

R_240219/2

Work report

Rotor blade set LM 37.3P

Bl. Nr. 332 DK, 289 DK, 326 DK

on behalf of:

Angel Costa

Santiago de Compstela

Espania



Performance:

Renertech Rotorblattservice GmbH & Co. KG

Graf Zeppelin- Straße 68
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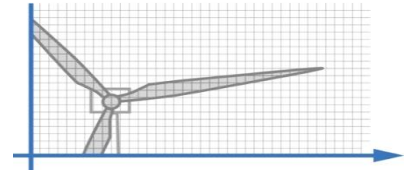
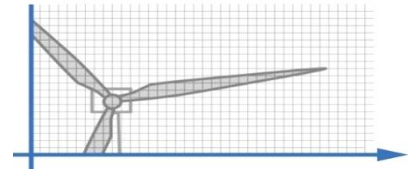


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Renertech Rotorblattservice GmbH & Co. KG

Work report

Client	Angel Costa		
	Santiago de Compostela España		
Contact	Angel Costa		
Street	Santiago de Compostela		
Postcode City	España		
Telephone No.	+ 34 626 86 86 30		
Location	Storage location: Premises: Renertech Rotor Blade Serv		
GPS Data			
Antenna system			
Appendix no.			
Management			
Enclosure			
Type			
Hub hight			
D Rotor			
Tower			
Blädes			
Manufacturer	LM		
Type	LM 37.3P		
Sheet Numbers	289	332	326
Start of work	23.01.2024		
End of works	09.02.2024		
Fitter(s) on site	Employees of Renertech		
1)			
2)			
3)			
4)			
Creator	Bolte	from the:	19.02.2024

General

1.1 Task:

The company Renertech Rotorblattservice GmbH & Co. KG was commissioned to carry out a diagnosis and repair on the aforementioned rotor blades. The work includes the preparation of this report with photographic documentation.

1.2 Basics:

In the case of commissioned rotor blade repairs, these are carried out in accordance with guidelines and the approval of the DNV Energy System DNV approval number CR-SA-DNV-SE-0436-04224-2 as well as internal work instructions of the company Renertech

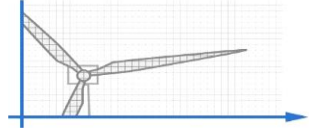
Weather conditions at the time of repair:

cloudy, tempbewölkt, Temp. +8°C - +10°C

Sheet No.

289

Work report



Fitter Employees of Renertech		Date: 23.01.2024	Management Angel Costa
Leaf Number LM 37.3P	Shett Number 289		

Pos.		Pressure side		Suction side		Pos.
1	R2,5 VK chipper Ø 1cm Rep: sanded & varnished Image: 1		0,0			
			1,0			
			2,0			
			3,0			
			4,0			
			5,0			
			6,0			
			7,0			
			8,0			
			9,0			
			10,0			
			11,0			
			12,0			
			13,0			
			14,0			
			15,0			
			16,0			
			17,0			
			18,0			
			19,0			
			2			
21,0						
22,0						
23,0						
24,0						
25,0						
26,0						
27,0						
28,0						
29,0						
30,0						
3	R21-R24,5 VK 29QR L= 2-6cm Rep: sanded, filled, sanded & varnished Image: 14-30		31,0			
			32,0			
			33,0			
			34,0			
			35,0			
			36,0			
			37,0			
			38,0			
			39,0			
			40,0			
			41,0			
4	R28-R37 VK Erosion, chipping & damaged E-foil Rep: sanded, troweled, sanded & new paintable E-foil applied Image: 31-50		42,0			
			43,0			
			44,0			
			45,0			
			46,0			
			47,0			
			48,0			
			49,0			
			50,0			
			51,0			
			52,0			

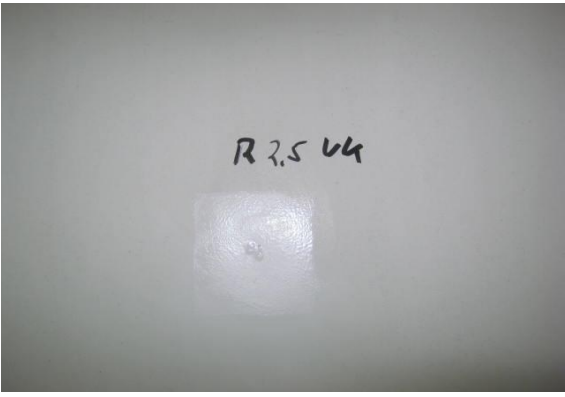


Bild 1

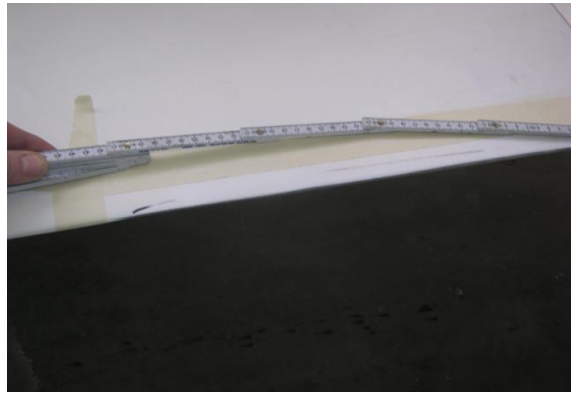


Bild 2

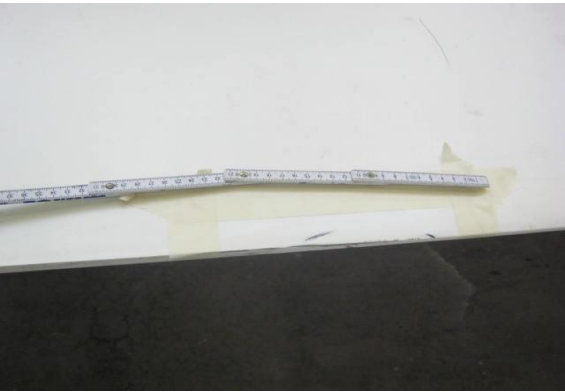


Bild 3



Bild 4



Bild 5

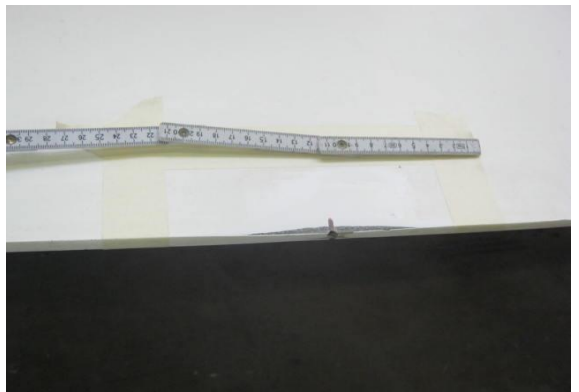


Bild 6



Bild 7



Bild 8



Bild 9



Bild 10



Bild 11



Bild 12



Bild 13



Bild 14



Bild 15



Bild 16



Bild 17



Bild 18



Bild 19



Bild 20

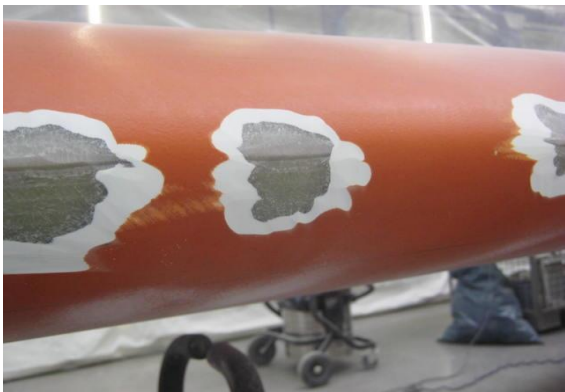


Bild 21



Bild 22



Bild 23



Bild 24



Bild 25



Bild 26



Bild 27



Bild 28



Bild 29



Bild 30



Bild 31



Bild 32



Bild 33



Bild 34



Bild 35



Bild 36



Bild 37



Bild 38



Bild 39



Bild 40



Bild 41



Bild 42



Bild 43

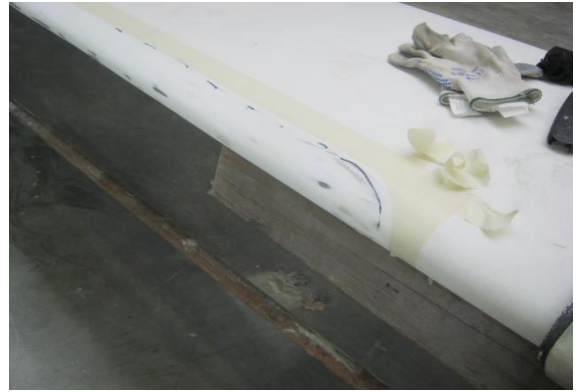


Bild 44



Bild 45



Bild 46



Bild 47



Bild 48



Bild 49



Bild 50



Bild 51



Bild 52

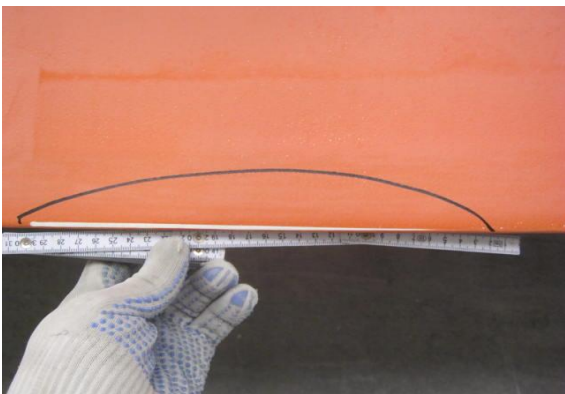


Bild 53



Bild 54



Bild 55



Bild 56



Bild 57



Bild 58



Bild 59



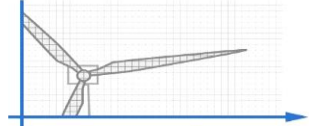
Bild 60



Sheet No.

332

Work report



Fitter Employees of Renertech		Date: 23.01.2024	Management Angel Costa
Leaf Name LM 37.3P	Sheet Number 332		

Pos.	Pressure side		Suction side	Pos.
		0,0		
		1,0		
		2,0		
		3,0		
		4,0		
		5,0		
		6,0		
		7,0		
		8,0		
1	R11 VK LR L= 4,5cm Rep: sanded & varnished Image: 1-3	9,0		
		10,0		
		11,0		
		12,0		
		13,0		
		14,0		
		15,0		
		16,0		
		17,0		
		18,0		
		19,0		
2	R25 DS QR L= 5cm Rep: sanded, 3-ply laminated filled, sanded and varnished Image: 4-10	20,0		
		21,0		
		22,0		5
		23,0		
		24,0		
3	R26-R27 VK longitudinal crack L= 40cm and chipping 10x5cm Rep: sanded, 5-ply laminated filled, sanded and varnished Image: 11-23	25,0		
		26,0		
		27,0		
		28,0		
		29,0		
		30,0		
		31,0		
		32,0		
4	R25-R37 VK Erosion, chipping & damaged E-foil Rep: sanded, troweled, sanded & new paintable E-foil applied Image: 24-40	33,0		
		34,0		6
		35,0		
		36,0		
		37,0		
		38,0		
		39,0		

Remarks:

Water drainage hole is free

Lightning protection measurement: DS 0,5Ω SS 0,8Ω

Sheet inside report:SS/HK/VK entry shot on approx. 3/4 of the circumference loose and broken. Areas cleaned & shot reinforced with angle. Image: 56-62

Signal markings on the blades repainted in RAL 3020. Image: 63-64

Leading edge:(VK) ; Trailing Edge:(HK) ; Radius:((R) R0 = blade flange, given in meters from flange) ; Length:((L) in cm) ; Transverse Crack:(QR)
Longitudinal Crack:(LR) ; Pressure side:((DS) wind-blown side of the blade) , suction side: ((SS) leaf side to tower) ; Diameter:(Ø)

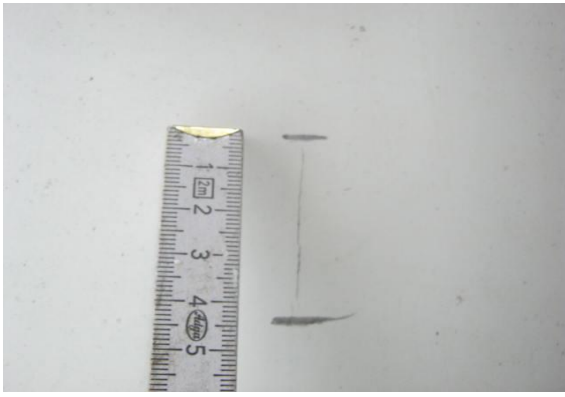


Bild 1



Bild 2



Bild 3



Bild 4

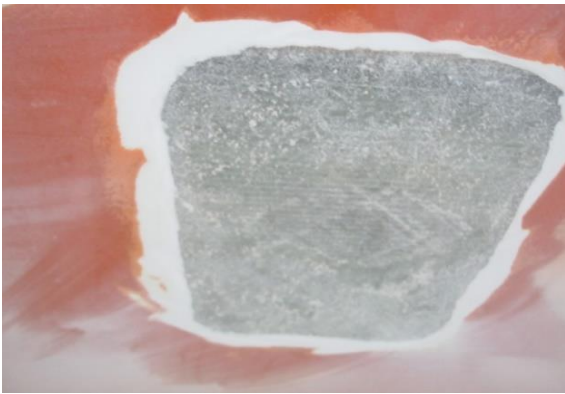


Bild 5



Bild 6

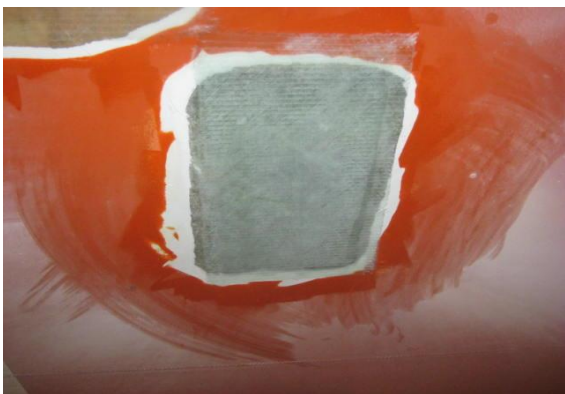


Bild 7

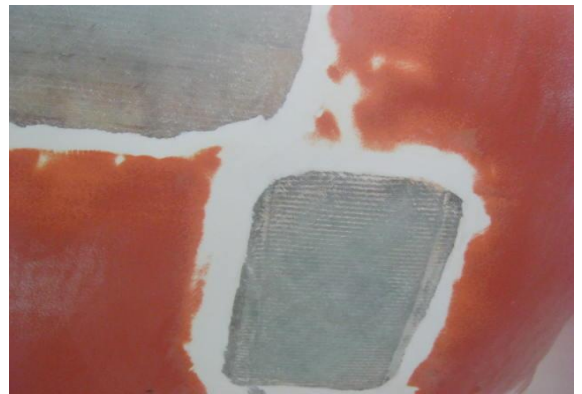


Bild 8

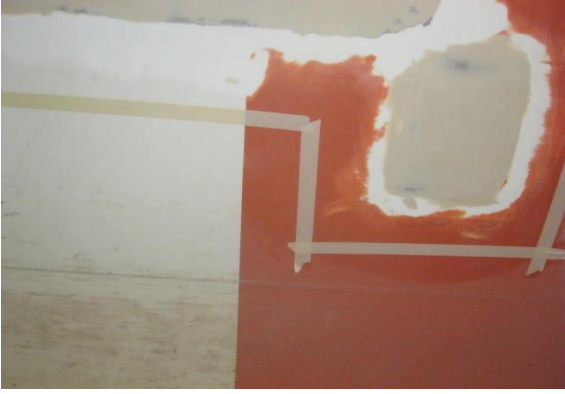


Bild 9



Bild 10



Bild 11



Bild 12

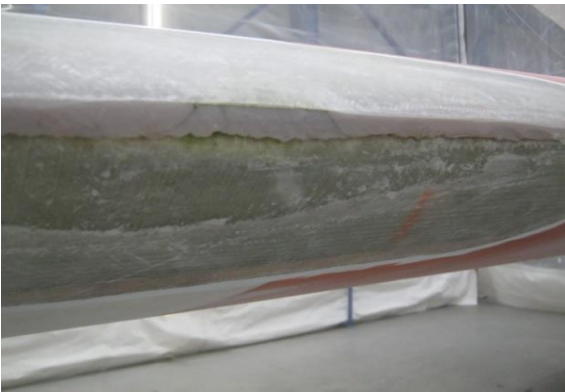


Bild 13

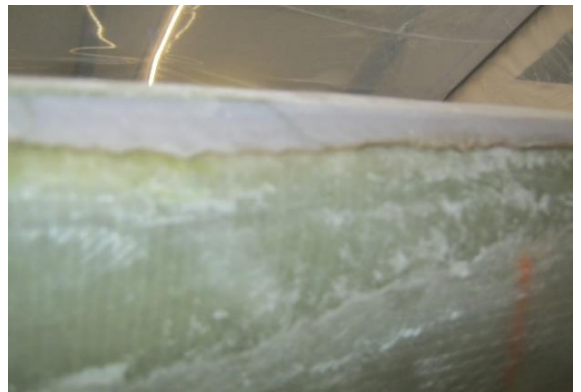


Bild 14

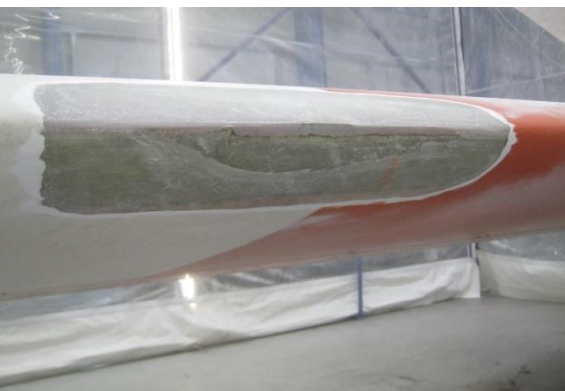


Bild 15

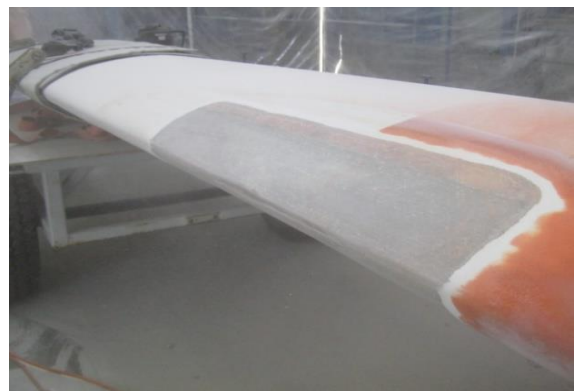


Bild 16



Bild 17

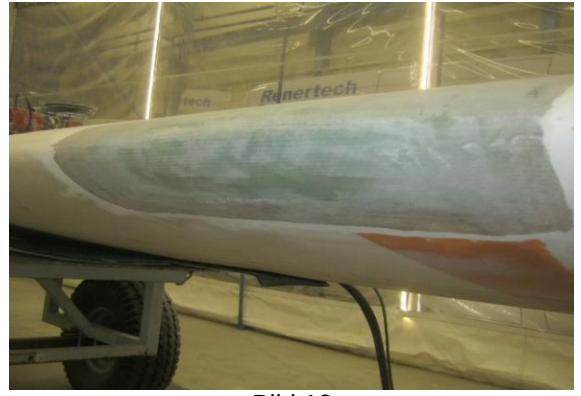


Bild 18

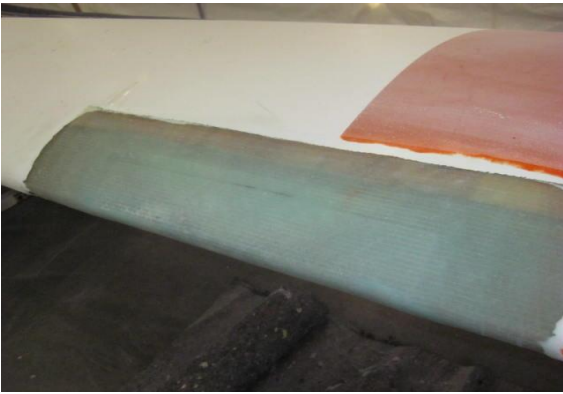


Bild 19



Bild 20

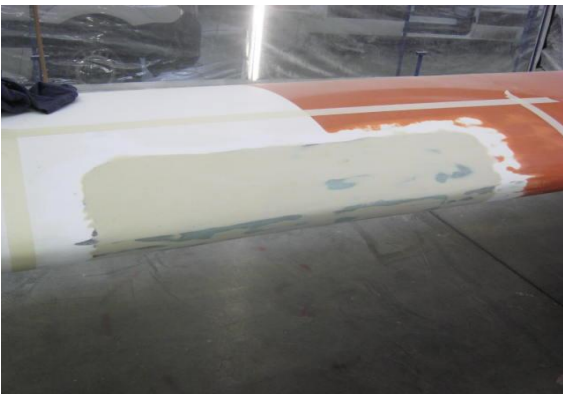


Bild 21

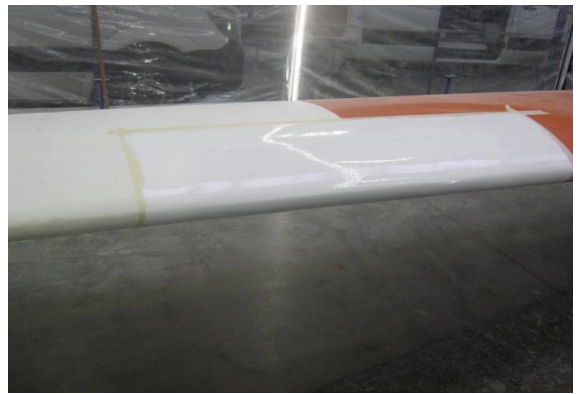


Bild 22



Bild 23



Bild 24



Bild 25



Bild 26



Bild 27



Bild 28



Bild 29



Bild 30



Bild 31



Bild 32



Bild 33



Bild 34



Bild 35

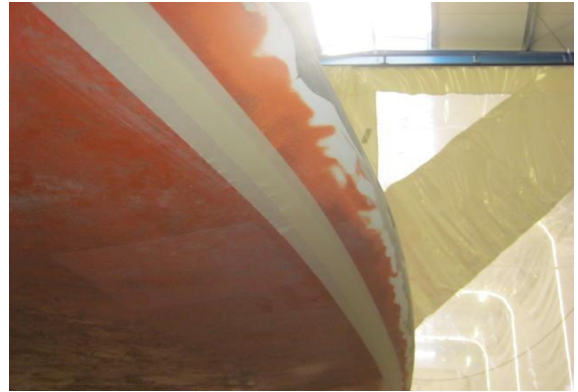


Bild 36

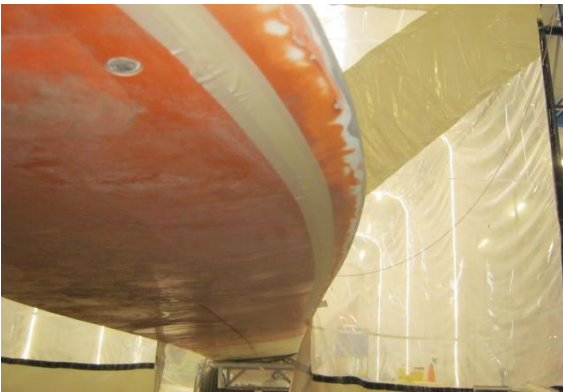


Bild 37



Bild 38



Bild 39



Bild 40



Bild 41



Bild 42



Bild 43

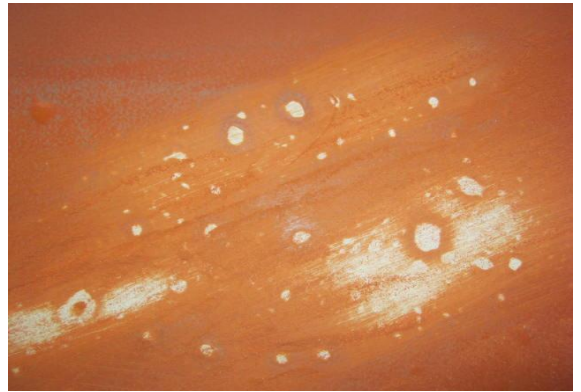


Bild 44



Bild 45



Bild 46

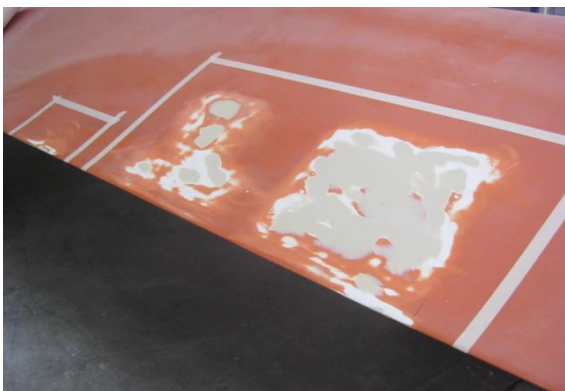


Bild 47



Bild 48



Bild 49



Bild 50



Bild 51



Bild 52



Bild 53



Bild 54



Bild 55



Bild 56



Bild 57



Bild 58



Bild 59

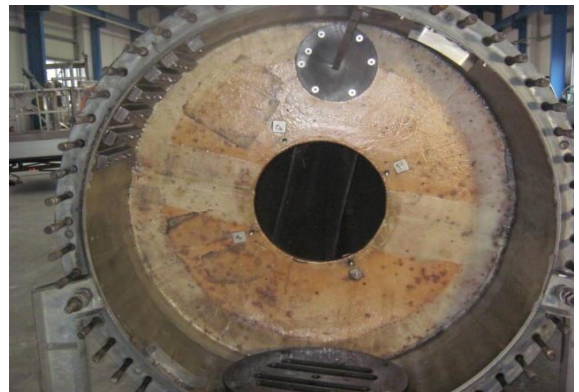


Bild 60



Bild 61

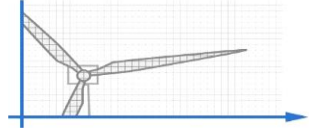


Bild 62



Sheet No.

326



Work report

Fitter Employees of Renertech		Date: 23.01.2024	Management: Angel Costa
Leaf Name: LM 37.3P	Sheet Number 326		

Pos.	Pressure side	Suction side	Pos.
		0,0	
		1,0	
		2,0	
		3,0	
		4,0	
		5,0	
		6,0	
1	R8-R9 VK 2QR L= 8-9cm Rep: sanded, filled, sanded & varnished Image: 1-6	7,0	
		8,0	
		9,0	
		10,0	
		11,0	
		12,0	
		13,0	
2	R15-R16 HK Chipped Rep: sanded & varnished Image: 7-8	14,0	
		15,0	
		16,0	
3	R17-R23 VK 2QR L= 8-9cm Rep: sanded, 3-ply laminated, filled, sanded and varnished Image: 9-19	17,0	
		18,0	
		19,0	
		20,0	
		21,0	
		22,0	
		23,0	
4	R25-R26 HK on L= 75cm open Rep: sanded, 5-ply laminated, filled, sanded and varnished Image: 20-26	24,0	
		25,0	
		26,0	
5	R27 VK 1LR L= 4cm Rep: sanded, filled, sanded & varnished Image: 27-28	27,0	
		28,0	
		29,0	
		30,0	
		31,0	
		32,0	
		33,0	
		34,0	
6	R33-R37 VK Paint Chipping & Erosion & Damaged E-Foil Rep: sanded, troweled, sanded & new paintable E-foil applied Image: 29-33	35,0	
		36,0	
		37,0	
		38,0	
		39,0	

Remarks:

Water drainage hole is free

Lightning protection measurement: DS 0,9Ω SS 0,9Ω

Sheet inside report: SS/HK/VK entry shot loose & broken on half of the circumference. Areas cleaned & shot reinforced with angle. Image: 34-45

Signal markings on the blades repainted in RAL 3020. Image: 46-48

Leading edge:(VK) ; Trailing Edge:(HK) ; Radius:((R) R0 = blade flange, given in meters from flange) ; Length:((L) in cm) ; Transverse Crack:(QR)
Longitudinal Crack:(LR) ; Pressure side:((DS) wind-blown side of the blade) , suction side: ((SS) leaf side to tower) ; Diameter:(Ø)



Bild 1

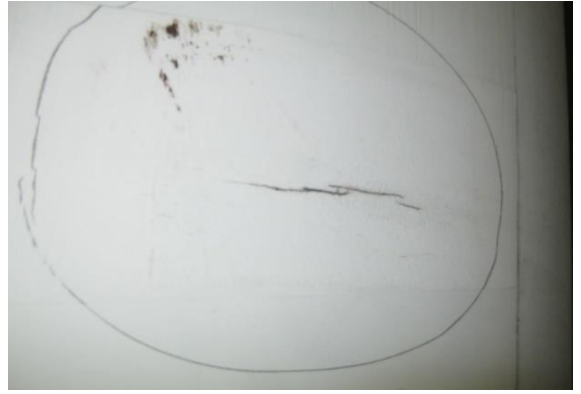


Bild 2

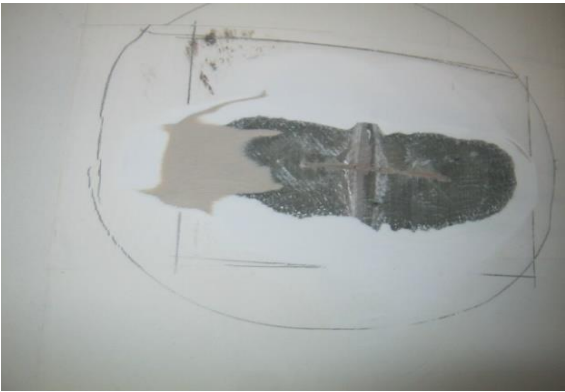


Bild 3



Bild 4



Bild 5



Bild 6



Bild 7

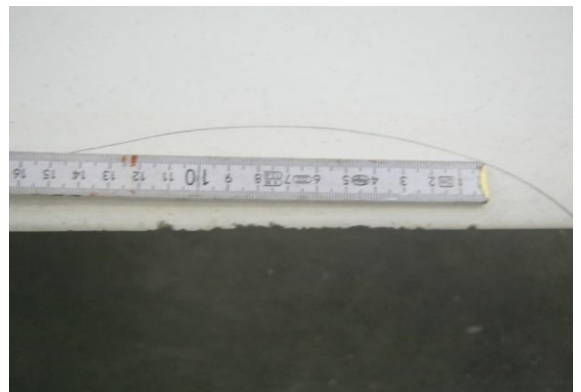


Bild 8

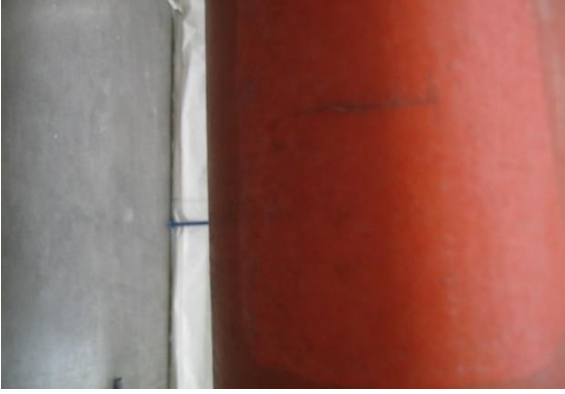


Bild 9



Bild 10



Bild 11



Bild 12



Bild 13

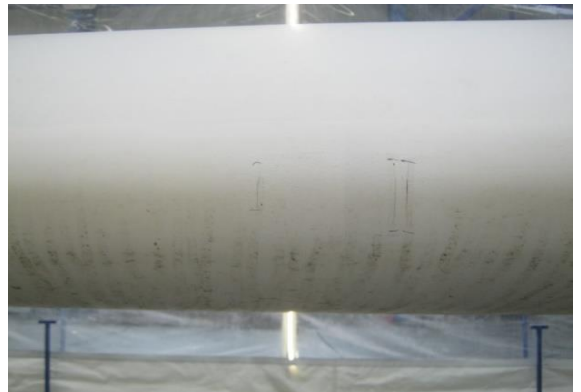


Bild 14



Bild 15

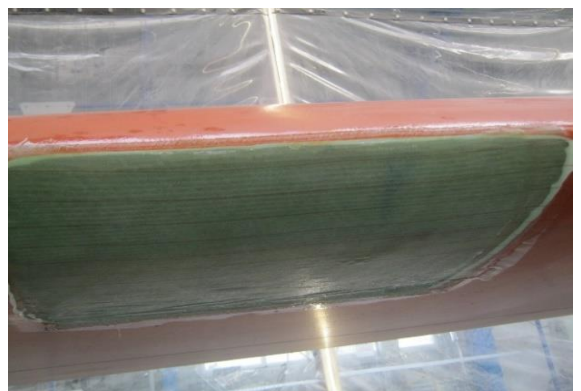


Bild 16



Bild 17

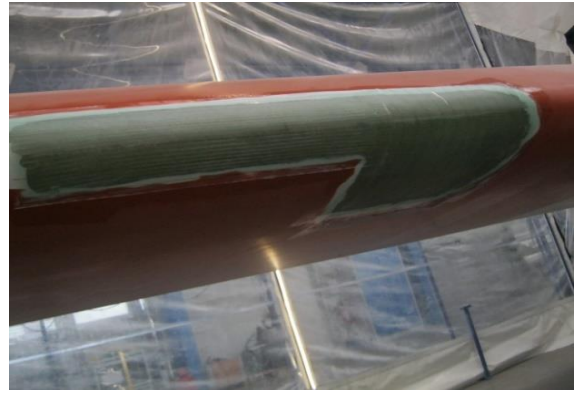


Bild 18



Bild 19

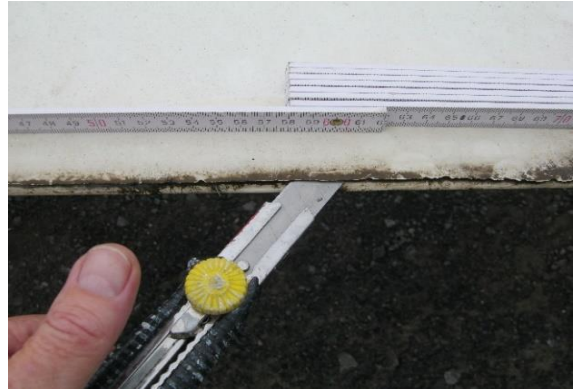


Bild 20



Bild 21



Bild 22



Bild 23



Bild 24



Bild 25

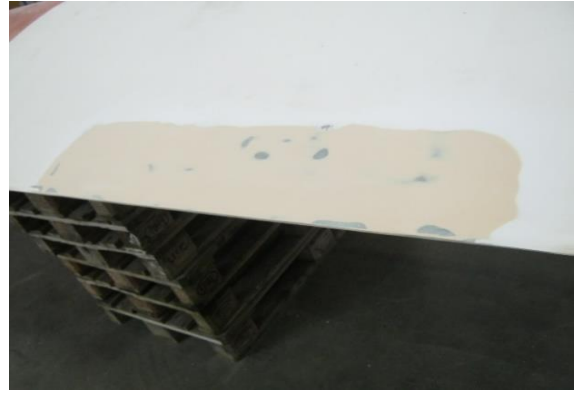


Bild 26



Bild 27



Bild 28



Bild 29



Bild 30



Bild 31



Bild 32



Bild 33



Bild 34



Bild 35



Bild 36



Bild 37

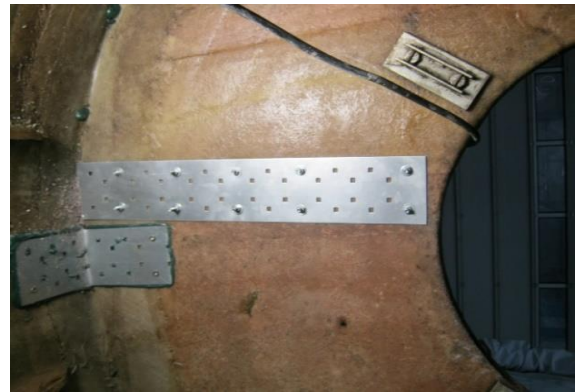


Bild 38



Bild 39



Bild 40



Bild 41



Bild 42



Bild 43



Bild 44



Bild 45



Bild 46



Bild 47



Bild 48

Summary

Rotor blade set: Rotor blade set LM 37.3P

Work numbers: Sheet no. 332 DK, 289 DK, 326 DK

In the period from 23.01.2024 to 09.02.2024, repairs were carried out on the LM 37.3P rotor blade set stored on the premises of Renertech Rotorblattservice.

Rotor blade 289 DK:

In the area radius R2.5 at the leading edge there was a chipping Ø 1cm and at radius R9-R11 at the trailing edge there was chipping and a transverse crack, length up to 3cm. At radius R22-R25 there were several paint chips Ø 0.5-3cm on the trailing edge to the suction side. The areas were sanded, filled, sanded and painted. On the leading edge at radius R21-R24.5 there were 29 transverse cracks, length 2-6cm, at radius R28-R37 paint chips and at radius R34-R37 erosion. The area has been sanded, filled, sanded & new paintable E-foil applied

Rotor blade 332 DK:

In the area radius R26-R27 at the leading edge there was a longitudinal crack, length 40cm and chipping 10x5cm. The area was sanded, laminated in 5 layers, filled, sanded and painted. At radius R25 there was a transverse crack on the printing side, length 5cm. The area was sanded, laminated in 3 layers, filled, sanded and painted. At radius R33-R37 there were several chips, length 3.5-50cm, at radius R11 at the leading edge a longitudinal crack, length 4.5cm and at radius R22-R24 bubbles in the paint. The areas were sanded, filled, sanded and painted. In the area of radius R25-R37 there was erosion, chipping and damaged E-foil on the leading edge. The area was sanded, filled, sanded and new spreadable E-foil applied.

Rotor blade 326 DK:

At the leading edge at radius R8-R9 there were two transverse cracks, length 8-9cm. In the area of radius R15-R16 at the trailing edge there were several chips. At radius R27 at the leading edge there was a longitudinal crack, length 4cm. The areas were sanded, filled and painted. In the area radius R17-R23 there were two transverse cracks, length 8-9cm. the area was sanded, laminated in 3 layers, filled, sanded and painted. In the R25-R26 radius, the trailing edge is open over a length of 75cm. The area was sanded, laminated in 5 layers, filled, sanded and varnished

Water drainage borehole:

The water drainage holes are free.

Lightning protection measurement:

During the lightning protection measurement, the measured resistance values at the receptors were sufficiently low.

Inside of the leaf:

On sheet 289 on the suction side at the front and rear edge, the entrance shot was loose and broken on about 3/4 of the circumference. On sheet 332 the entrance shot was broken in two places, length 35-45cm. On sheet 326 on the suction side, the entrance shot is loose and broken on half of the circumference. The areas were cleaned and the shots were reinforced with angles.

The operation of the turbine is possible without restriction with regard to the rotor blades and the work carried out by us, taking into account the operating parameters specified by the manufacturer.

Bad Wünnenberg-Haaren, den 19.02.2024


Johannes Kolsch