



Synthetic Resin Sleeper 합성수지침목



동양이화



DONGYANG P&C

Best, Highest A company specializing in the highest quality railway and automobile materials and parts

■ Company DONGYANG P&C
 ■ Name LEEHWA INDUSTRY
 LCI

■ CEO Lee Seung-Hyun

■ Date of

■ Establishment 1980

■ Location Korea 3
 Mexico 1
 America 1
 ASIA 2

■ Number of employees
 150



LEEHW-CHINA

LEEHW-INDIA

◇ 1980~1990

1980 Dongyang Urethane Establishment
 1990 Dongyang Leehwa Corporation Establishment

◇ 1991~2000

1996 Corporate research institute Establishment
 1999 LC I Co., Ltd (affiliate company) Establishment
 2000 QS-9000 Obtained quality system certification
 2000 SQ certification (Hyundai Motor Company)

◇ 2001~2010

2007 ISO/TS 16949 Certification
 2007 ISO 14001 Certification
 2009 Certification as a specialized component material company

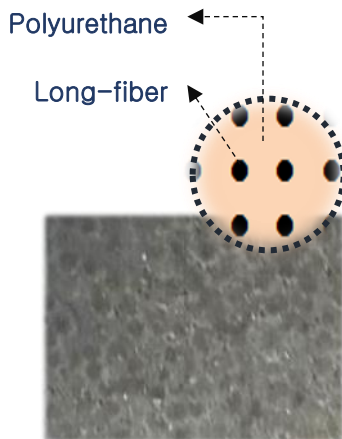
◇ 2011 ~

2012 Leehwa Industry Co., Ltd.(affiliate company)
 2015 Leehwa America Establishment
 2015 Leehwa Mexico Establishment
 2016 Building a Smart factory
 2016 Leehwa China Establishment
 2017 Mass production of railway elastic pads
 2018 IATF 16949 certification
 2018 Leehwa India Establishment
 2019 MAIN-BIZ certification
 2022 Mass production of synthetic resin sleepers

Railway parts (Synthetic resin sleeper)

Synthetic Resin Sleeper

A sleeper that can replace existing wooden sleepers, made of long-fiber reinforced polyurethane foam, and a synthetic resin sleeper with long-fiber reinforced polyurethane material with polyurethane evenly dispersed between tens of thousands of long fibers, possessing high mechanical performance, durability, insulation, etc.



[Uniform distribution cross-section of long fibers and polyurethane]

[Synthetic resin sleeper]



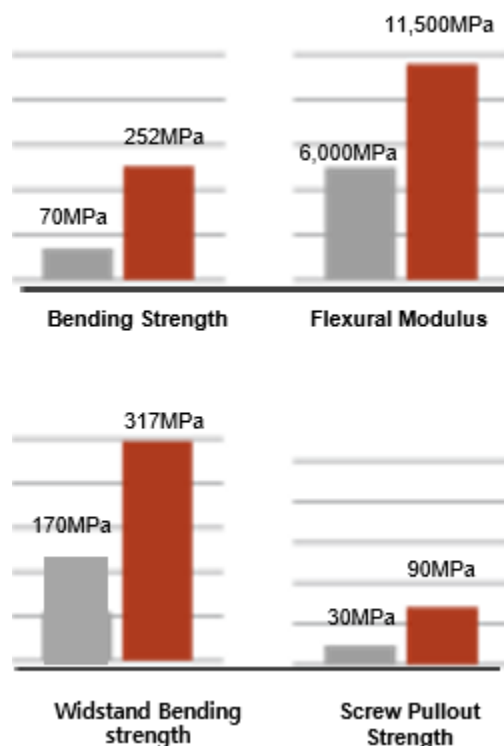
Railway parts (Synthetic resin sleeper)

Features of the technology

- The durability of long-fiber reinforced polyurethane synthetic resin sleepers is over 50 years
- High mechanical performance and electrical insulation
- Excellent handling/cutting/processing properties like wood and easy maintenance
- Eco-friendly sleepers that do not pollute the environment
- Easy maintenance without requiring separate facilities

Mechanical Performance of Synthetic Resin Sleepers

Item	Standard *	Result
Bending Strength	≥ 70 MPa	252
Flexural Modulus	$\geq 6,000$ MPa	11,500
Widstand Bending strength	≥ 170 MPa	317
Compressive Strength	≥ 40 MPa	89.3
Shear Strength	≥ 7 MPa	11.1
Adhesive Shear Strength	≥ 7 MPa	11.5
Specific Gravity	0.74 ± 0.1 g/cm ³	0.747
Water Absorption	≤ 10 mg/cm ³	3.31
Spike Pullout Strength	≥ 15 kN	69.25
Screw Pullout Strength	≥ 30 kN	90
DC Insulation Resistance	$\geq 1.0 \times 10^{10}$ Ω	3.0×10^{14}
AC Breakdown Voltage	≥ 20 kV	59.9



*Specifications according to KRSA-T-2017-1003-R0 "Synthetic Resin Sleeper"
 **Synthetic resin sleepers meet the standards of JIS E 1203, ISO 12856-1 Type A

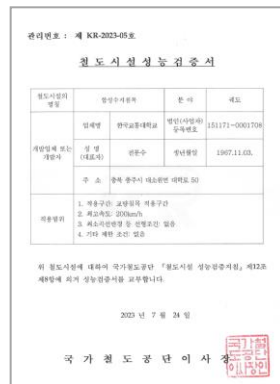
Railway parts (Synthetic resin sleeper)

Technical Certification

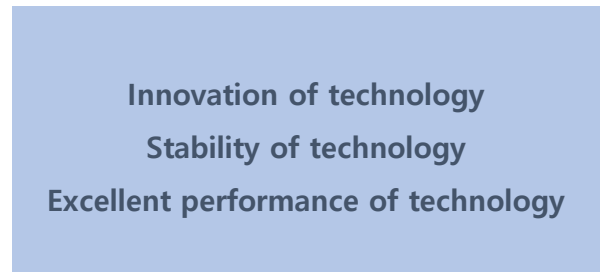
- Ministry of Land, Infrastructure and Transport Innovation Product Certification (No. 2022-393)
- National Railroad Corporation Railway Facility Performance Verification (No. KR-2023-05)
- 2 patents registered (No. 10-2074626, No. 10-2347857)



Innovative Product
Certificate



Railway Facility
Performance
Verification



Patent
(No. 10-2074626)



Patent
(No. 10-2347857)

Patent

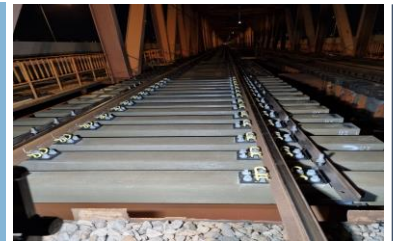
Railway parts (Synthetic resin sleeper)

Application

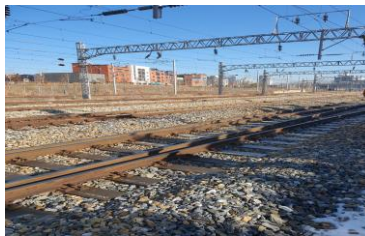
Synthetic resin sleepers are a technology that was successfully domestically produced in 2022 and are being mass-produced and supplied to numerous companies such as Korea Railroad Corporation and Seoul Metro.



KORAIL
(Bridge)
Cheongnyang-ri



KORAIL
(Turnout) Osong
Station



Seoul Metro
(Bridge) Dong-ho,
dong-jak Bridge



Business expansion

We are currently promoting the expansion of our excellent technology called synthetic resin sleepers to the entire world.

Railway parts (Repair agent for synthetic resin sleepers)

Repair agent for synthetic resin sleepers

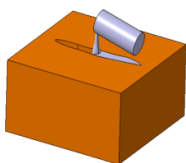
Simultaneously developing a repair agent that can repair synthetic resin sleepers, making it easy and convenient to repair sleepers.



Hardner



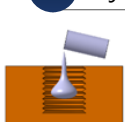
Resin



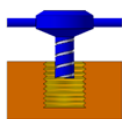
A. Simple Crack Repair

- Simple cracks are used by injecting a mixture of resin and hardener into the crack area to fill the crack and then hardening it to prevent the crack from progressing.

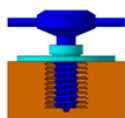
1 Inject the mixture



2 Drilling holes after hardening



3 Spike fastening



B. Spike hole repair

- Inject resin into the drilled hole, harden it, and then insert the spike.



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