

BASIC CONDITIONS of "COMPACT Seal" BONDING REPAIR (Afloat)
(AFT & FWD Seal)

1. Scope of Service

- 1) Overhauling seals and inspection.
- 2) Bonding sealing ring(s) by using KEMEL's special compound 'A + B' and the device.
- 3) Assembling seals and witness oil pressure test.

2. Ship/Shipyards Assist – to be arranged by the order party**AA) AFT Seal**

- 1) Work permission by port authorities and related organizations.
- 2) Oil pollution measures such as oil tray/oil fences. (Possible to have oil drips while working.)
- 3) Trimming ship, the assembly to be completely out of water approx. 1M above water.
- 4) Set-up proper stage around propeller/stern tube area. (See sketch attached.)
- 5) Removal rope guard.
- 6) Installation lifting gears (chain block - 1 ton) above the seal.
- 7) Furnish power supply (220V/1KW AC, single phase) for the bonding device at the propeller/stern tube area.
- 8) Supply working lights, general tools, cleaning oil, rags (5 kg), lighting etc. at the work site.
- 9) Full time labor assists. (2 – 3 persons)

BB) FWD Seal

- 1) Removal gratings & large pipes around the work site if the room not sufficient.
- 2) Set-up proper stage below the seal if found necessary.
- 3) Furnish power supply (220V/1KW AC) for the bonding device at the working site.
- 4) Supply of general tools, cleaning oil, rags (5 kg), lighting etc. at the work site.
- 5) Full time labor assists. (1 – 2 persons)

3. Draining stern tube oil

- 1) Drain out stern tube oil completely by the ship before overhauling AFT or FWD seals
- 2) Confirm no continuous seawater drained from the stern tube before overhauling FWD seal.

4. Weather/Sea conditions may cause a delay of the work.**5. Working hours, 15 - 20 hours/AFT, 8 - 12 hours/FWD for our scope of services, without interruption.****6. Safety Work – to be organized by the order party**

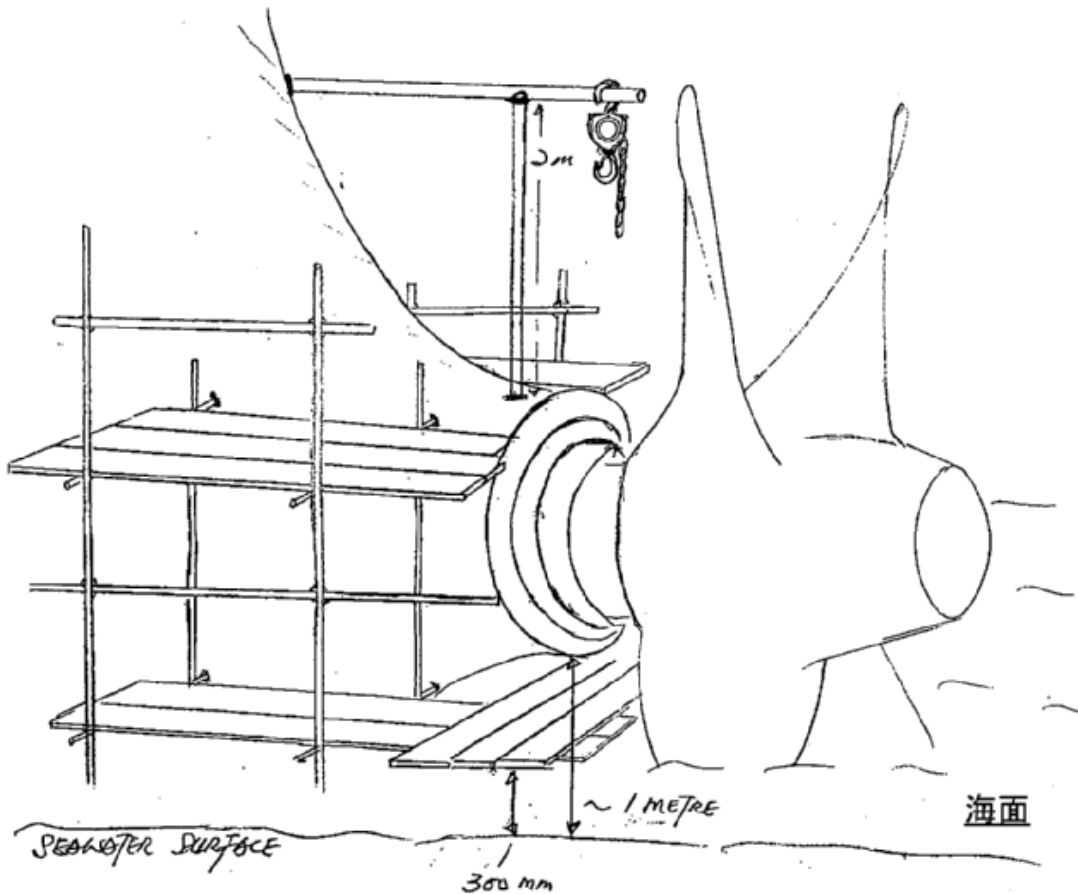
- 1) Prohibit turning tail shaft while bonding work in progress.
- 2) Establish communication methods for notifying turning shaft in case necessary.
- 3) Establish electrical grounding for bonding device and for other electrical equipment.
- 4) Deploy full time safety watches till the work completed.
- 5) Provide sufficient numbers of safety/working lights.
- 6) Maintain communication methods for emergency situation.
- 7) Instruct ship's safety rules/regulations for service engineer and labors.
- 8) Provide safety handrails on the stage for AFT seal work.
- 9) Prohibit propeller repair, sand blasting and spray painting around stern area for AFT seal work.
- 10) Supply sufficient numbers of life jackets and life buoys for service engineers and labors, for AFT seal work.
- 11) Maintain free access all the time to shore or to the ship for emergency evacuation from the working area, for AFT seal work.

7. Others

- 1) Arrange transports from shore to the ship and back to shore if required.
- 2) Arrange ship's cabin for service engineer, by request, in case of the work overnight/over 8 hours and no facility available near-by.
- 3) Provide meals/water for service engineer/labors, by request, in case of no facility available near-by.
- 4) The service engineer is authorized to interrupt AFT seal work for safety or quality reasons at his judgment during the work, due to sudden change of sea conditions till it recovers. (Guideline for interruption; Wind force 4 & above by Beaufort scale attached.)
- 5) Service engineer makes proper protections of stem tube from splashing water entering into the system when leaving the work site.

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STAGING SKETCH - PLEASE ERECT STAGING AS PER SKETCH BELOW:



Beaufort wind force scale

Specifications and equivalent speeds

Beaufort wind scale	Mean Wind Speed		Limits of wind speed		Wind descriptive terms	Probable wave height in metres*	Probable maximum wave height in metres*	Seastate	Sea descriptive terms
	Knots	ms ⁻¹	Knots	ms ⁻¹					
0	0	0	<1	<1	Calm	↓ -	-	0	Calm (glassy)
1	2	1	1-3	1-2	Light air	0.1	0.1	1	Calm (rippled)
2	5	3	4-6	2-3	Light breeze	0.2	0.3	2	Smooth (wavelets)
3	9	5	7-10	4-5	Gentle breeze	0.5	1.0	3	Slight
➔ 4	13	7	11-16	6-8	Moderate breeze	1.0	1.5	3-4	Slight-Moderate
5	19	10	17-21	9-11	Fresh breeze	2.0	2.5	4	Moderate
6	24	12	22-27	11-14	Strong breeze	3.0	4.0	5	Rough
7	30	15	28-33	14-17	Near gale	4.0	5.5	5-6	Rough-Very rough
8	37	19	34-40	17-21	Gale	5.5	7.5	6-7	Very rough-High
9	44	23	41-47	21-24	Severe gale	7.0	10.0	7	High
10	52	27	48-55	25-28	Storm	9.0	12.5	8	Very High
11	60	31	56-63	29-32	Violent storm	11.5	16.0	8	Very High
12	-	-	64+	33+	Hurricane	14+	-	9	Phenomenal