

HYUNCHANG

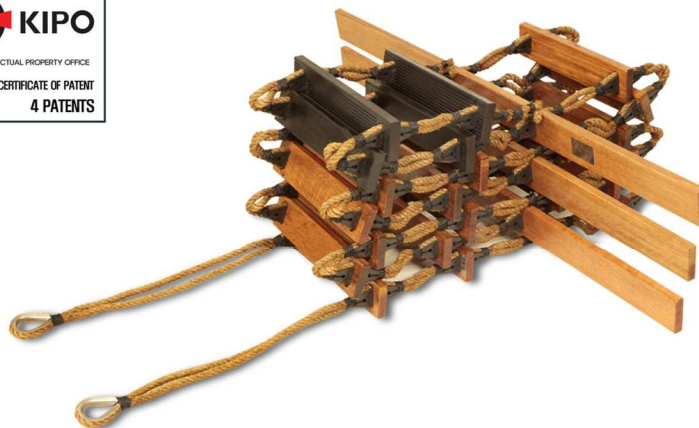
ROPE LADDER

since 1984

Embarkation
Ladder

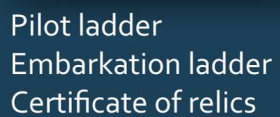


Pilot
Ladder



www.pilot-embarkation-ladder.com

Certificate





- 1984 03 Establishment of Hyunchang
- 1994 11 Registered as 1st vendor to Hyundai Heavy Industries & start of delivery
- 1995 10 Acquired Form Certificate [Pilot Ladder, Maritime and Port Administration]
- 1998 12 Started export through marine equipments
- 1999 03 Acquired ISO 9001:1994 8 Certification of Quality Management System
- 1994 04 Acquired CE-MARK (BV)
- 2002 04 Registered as 1st vendor to STX Offshore & Shipbuilding & start of delivery
- 2005 06 Acquired Certification of Quality Management System ISO 9001:2000/KS A 9001:2001[BVQI]
- 2006 01 Building a new factory
- 2006 07 Registered as 1st vendor to Hanjin Heavy Industries & start of delivery
- 2006 10 Nation-certified products [ROPE LADDER]
- 2008 05 Acquired Certification of Quality Management System ISO 9001:2000/KS Q 9001:2009[BVQI]
- 2008 07 Acquired Form Certificate [Pilot Ladder Maritime and Port Administration]
- 2010 01 Acquired CE-MARK [DNV], MED
- 2011 05 Acquired Certification of Quality Management System ISO 9001:2008/KS Q 9001:2009[BVQI]
- 2013 03 Displayed at National Maritime Museum
- 2013 05 Registered as relics by National Maritime Museum -expected to be appointed as National Heritage-
- 2015 01 0% Claim for 5 years
0 Claim due to defect of complete products since 2010
- 2015 01 0% delivery delay for 30 years
0 Claim due to delivery delay since 1984



PRODUCT

–Pilot Ladder

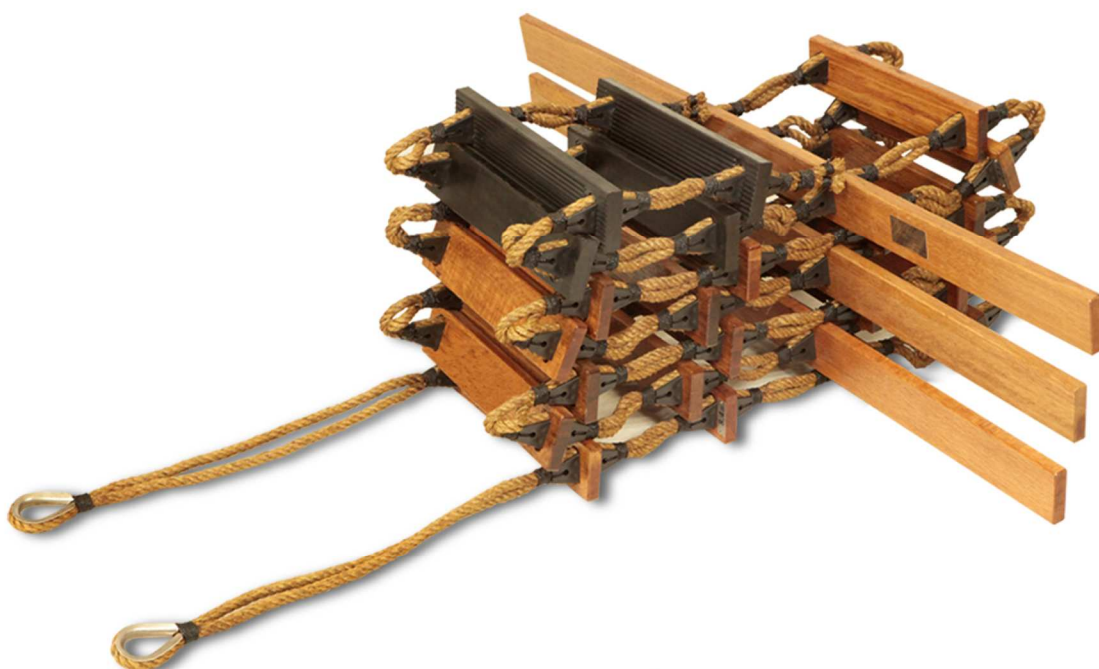
Product Description

The Pilot Ladder is the rope ladder used for embarkation and disembarkation for pilot and crew's getting in and out the vessel in general situation.

The steps of the ladder are made of hardwood except the lower four steps are made of rubber.

Product Specification

Step	: Hardwood (OAK)	(Three Years drying)
spread step	: Hardwood (OAK)	(Three Years drying)
Side Ropes	: 4 strand Manila Rope	
Seizing Ropes	: Tar Rope (Patent)	



ISO 799:2004, SOLAS

PRODUCT

–Embarkation Ladder

Product Description

The Embarkation Ladder is the rope ladder used for embarkation and disembarkation during the emergency case and for crew's getting in and out the vessel in general situation. The steps of the ladder are made of hardwood except the lower four steps are made of rubber.

Product Specification

Step : Hardwood (OAK) (Three Years drying)
Side Ropes : 4 strand Manila Rope
Seizing Ropes : Tar Rope (Patent)



ISO 5489:2009, SOLAS


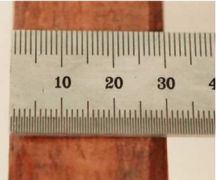
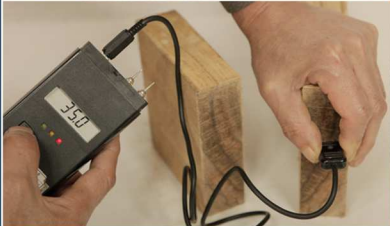



PRODUCT

Using only dried woods
[dried for more than 3 years]

WOOD

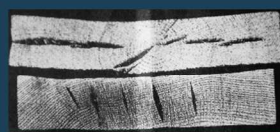
Undried must be directly linked to casualties

Comparing woods

Wood	Comparison	Dried Wood
 <p>Using undried woods, 7~10% contraction occurred after moisture inside woods evaporated during the production.</p>	Contraction rate	 <p>Dried woods do not contract</p>
 	Moisture content	 
Undried woods cause crack during the drying under unstable condition, and decrease flexural strength and shearing strength	Strength	Dried woods have 2~3 times more flexural strength and shearing strength than undried woods. Natural drying brings 130%~150% more strength than heat drying.

Problems when not using dried woods

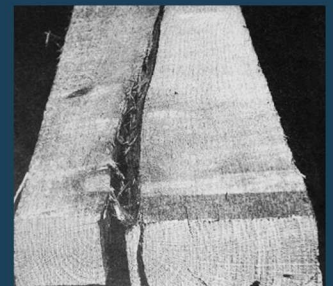
- **Damage to steps** Due to sudden drying, Steps crack and be destroyed.
- **Breakaway of step fixture** Wood contraction causes empty space between fixed step fixture and step causing step fixture breakaway.
- **Damage to ropes** When step contracts, step moves around causing damage to ropes



Inside cleft occurred at OAK material



Inside twist occurred at OAK material



What happens when these two occur together

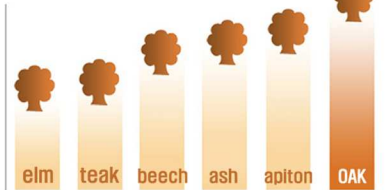
Using only dried woods (dried for more than 3 years)

WOOD

Undried must be directly linked to casualties

Flexural Strength

**Apiton must not be used
for Pilot ladder.
Stated in ISO:799**



Low Quality High Quality

The above 6 types of woods are mandatory by ISO, therefore other woods cannot be used. Apiton must not be used for making pilot ladder.
(Mandatory by ISO 799:2004)

For woods to make Rope Ladder, we use OAK tree after selection process
For Pilot Ladder woods,
5 kinds of Hardwood are designated
For Embarkation Ladder woods,
6 kinds of Hardwood are designated

HYUNCHANG

ISO 799, ISO 5489 TEST

5 Testing for approval

Before approval of a ladder design by a maritime safety administration as complying with this International Standard, a prototype ladder and its components shall be subjected to the tests and meet the criteria specified in Table 2. A fully assembled ladder shall be used in the tests. Any step or other part of the ladder which is permanently deformed as a result of testing shall not be used in a ladder which is placed in service.

Pilot Ladder is regulated in ISO 799 whereas Embarkation Ladder is regulated in ISO 5489. Regulated in the beginning of the approval test provision.

- Any step or other part of the ladder which is permanently deformed as a result of testing shall not be used in a ladder which is placed in service.

To comply with above rules, we dry woods for 3 years in the drying field to make our products

PRODUCT

Certificate of Measurement on wood moisture content

WOOD

Test report

[illegible]

2015-08-27일자로 의뢰하신 시료에 대한 시험결과는 아래와 같습니다.

(01) 附錄 (KS F 2199 : 2001) : %

01

시료 사진 :

FITI시형연구원 

문서 확인 번호 : HNSO-8PFO-2A00

● DOCUMENT SERVICE

- 이 성학사는 제시한 자료에 대한 서열번호부터 차례대로 대한 문헌을 포함하지 않으며, 자료명은 원문자와 제시한 원문명(2015)
- 이 성학사: PUSAN 시한 내에 찾아볼 수 있는, 모든 것 수습본으로 기록될 수 있으며, 정보 제공을 새로운 관행으로

Certificate of measurement on wood moisture following KS standard

Test report

의뢰자 : 현창공업사

주 소 : 경남 양산시 상북면 소토리 479-25

품명 : 목재

의뢰자제시시료명 : Step

2015-08-27일자로 의뢰하신 시료에 대한 시험결과는 아래와 같습니다.

시 험 항 목

시 험 결 과

(01) 함수율 : %

5.4

시료 사진 :



Test result 5.4%

5.4% of Moisture rate is perfectly dried condition that is same rate of high quality furniture.

Holds leading-edge technology in Korea for OAK drying using natural drying.
Natural drying leads to hardness over 2 times compared to undried wood.
Natural drying leads to hardness over 30% compared to mechanical drying

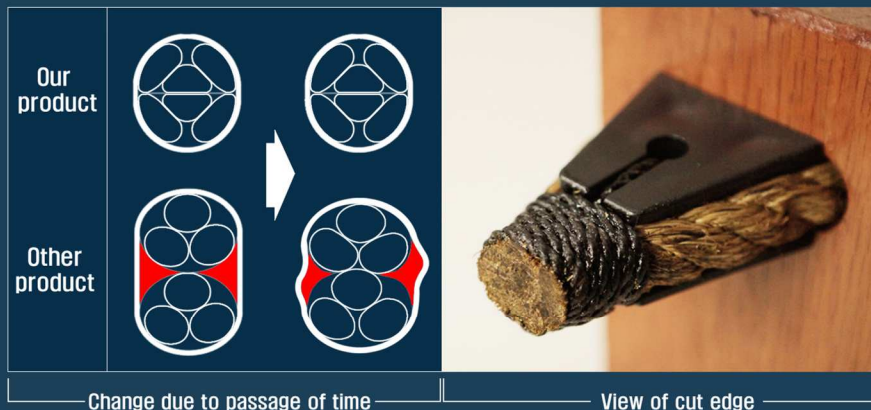
PRODUCT

Production by technology with 4 patents



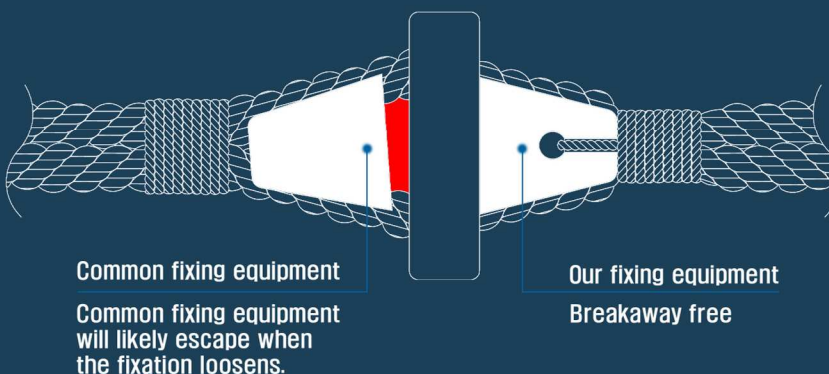
Technical skills

1. semi-permanent Binding [patent]

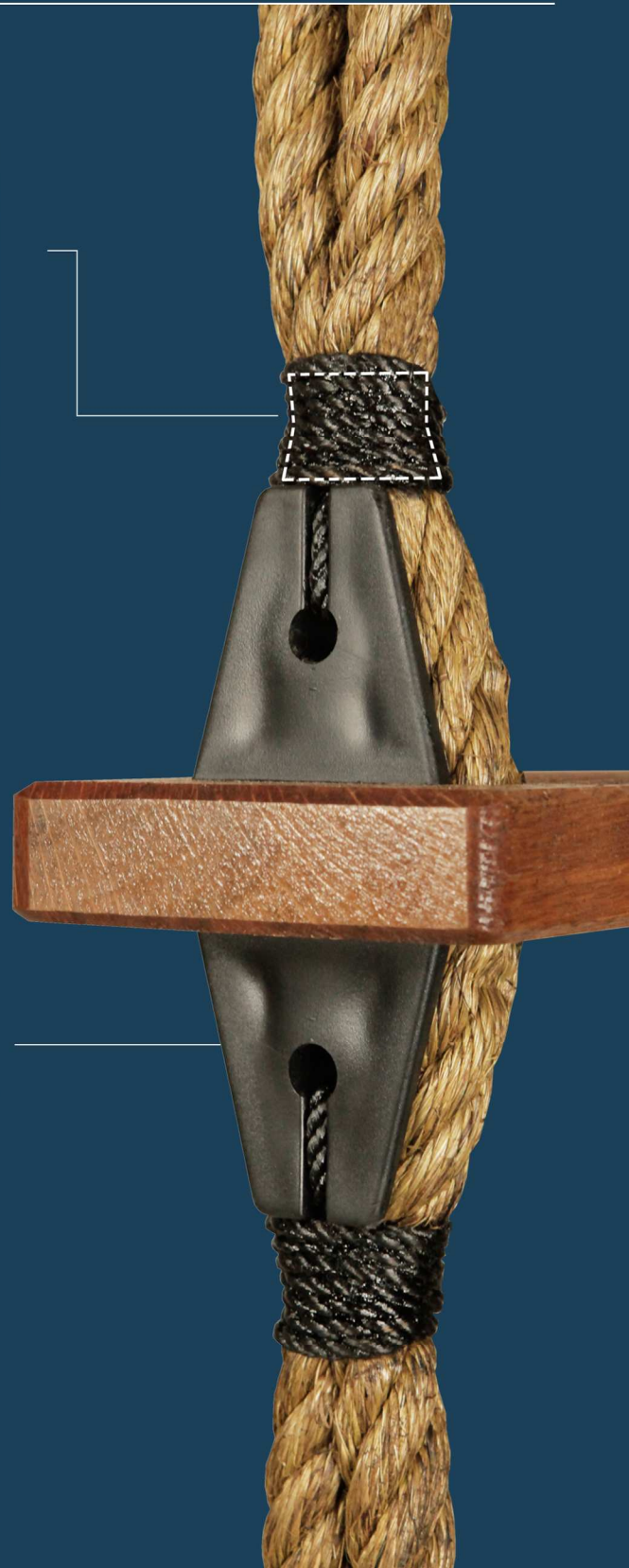


At common Rope Ladders, 2 thick ropes change their shapes as time passes making seizing ropes become loose. When the loosening occurs, it is directly linked to safety accidents. To prevent safety accidents, we invented a technique that allows production by calculating the shape change during the production process, and our Rope Ladders are produced based on this technology.

2. Equipment for preventing separation -Step Fixture- (patent)



Common fixation equipment do not have a separate fixation device when loosening occurs between Rope and Step, causing high chance of breakaway. The loosening of fixation device leads to imbalance of the foothold, resulting in the function loss of the Rope Ladder. Breakaway of fixation equipment causes severe friction force to 2 thick Ropes leading to rope snaps and safety accidents. Because of step fixture, this doesn't happen to our Rope Ladders.



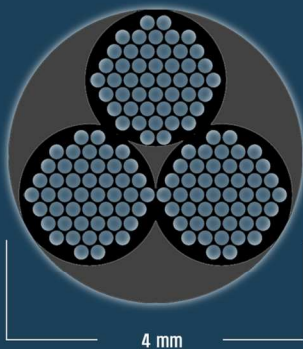
PRODUCT

Production by technology with 4 patents



Technical skills

3. TAR ROPE that is coated until inside to prevent corrosion [patent]

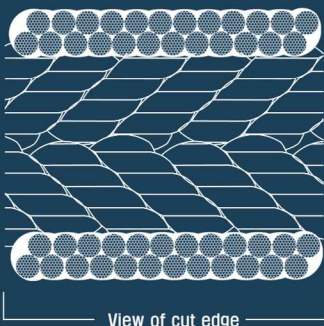


View of cut edge



Rope Ladders are fixed with seizing ropes and corrosion occurs to this seizing ropes as time passes by. Seizing ropes with corrosion will be cut off and be directly linked to casualties. To prevent this problem, our seizing ropes are coated resulting in semi-permanent life.

4. TAR ROPE with enhanced durability [patent]



View of cut edge



Ropes are bound together and do not come loose even when they are cut



Seizing ropes of Rope Ladders have 4mm thickness for each strap and are winded 7~10 times. Because of this, when one part was damaged, the ropes which have been winded together 7~10 times will all come loose. This will eventually lead to a person falling into the sea, among various other accidents. To prevent this accidents, 7~10 seizing ropes are bound together in our products. Bound seizing ropes will be stronger as time passes.



TEST

Product Test

In Korea, only we have vertical test equipment.



Test procedure

Suspend the ladder vertically, hanging to its full length or extend the ladder to its full length on a horizontal surface, with the top end of the ladder secured using its own attachments. Apply a static load of 8,8 kN widely distributed over the bottom step for a period of at least 1 min, so that the load is applied evenly between the side ropes through the step attachment fittings. Repeat the procedure at five different steps, except that the ladder is not required to be hanging at full length and only the step under test, its side rope attachments and the side ropes immediately above the step attachment fittings are required to be subjected to the load.



ISO 799 : ISO 5489

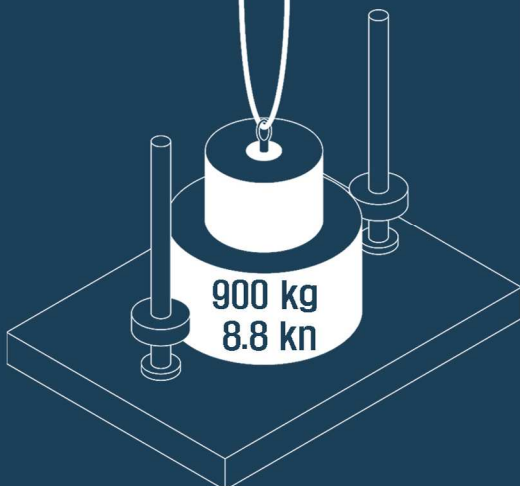
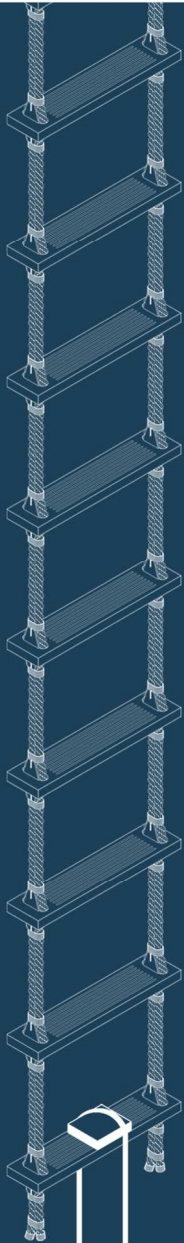
Making products that do not transform after 1 minute of load test (8.8 Kn weight)



TEST

Product Test

Load Test



ISO 799 : 2004
Pilot Ladder
ISO 5489 : 2009
Embarkation Ladder

Carrying out the test
stated in ISO 799, ISO 5489
using vertical test equipment



NAVER

현상공업사



검색

TEL : 82 055 374 0020
FAX : 82 051 582 0343
H.P : 82 011 585 3569
Homepage : <http://www.pilot-embarkation-ladder.com>
e-mail : hc316@naver.com

14, Wagok 2-gil, Sangbuk-myeon, Yangsan-si,
Gyeongsangnam-do, Korea