NAFLIC

National Association For Leisure Industry Certification

Standards & Related Documents Committee

TECHNICAL BULLETIN — July 2014

376. Huss Frisbee Repair Instructions

The committee has been informed of a new repair instruction for a Huss Frisbee ride, a copy of which is attached to this TB. The defect was found during the ADIPS annual inspection.

The information contained within is that of the manufacturer and not NAFLIC. When following the advice from the manufacturer, you are reminded of your duties and responsibilities under HSG175 regarding modifications.

S 184

Project 29, Frisbee No 85273, year of manufacture 2003

- Frisbee, UK
- The area where the crack is located is in the gondola beam see picture 1.
- Noticed by the park operators
- Broken high strength bolt see picture s 2 and 3

Pictures:

Picture 1

Picture 2

Picture 3

Statement:

According to our experience the crack is caused by fatigues.
A repair by welding is possible.

Regarding the bolt it is a fatigue fracture, with lines of rest.

Qualification for welding repair:

- The company which will carry out the repair welding needs a suitable welding permission according to the local requirements of UK, minimum standard according to DIN 18800-7 class E respectively acc. to EN 1090 execution class 3.
- The welder who will carry out the repair welding needs a suitable welding certificate according to the local requirements of UK, minimum standard according to EN 287-1 respectively ISO 9606-1. The welder shall be qualified for overhead position
- The inspection company should be a qualified inspection laboratory, which is accredited in accordance with the EN ISO/IEC 17025
- The inspection personnel shall be qualified and certified to level II in accordance to EN 473

Non-destructive testing:

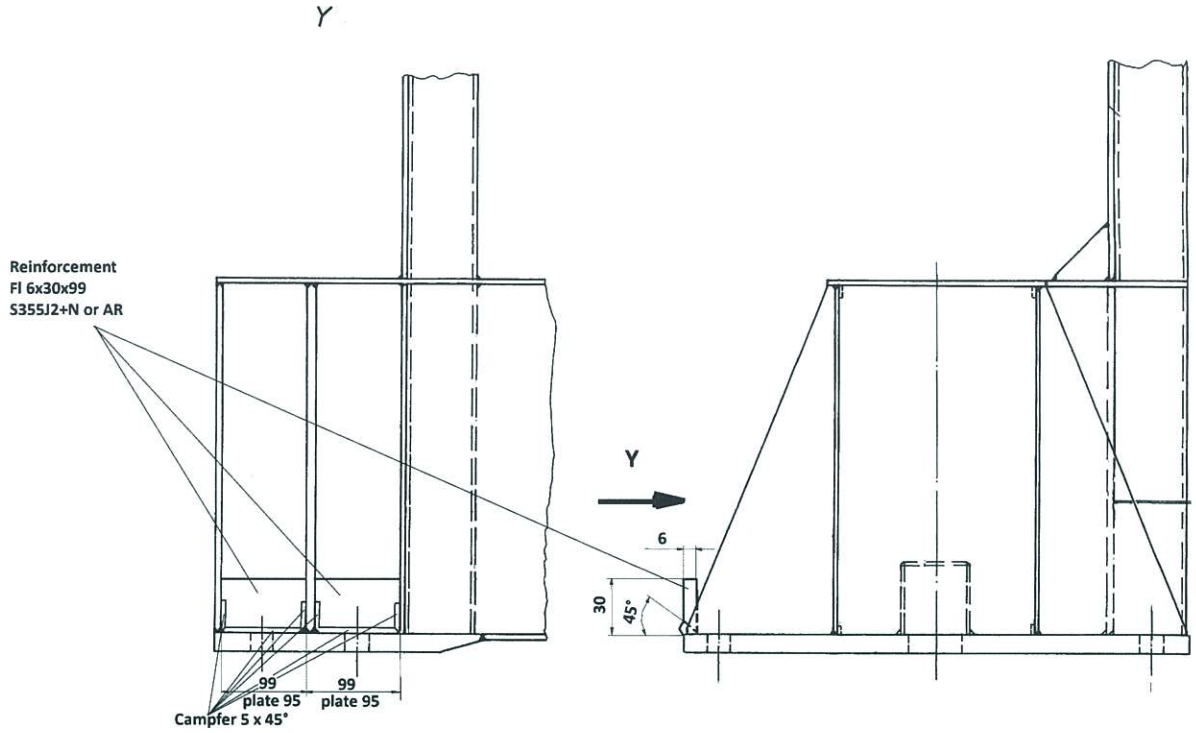
- All welds must comply with quality class B according to ISO 5817.
- 100% of the new weld have to inspected visually (VT) according EN 970 respectively ISO 17637
- Magnetic particle tests (MT) according to ISO 17638 and ISO 23278, allowable limit 1 according to ISO 23278
- Ultrasonic testing (UT) according to ISO 11666, ISO 23279 and ISO 17640, test category B according to ISO 17640

Welding execution:

Crack :

- Remove the crack by grinding, V-shaped
- Weld with basic covered stick electrode according to WPS S-184-1. If necessary drying of the electrode before welding.
- The repaired weld has to be grinded flat, not notches, no welding splatter are allowed, continuous undercut and intermittent undercut according to ISO 5817 max. 0,5mm.
- Reworking of drilling
- Install the reinforcement plates (6 thick), the plates must be corrected on site if necessary, see sketch 1 and WPS S-184-2
- The outdoor temperature must be higher than 5°C during welding; otherwise a "winter site" (e.g. heated tent) has to be set up.
- After 24 hours check the repaired weld by UT and MT, scope is 100%. Welds of reinforcement plates check only by MT, scope is 100%
- repair the surface coating, dry layer thickness250µ
-

Sketch1:



Bolts:

- Replace all bolts of the connection between gondola beam and cantilever. Use only bolts supplied by Huss Parts &Service.
- The pre-tightening torque is 200Nm.
- After a tightening torque of 1000Nm the gap between the flanges shall be closed. If not use fitting plates.
- The final tightening torque is 1500 Nm (slightly oiled).
- For check of the tightening torque use 1650 Nm.
- Checks have to be performed after one week of operation and then in a yearly frequency
- Replace the bolts after 8 years

HUSS PARTS & SERVICE

Welding-Procedure-Specification (WPS)

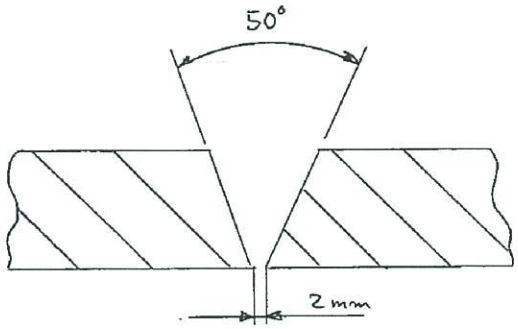
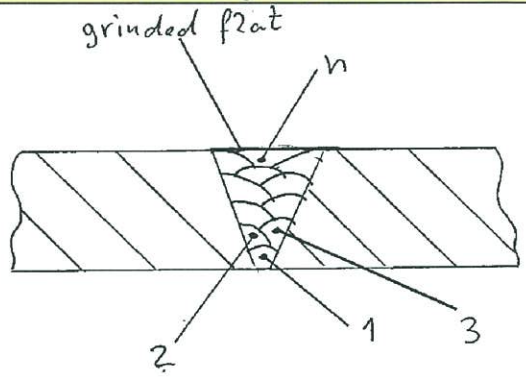
Specification-Nr.:S184-1 2013

Date of making: 2013-05-16

project	P29 Frisbee # 85273		
place of welding	Pleasure Island ,UK	form / EN	Sheet metal EN 10025
controler / -board	customer	material / EN	S235J2+N
manufacturer	HUSS Maschinenfabrik	weldingprocess / EN	111 / ISO 4063
ident-nr.	-------	filler-metal / EN	E 38 4 B 42 H5 / ISO 2560
welder-name	--------	name of filler-metal	e.g..: Böhler Fox EV 47
WPAR-nr.	------	gas / amount	---------
		gas for root / amount	---------

details, construction of the welding

kind of weld seam	butt weld	weld-position	Acc. to ISO 6947
preperation of joint	Acc. to ISO 9692-1	preheating	----------

construction of the welding	welding-sequence
	

sequence-nr.	1	2 - n		
process	111	111	-----	-----
filler-metal / ∅	2,5	3,2	-----	-----
Amperes	80 - 100	100 - 140	-----	-----
Volts	-----	-----	-----	-----
kind of current	= +	= +	-----	-----
wire-feed	manual	manual	-----	-----
hand-feed*)	manual	manual	-----	-----
warmth „Q"*)	------	-------	-----	-----
swing,interrupt etc.*)	------	-------	-----	-----
duration of interrupt*)	------	-------	-----	-----

further information*):

wolframelectrode / ∅	--------	postheating	-----
temperature of sequence	Max 280°C°	dur./temp./proc.	------
adjustments	------	rate of heating	------
suction / ventilation	------	rate of cooling	on air
distance of nozzle	------	angle of burner	--------
other	No welding spatter are alowed, if necessary drying of the electrode, the seam has to be free of notches ,UT and MT-Inspection, scope 100%,		

HPA

Michalik, (IWE) 2013-02-18

name, date, signature

controler / -board

name, date, signature

*) if needed

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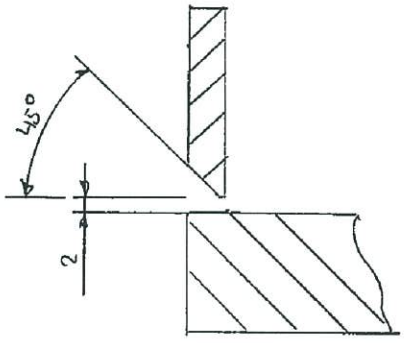	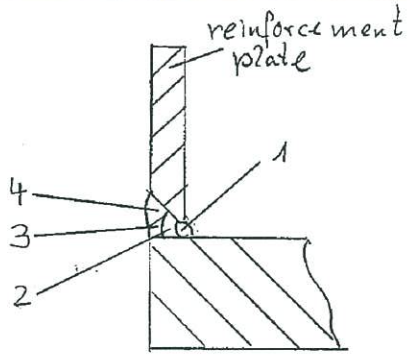

sequence-nr.	1	2 - 4		
process	111	111	-----	-----
filler-metal / ∅	2,5	3,2	-----	-----
Amperes	80 - 100	100 - 140	-----	-----
Volts	-----	-----	-----	-----
kind of current	= +	= +	-----	-----
wire-feed	manual	manual	-----	-----
hand-feed*)	manual	manual	-----	-----
warmth „Q"*)	------	-------	-----	-----
swing,interrupt etc.*)	------	-------	-----	-----
duration of interrupt*)	------	-------	-----	-----

further information*):

wolframelectrode / ∅	--------	postheating	-----
temperature of sequence	Max 280°C°	dur./temp./proc.	------
adjustments	------	rate of heating	------
suction / ventilation	------	rate of cooling	on air
distance of nozzle	------	angle of burner	--------
other	No welding spatter are alowed, if necessary drying of the electrode, the seam has to be free of notches ,MT-Inspection, scope 100%,		

HPA

Michalik, (IWE) 2013-02-18

name, date, signature

controler / -board

name, date, signature

*) if needed

EN ISO 2560-A:2005: E 38 4 B 42 H5
EN ISO 2560-B:2005: E 49 16-1 A U H5
AWS A5.1-04: E7016-1H4R
AWS A5.1M-04: E4916-1H4R

BÖHLER FOX EV 47

SMAW basic electrode, mild steel

Description

Basic electrode for high-quality welds. Good weldability in all positions except vertical-down. Metal recovery about 110 %. Very low hydrogen content (according AWS condition HD < 4 ml/100 g weld metal).
Weld metal extremely ductile, crack resistant and ageing resistant thus especially suited for rigid weldments with heavy seam cross sections.

Typical Composition of All-weld Metal

	C	Si	Mn
wt-%	**0.06**	**0.5**	**0.7**

Mechanical Properties of All-weld Metal

(*)		u		s	
Yield strength R_e N/mm² (MPa):		**460**	(≥ 400)	**400**	(≥ 360)
Tensile strength R_m N/mm² (MPa):		**530**	(490 - 600)	**500**	(450 - 580)
Elongation A ($L_0 = 5d_0$) %:		**27**	(≥ 22)	**29**	(≥ 22)
Impact work ISO-V KV J	+ 20 °C:	**190**	(≥ 110)	**200**	(≥ 110)
	- 20 °C:	**110**		**150**	
	- 40 °C:	**90**	(≥ 47)	**100**	

(*) *u untreated, as-welded*
s stress relieved 600 °C/2 h/furnace down to 300 °C/air

Operating Data

re-drying if necessary:
300 - 350 °C, min. 2 h
Electrode identification:
FOX EV 47 7016-1 E 38 4 B

ø mm	L mm	amps A
2.5	250/350	80 - 110
3.2	350/450	100 - 140
4.0	450	130 - 180
5.0	450	180 - 230

=+

Base Materials

steels up to a yield strength of 380 N/mm² (52 ksi)

S235JR-E295, S235J2G3 - S355J2G3, C22, P235T1-P275T1, P235T2, P275T2, L210 - L320, L290MB - L320MB, P235G1TH, P255G1TH, P235GH, P265GH, P295GH, S235JRS1 - S235J4S, S355G1S - S355G3S, S255N - S355N, P255NH-P355NH, S255NL - S355NL, GE200-GE240

ASTM A 27 a. A36 Gr. all; A214; A 242 Gr. 1-5; A266 Gr. 1, 2, 4; A283 Gr. A, B, C, D; A285 Gr. A, B, C; A299 Gr. A, B; A328; A366; A515 Gr. 60, 65, 70; A516 Gr. 55; A570 Gr. 30, 33, 36, 40, 45; A 572 Gr. 42, 50; A606 Gr. all; A607 Gr. 45; A656 Gr. 50, 60; A668 Gr. A, B; A907 Gr. 30, 33, 36, 40; A841; A851 Gr. 1, 2; A935 Gr. 45; A936 Gr. 50; API 5 L Gr. B, X42 - X52

Approvals and Certificates

TÜV-D (1098.), DB (10.014.09), ÖBB, TÜV-A (72), ABS (3H5), BV (3HHH), DNV (3H10), GL (3H5), LR (3m H5), RMR (2), RINA (3YH5, 3H5), LTSS, VUZ, SEPROZ, CE