC	FURNACE TOWER V-BRACING FN-6VB4	
CHECKED			
APPROVED		REFER DRAWING NO.	
SCALE	NTS	DRAWING NO.	754-S- FN-6VB42 REV A

STP&I

Record No. : 148 R1

ULTRASONIC TESTING RECORD

Project :	1.5 MTPY SHADEED HOTLINK PLANT	Date	9/1/2007
Job No. :	0754-0-1	Client	KOBE STEEL

Applied Standard	Method : Pulse Echo		
	Acceptance Standard : AWS D1.1/D1.1M: 2004,STRUCTURE WELDING CODE-STEEL (SECTION 6 PART F)		
Material :	Carbon Steel	Thickness :	19 mm
Weld Surface :	Smooth and grinding	Object (Groove Design)	SINGLE BEVEL GROOVE, BUTT JOINT
Apparatus :	PANAMETRICS EPOCH 4	Probe :	NDT SYSTEM AWS 0256
Frequency :	2.25 (MHz)	Sensitivity :	HOLE Ø 1.5 (80 % FSH)
Standard Test Block :	IIW BLOCK . V 1	Couplant :	Starch Paste
Sketch of Examined Location	P/M FN-5B38		

SEE ATTACHED DRAWING SKETCH

Weld Identification

Exm. Location	Indication number	Transducer angle	From Face	Leg	Decibels: Indication Level (A)	Decibels: Reference Level (B)	Decibels: Attenuation factor (C)	Decibels: Indication rating (D)	Discontinuity: Length	Discontinuity: Sound path	Discontinuity: Depth from "A" surface	Distance: From X	Distance: From Y	Discontinuity evaluation	REMARK
1TF	–	70	AB	I,II	–	46	–	–	–	–	–	–	–	–	ACC

Completed By	Inspected by	Witnessed/ Reviewed	Witnessed/ Reviewed
Company	STP&I Public Company Limited	STP&I Public Company Limited	KOBE STEEL CO.,LTD
Signature	Q.C. STP&I DEPT.	Q.C. STP&I DEPT.	
Name	MR. SUTEP T.	MR. CHAYAPHOL W.(ENG.QC)	K. UEDA
Date			

LOCATION LIST

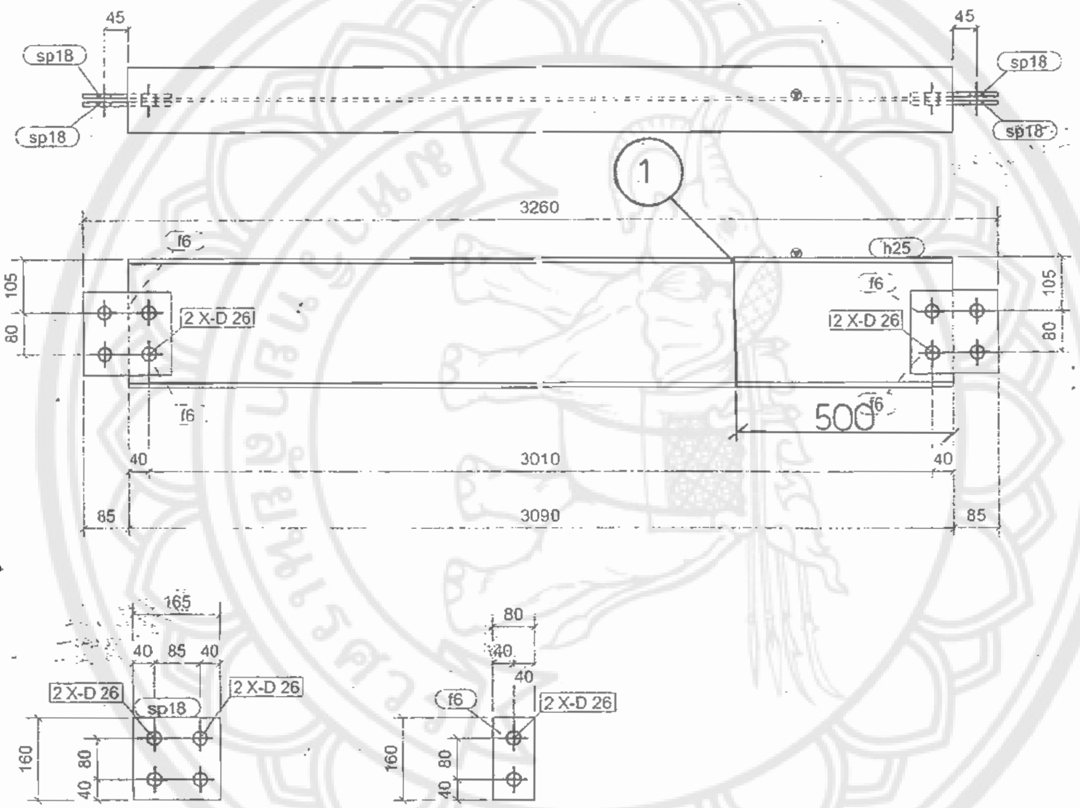
OS.	COORDINATE
19.310	DB-DE/2-2.1/+19310

MATERIAL LIST FOR ONE ASSEMBLY MK'D FN-5B38 — No. Required

Mark	Description	Grade	Q'ty	Length(mm)	Area (m2)	Weight (kg)
h25	H-250X125X6X9	SS400	1	3090.0	3.00	91.35
f6	PL1X160	SS400	4	80.0	0.10	0.40
sp18	PL8X160	SS400	4	165.0	0.23	6.63
				Total	3.33	98.38

BOLT LIST FOR ASSEMBLY FN-5B38 No. 1

Diam	Grade	Type	Length	No	kg/set	Member
24		Site	65	2	0.51	FN-5B17 FN-5B38
24		Site	65	2	0.51	FN-5B18 FN-5B38
24		Site	65	4	0.51	FN-5B38 FN-5B38 FN



APPROVED 15 NOV 2006

ORIGINAL

1 No. REQUIRED AS DRAWN FOR PIECE MARK NO. FN-5B38

GENERAL NOTES:
1. All Welding To Be In Accordance With AWS D1.1.
2. Notches To Have 10 mm Radius At Internal Corners UON.

REV	DATE	DESCRIPTION	DRAWN	CHKD.	APPRDD.
A	15/11/06	For Review	D		

KOBELCO — KOBE STEEL, LTD.

CLIENT

HDRI/HBI COMBINATION HOTLINK PLANT

STP & I PUBLIC COMPANY LIMITED.

DRAWN: SOD
CHECKED
APPROVED
SCALE: NTS

FURNACE TOWER
BEAM FN-5B38

REFER DRAWING NO.
DRAWING NO. 754-S- FN-5B38 REV. A

ภาคผนวก ข

มหาวิทยาลัยนเรศวร

ข.1 คุณสมบัติและการรับรองของบุคลากรในการทดสอบโดยไม่ทำลาย

สมาคมการทดสอบโดยไม่ทำลายแห่งสหรัฐอเมริกา ASNT (American Society for Nondestructive Testing) ได้กำหนดเอกสารข้อแนะนำ "Recommended Practice No. STN-TC-1A" ที่กำหนดแนวทางที่จำเป็นแก่ผู้ว่าจ้าง (Employer) ในการกำหนดคุณสมบัติและออกใบรับรองแก่พนักงาน (Employee) สำหรับวิธีการทดสอบโดยไม่ทำลาย (NTD) ดังแสดงในรูปที่ ก1

รูปที่ ข1 แสดงเอกสารแนะนำ Recommended Practice No. STN-TC-1A

ที่มา : คู่มือการทำงานบริษัทเอสทีพี แอนด์ ไอ จำกัด (มหาชน)

ผู้ว่าจ้าง(Employer) ต้องมีเอกสารที่ระบุรายละเอียดเกี่ยวกับการกำหนดคุณสมบัติ การอบรม การวัดผลและการสอบและการรับรองพนักงาน (Employee) ที่ปฏิบัติงานการทดสอบโดยไม่ทำลาย (NDT) ของบริษัท โดยต้องระบุชั่วโมงการอบรมและประสบการณ์ของพนักงานนั้น การรับรองบุคลากรด้าน NDT เป็นความรับผิดชอบของผู้ว่าจ้าง ตามปกติการรับรองพนักงานจะมี 3 ระดับดังนี้

ระดับ 1 (Level 1)

- สามารถที่จะทำการสอบเทียบเครื่องมือ (Calibration)
- ปฏิบัติงานตรวจสอบและประเมินผลตามวิธีการที่กำหนดไว้ในคำสั่งปฏิบัติงาน (Working Instruction)

ระดับ 2 (Level 2)

- สามารถที่จะทำการสอบเทียบเครื่องมือและอุปกรณ์ได้
- ปฏิบัติงานงานตรวจสอบพร้อมทั้งประเมินผลตามรายละเอียดที่กำหนดได้
- สามารถเตรียมคำสั่งปฏิบัติงานและจัดทำรายงานผลการตรวจสอบและลงนามในรายงาน
- สามารถทำการสอนพนักงานฝึกหัดและพนักงานระดับ 1 ที่หน้างานได้

ระดับ 3 (Level 3)

- จัดทำและกำหนดเทคนิคการทดสอบแปลความใน Code ที่เหมาะสมได้หากไม่มีมาตรฐานกำหนดออกแบบวิธีการและเทคนิคการตรวจสอบได้
- อบรมให้ความรู้พนักงานและรับรองความรู้ความสามารถผู้เข้าอบรม

บุคลากรด้าน NDT ระดับ 1 (Level 1) ระดับ 2 และ (Level 2) ต้องทำการสอบวัดผลใน 3 ส่วนต่อไปนี้

1. ความรู้ทั่วไป (General Examination)
2. ความรู้เรื่องข้อกำหนดมาตรฐาน (Specific Examination)
3. ภาคปฏิบัติ (Practice Examination)

(ภายใต้การดูแลของบุคลากรด้าน NDT ระดับ 3 (Level 3) ที่อาจจะเป็นพนักงานของบริษัทหรือว่าจ้างจากภายนอกก็ได้)

บุคลากรด้าน NDT ระดับ 3 (Level 3) ต้องทำการสอบวัดผลกับ ASNT ใน 2 หัวข้อ

1. วิชาความรู้พื้นฐาน (Basic)
2. ความรู้ในวิธีการทดสอบที่ต้องการวัดผล (Method)

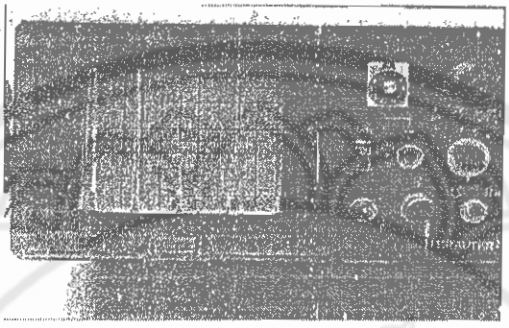
ภาคผนวก ค

มหาวิทยาลัยนเรศวร

ค.1 ความรู้ทั่วไปเกี่ยวกับอุปกรณ์ PANAMETRICS EPOCH 4

อุปกรณ์ Pulse-echo มี 2 ระบบดังนี้

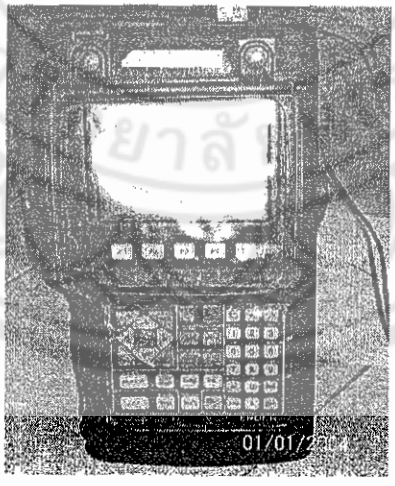
1. Analog เป็นเครื่องรุ่นเก่าที่กำลังจะหมดไป จะใช้ปุ่มแบบหมุนในการควบคุมเครื่อง ต้องใช้เครื่องคิดเลขประกอบการทดสอบเพื่อหาตำแหน่งของความบกพร่องที่ตรวจพบ



รูปที่ ค1 แสดงเครื่อง Pulse-echo ระบบ Analog

ที่มา : คู่มือการทำงานบริษัทเอสทีพี แอนด์ ไอ จำกัด (มหาชน)

2. Digital จะใช้ส่วนใหญ่ในปัจจุบัน ปุ่มควบคุมเครื่องเป็นแบบกดและมีเมนูให้เลือกที่จอแสดงผลคล้ายคอมพิวเตอร์ สามารถเก็บค่าต่าง ๆ ในหน่วยความจำได้มีเครื่องคำนวณในตัวซึ่งจะแสดงค่าที่ต้องการทราบได้ทันทีที่สัญญาณสูงเลยระดับที่ตั้งไว้ (Gate) ดังแสดงในรูปที่ ข2



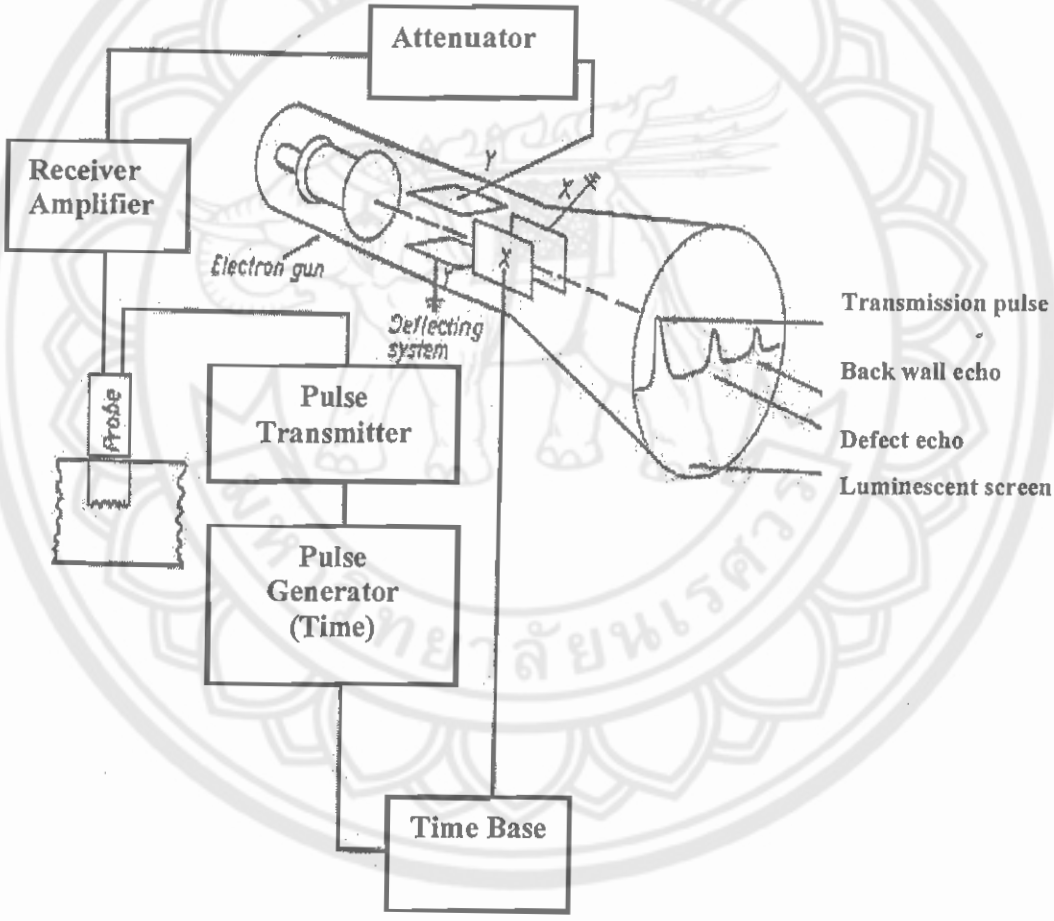
รูปที่ ค2 แสดงเครื่อง Pulse-echo ระบบ Digital

ที่มา : รายการอุปกรณ์บริษัทเอสทีพี แอนด์ ไอ จำกัด (มหาชน)

ค.2 อุปกรณ์แบบ Pulse-echo มีส่วนหลักๆดังนี้

ทั้งแบบ Analog และแบบ Digital อุปกรณ์ที่สำคัญเช่นเดียวกันคือ

Pulse Generator	-	ตัวสร้างสัญญาณเป็นช่วงๆ
Time Base	-	ตัวปรับระยะทางหรือเวลาของคลื่น
Pulse Transmitter	-	ตัวส่งสัญญาณเป็นช่วงๆ
Receiver / Amplifier	-	ตัวรับสัญญาณกลับและภาคขยาย
Cathode Ray Tube	-	จอแสดงสัญญาณ (LCD)
Attenuation / Gain	-	ตัวปรับขยายสัญญาณที่จอ



รูปที่ ค3 แสดงอุปกรณ์หลักของ Pulse-echo

ที่มา : คู่มือการทำงานบริษัทเอสทีพี แอนด์ ไอ จำกัด (มหาชน)

สัญญาณหลัก ๆ ที่ต้องควบคุมมี 7 อย่างดังนี้

1. Gain / Sensitivity ใช้ปรับความสูงของสัญญาณที่ได้รับมา
2. Sweep Length ขยายหรือหดระยะแสดงผล
3. Sweep Delay เลื่อนหน้าจอไปซ้ายหรือขวาโดยไม่เปลี่ยนระยะแสดงผล
4. Pulse repetition rate คือจำนวนครั้งที่ส่ง pulse ออกมาต่อหนึ่งหน่วยเวลา ปกติจะปรับตั้งได้ตั้งแต่ 50-2000 pulse/s ถ้า Sweep Length กว้าง Pulse rate ต้องต่ำเพื่อให้เวลาเครื่องแสดงผลก่อนส่ง Pulse ชุดต่อมา เครื่องบางรุ่นจะทำการปรับ Pulse rate อัตโนมัติ การเพิ่ม Pulse Length (ลด Pulse rate)จะเป็นการเพิ่มพลังงานเสียงที่ส่งออกไปแต่จะลดความสามารถของอุปกรณ์ในการแยกแยะความไม่ต่อเนื่อง ถ้าต้องการส่งคลื่นไปไกล ๆ หรือตรวจสอบวัสดุที่มีขนาดเกรนใหญ่
5. Reject / Suppression ใช้ลดหรือกำจัดหญ้า (grass) ที่อยู่บริเวณ Base line แต่อาจจะมีผลต่อ Vertical Linearity
6. Flaw alarm / Gate กำหนดบริเวณความยาวของ Sweep line โดยลากเส้นตามแนวนอนที่ระดับความสูงตามต้องการถ้าสัญญาณสูงเกินเส้นที่วางไว้เครื่องจะเตือนหรือบันทึกไว้
7. Distance Amplitude Control ความสูงของสัญญาณจากความไม่ต่อเนื่องที่มีขนาดเท่ากันจะลดลงถ้าอยู่ลึกกว่าจาก Attenuation แต่มีการชดเชยโดยการเพิ่มระบบควบคุมทางอิเลคทรอนิคส์ ให้มีความสูงเท่ากันถ้ามีขนาดเท่ากันโดยไม่ลดลงตามความลึก มีชื่อเรียกหลายอย่าง เช่น

   DAC - Distance Amplitude Correction

   TCG – Time Correction Gain

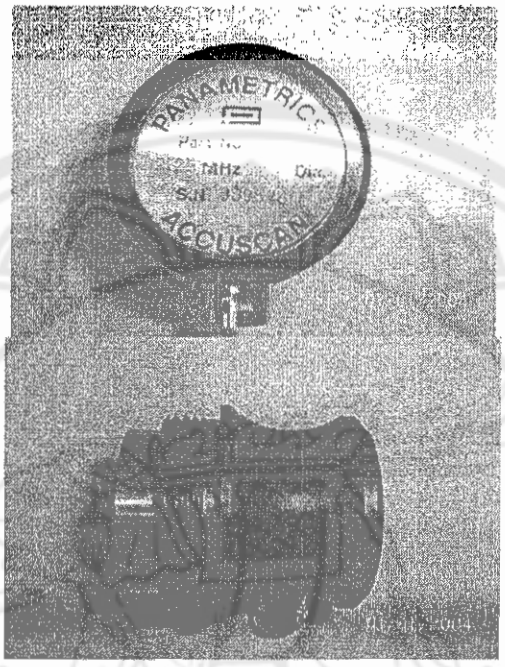
   STC – Sensitivity Time Control

ภาคผนวก ง

มหาวิทยาลัยนเรศวร

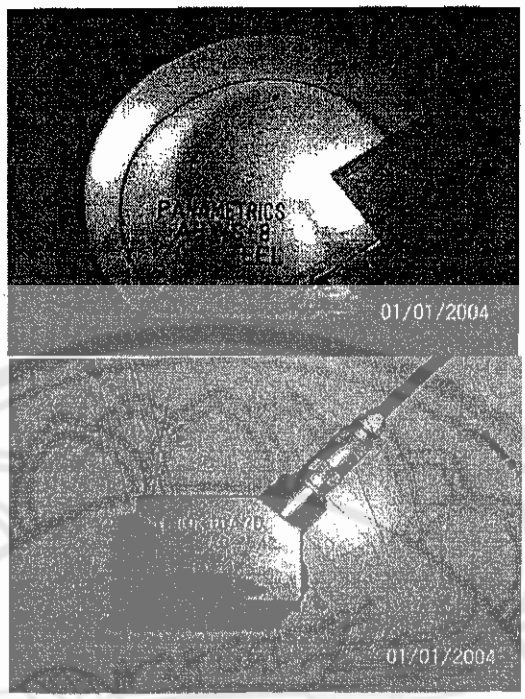
ง.1 ชนิดของหัวตรวจสอบมี 3 ชนิดคือ

1. หัวตรง (Normal Beam Probe หรือ Straight Beam Probe) ทำหน้าที่ส่ง/รับคลื่นในแนวตั้งฉากกับผิวชิ้นงาน ส่งคลื่นตามยาวออกมาโครงสร้างประกอบด้วยดังแสดงในรูปที่ ค1-ค2



รูปที่ ง1-ง2 แสดงหัวตรวจสอบชนิดหัวตรง
ที่มา : รายการอุปกรณ์บริษัทเอสทีพี แอนด์ ไอ จำกัด (มหาชน)

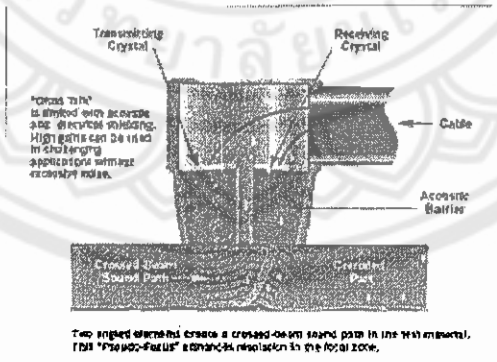
2. หัวมุม (Angle Probe หรือ Shear Wave Probe)หัวตรวจสอบจะส่งคลื่นออกมาทำมุมกับผิวงาน โดยมุมของคลื่นทำมุมกับแนวดิ่ง 35°, 45°, 60°, 70°, 80° มุมเหล่านี้อ้างอิงจากมุมที่เกิดบนเหล็กกล้าเท่านั้นหากนำไปใช้กับวัสดุชนิดอื่น มุมก็จะเปลี่ยนไปตามค่าความต้านทานเสียง (Impedance) โครงสร้างภายในมีลักษณะเช่นเดียวกลับหัวตรง แต่ผลึกวางเอียงเพื่อให้คลื่นตามยาวที่ส่งออกมาเกิดการหักเหเกิดเป็นคลื่นตามขวางที่มุมต่าง ๆ ตามแต่ที่ต้องการดังแสดงในรูปที่ ค3-ค4



รูปที่ รูปที่ ง3-ง4 แสดงหัวตรวจสอบชนิดหัวมุม

ที่มา : รายการอุปกรณ์บริษัทเอสทีพี แอนด์ ไอ จำกัด (มหาชน)

3. TR (Transmitter / Receiver) Probe หรือ Twin Crystal Probe หรือ Dual Probe ลักษณะคล้ายหัวตรงแต่มีผลึก 2 ชุดที่ตัวส่งและคลื่นรับแยกจากกันผลึกทั้ง 2 ทำมุมเข้าหากันเล็กน้อยดังแสดงในรูปที่ ค5



รูปที่ ง5 แสดงหัวตรวจสอบชนิด TR

ที่มา : คู่มือการทำงานบริษัทเอสทีพี แอนด์ ไอ จำกัด (มหาชน)

<u>ข้อดี</u> : TR Probe สามารถตรวจหาความบกพ่องที่ใกล้ผิวได้ดี และเหมาะสำหรับงานที่ชิ้นงานบางมาก เนื่องจากมี delay line ในตัว

<u>ข้อเสีย</u> : การวางผลึก (Crystal) ทั้ง 2 เป็นมุมหันเข้าหากันทำให้ต้องสอบเทียบเครื่องกับ Block ที่มีความหนาใกล้เคียงกับชิ้นงานจริง ไม่เช่นนั้นค่าที่อ่านได้อาจผิดจากค่าจริงมาก

ง.2 การบำรุงรักษา และตรวจเช็คหัวตรวจสอบ

ในการตรวจสอบด้วยอุลตร้าโซนิคแบบสัมผัสโดยตรง (Direct Contact) หัวตรวจสอบจะถูกวางสัมผัสบนชิ้นงานโดยตรง โดยมีสารประสาน (Couplant) เพื่อไม่ให้เกิดช่องว่างระหว่างหัวตรวจสอบกับผิวชิ้นงาน ชิ้นงานจะถูกตรวจสอบโดยการเลื่อนหัวตรวจสอบไปมา ผิวหน้าสัมผัสของหัวตรวจสอบจึงถูกเสียดสีและสึกกร่อน ผู้ทดสอบจึงควรระวังไม่ให้ผลึกของหัวตรวจสอบเสียหาย การสึกกร่อนของผิวหน้าสัมผัสหัวตรวจสอบสามารถทำให้ลดลงได้ โดยการใช้แผ่นป้องกัน ซึ่งแผ่นพลาสติกหรือยางบาง ๆ ติดที่หน้าสัมผัส แต่ก็จะมีผลทำให้ความไวลดลง และความกว้างของสัญญาณกว้างขึ้น แต่ก็มีหัวตรวจสอบซึ่งติดแผ่นป้องกันเป็นแผ่นเซรามิคซึ่งแข็งมากถ้าแผ่นป้องกันของหัวตรวจสอบถูกใช้จนสึกถึงแผ่นผลึก หัวตรวจสอบจะไม่สามารถใช้งานได้อีกต่อไป

การที่หัวตรวจสอบถูกกระแทกอย่างแรง เช่น ตกลงจากที่สูงอาจทำให้แผ่นผลึกแตกหักได้ อุณหภูมิที่ใช้งานไม่ควรสูงกว่าอุณหภูมิสูงสุดที่แนะนำให้ใช้ เพราะจะทำให้หัวตรวจสอบเสียหายได้เช่นกัน เนื่องจากกาวที่ติดระหว่างแผ่นผลึกกับแผ่นป้องกันจะหลอมละลาย นอกจากนั้นแผ่นผลึกเองยังมีลักษณะหมดอายุในตัวเพราะปฏิกิริยาโพลาโรเซชั่นของผลึกจะลดลงอย่างช้าๆ

นอกจากการใช้งานของหัวตรวจสอบอย่างถูกต้องแล้ว การตรวจเช็คหัวตรวจสอบยังนับว่ามีความสำคัญอย่างมากเช่นกัน การตรวจเช็คสามารถทำได้ไม่ยากโดยการใช้เครื่องอุลตร้าโซนิคและแท่ง CALIBRATION BLOCK V 1 ซึ่งจะทำให้ผู้ตรวจสอบสามารถทราบได้อย่างรวดเร็วว่าหัวตรวจสอบนั้นมีค่าตรงตามกำหนดหรือเสียหาย

ภาคผนวก จ

มหาวิทยาลัยนเรศวร

จ.1 ตัวประสาน (Couplant)

ตัวประสานระหว่างหัวตรวจสอบกับชิ้นงานช่วยไม่ให้อากาศอยู่ระหว่างกลาง เนื่องจากอากาศทำให้เสียงส่งผ่านเข้าไปในชิ้นงานได้น้อย (สะท้อนกลับมาก) โดยเฉพาะกับผิวงานที่ขรุขระ เนื่องจากเสียงผ่านตัวกลางที่เป็นอากาศได้ไม่ดีเท่าของแข็งหรือของเหลว จึงต้องมีสารนำคลื่นซึ่งส่วนมากเป็นของเหลวช่วยนำคลื่นจากหัวตรวจสอบข้ามไปยังชิ้นงานและรับคลื่นกลับมายังหัวตรวจสอบ โดยทั่วไปน้ำมันเครื่อง แป้งกวนเหลว กลีเซอรีน ซึ่งสามารถใช้ได้ดีกับวัสดุที่เป็นเหล็ก

จ.2 คุณสมบัติของ Couplant

มีลักษณะดังต่อไปนี้

1. มีเนื้อเดียวกัน ปราศจากฟองอากาศ ไม่มีอนุภาคปน
2. ไม่เป็นอันตรายต่อหัวตรวจสอบและชิ้นงาน
3. สามารถเกาะติดชิ้นงานได้ดีและล้างออกง่าย
4. มีความต้านทานเสียง (Impedance) ระหว่างหัวตรวจสอบใกล้เคียงกับชิ้นงาน

จ.3 การเลือก Couplant

ในการตรวจสอบแบบสัมผัส (Contact) การเลือก Couplant ขึ้นกับสภาพผิว (หยาบ หรือเรียบ) สำหรับผิวงานทั่วไปอาจใช้ กลีเซอรีน น้ำ หรือแป้งเปียก