

Hatch cover에 Flexible Pad 적용

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Application of Flexible Pad for Hatch Cover

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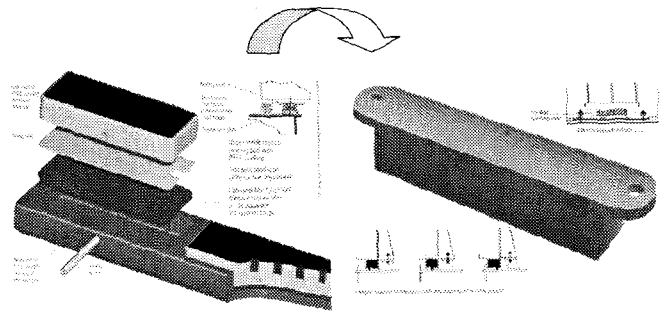
Abstract : Post panamax급 container vessel에 hatch cover용 bearing pad type을 flexible pad로 확대 적용하여 경쟁력 확보

Cover



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Comparison Commercial bearing pad and flexible pad

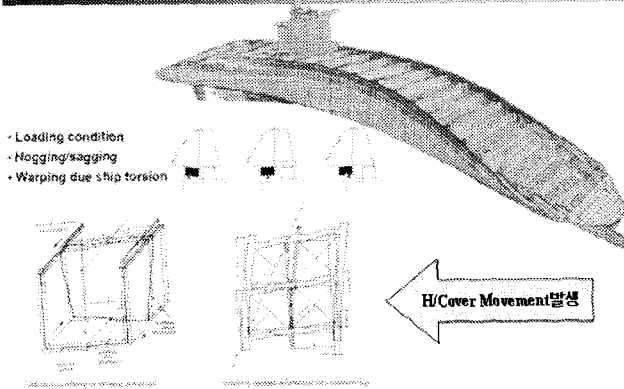


- 1) 작업성 : Bearing holder를 H/Cover 혹은 H/Coaming에 전방 용접 수행
2) 교체주기 : 약 3~4년

- 1) 작업성 : Flexi-pad를 H/Cover 혹은 H/Coaming에 Bolting수행
2) 교체주기 : 없음

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Hatch Cover movement due to H/Coaming deflection



- Loading condition
- Hogging/sagging
- Warping due ship torsion

Hatch coaming deflection due to warping and torsion

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국내 주요 Yard별 Bearing Pad 적용 사례

국내 대부분의 주요 Yard에서 Flexible pad를 Panamax급 이하 Container선에 적용함

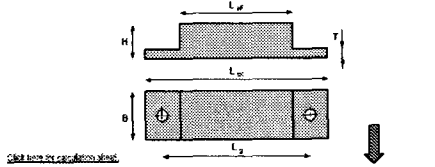
Ship Yard	2009년 실적		2008년 실적	
	Flexible Pad (No. of Vessels)	Bronze Pad (No. of Vessels)	Total No. of Vessel	TEU당 Vessel 구분 (No. of Vessel)
DSME	30% (16)	70% (38)	54	3300-4000 TEU (16) 4000-8400 TEU (38)
Samsung	6% (7)	94% (109)	116	1600-2500 TEU (7) 3000-9000 TEU (109)
HFI	9% (14)	91% (145)	159	2500-4000 TEU (14) 3000-9000 TEU (145)
Hyundai Mipo	87% (34)	3% (6)	39	2824 TEU (34) 4300 TEU (6)
Hyundai Samho	-	100% (31)	31	5000-9000 TEU (31)
Hanjin	4% (2)	96% (47) (Plastic and Bronze)	49	1950 TEU (2) 1600-9000 TEU (47)

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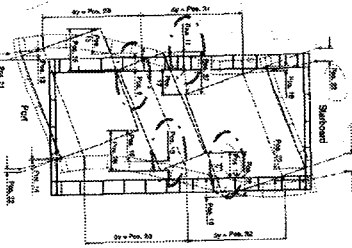
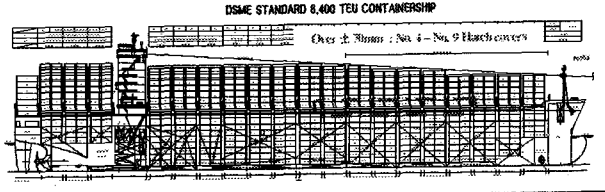


Click here for calculations sheet

Pad type	H	B	L ₁	L ₂	L ₃	T	Firing screw size	Max. load (kg)	Min. load (kg)	Max. vertical compression of Max. Force (mm)	Min. horizontal movement (mm)	Max. horizontal force (kN)	
LX5 200-40	40	55	230	130	17	750	M16	1.3	70	125	0.9	±12	5.5
LS 200-30	30	40	230	130	17	200	M16	1.0	110	110	0.9	±10	3.0
LS 300-30	30	70	230	130	17	200	M20	2.5	330	400	1.5	±13	18.0
LS 450-30	30	70	450	600	17	330	M20	2.0	330	350	1.3	±15	27.0
LS 200-70	70	70	230	130	17	200	M20	2.5	330	350	1.5	±20	30.0
LS 300-70	70	70	330	450	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 450-70	70	70	450	600	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 200-70	70	70	230	130	17	200	M20	2.5	330	350	1.5	±20	30.0
LS 300-70	70	70	330	450	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 450-70	70	70	450	600	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 200-70	70	70	230	130	17	200	M20	2.5	330	350	1.5	±20	30.0
LS 300-70	70	70	330	450	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 450-70	70	70	450	600	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 200-70	70	70	230	130	17	200	M20	2.5	330	350	1.5	±20	30.0
LS 300-70	70	70	330	450	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 450-70	70	70	450	600	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 200-70	70	70	230	130	17	200	M20	2.5	330	350	1.5	±20	30.0
LS 300-70	70	70	330	450	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 450-70	70	70	450	600	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 200-70	70	70	230	130	17	200	M20	2.5	330	350	1.5	±20	30.0
LS 300-70	70	70	330	450	17	330	M20	2.5	330	350	1.5	±20	30.0
LS 450-70	70	70	450	600	17	330	M20	2.5	330	350	1.5	±20	30.0

*Horizontal force of Max. horizontal movement (same to all direction)
 For one vessel select pads of the same "main type" (LX5, LS50, LS70, LS110 or LX1 i.e. pads with same height).
 For the installation details see drawing P14-12009. The pads should always have same 10% to be used loading.
 Make insurance force to the table a 2-dimensional unit. (Dimension in mm)

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1. Relative movement 관점
 - * 70mm이상 구역 : HC 4-9
 - * 70mm이하 구역
2. Pad 선정
 - * 70mm이상인 구역 : 선별적으로 70mm이상인 Position(Pos.9-12등)을 확인해서 Movement 100mm가 가능한 Pad를 적용한다.
 - 즉, Two(2) type의 Pad 적용 예정.

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Pad type	H	B	L ₁	L ₂	T	L ₃	Firing screw size	Max. horizontal movement	Remark
LXL 300-120	120	150	330	450	17	330	M24	±1.70	
LXL 450-120	120	150	450	600	17	530	M24	±1.70	
LXL 600-120	120	150	600	750	17	620	M24	±1.70	
XXL 230-170	170	230	230	340	17	310	M24	±1.100	
XXL 340-170	170	230	340	530	17	420	M24	±1.100	
XXL 450-170	170	230	450	610	17	530	M24	±1.100	

PANAMAX급
 현재 실적이 없고 개발만 완료함
 POST PANAMAX급

- ** XXL Type 적용 전 확인 사항
- 1) Pad의 Size의 증가로 인한 BMD, 폭 확인
 - 2) 특히 Post-panamax급은 대부분 L/Bridge가 설치 됨으로 L/Bridge와의 간섭 확인등

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