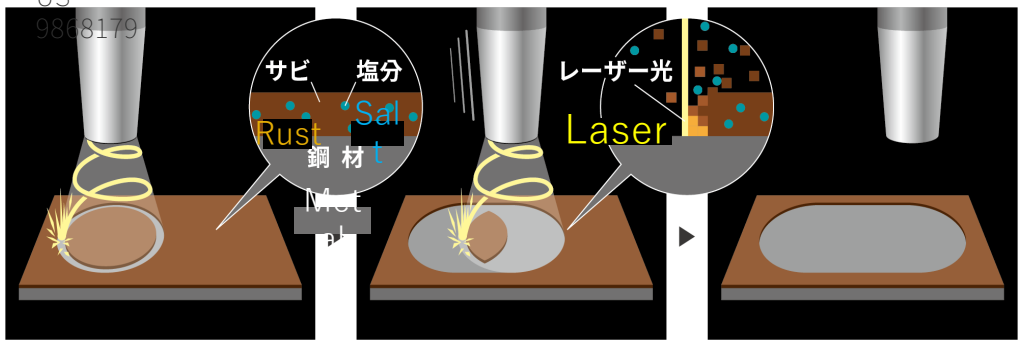
Beautifully, For the future

TOYOKOH

Toyokoh　Inc

Patented technology with ultra-high speed circular irradiation

Patent No. 5574354
US-9868179



Substrate preparation process

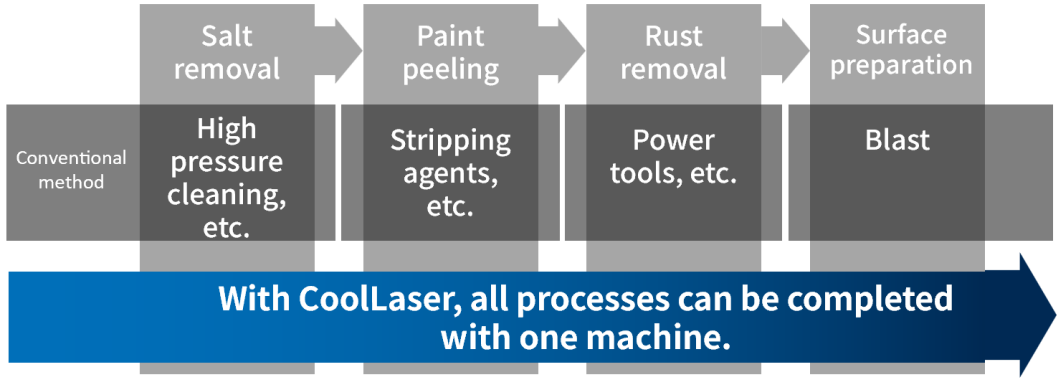
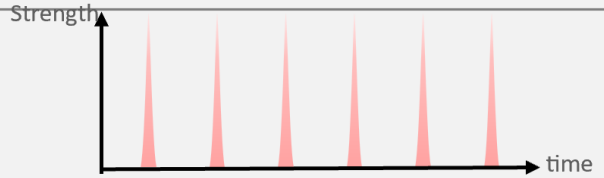


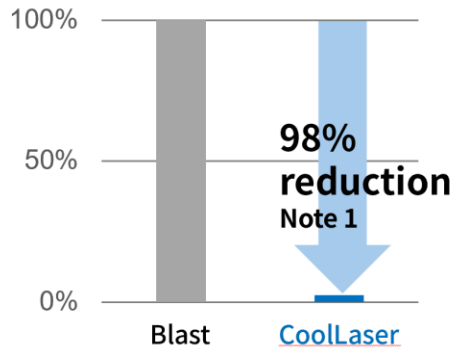
Illustration of laser oscillation

* Uses Pulsed Laser

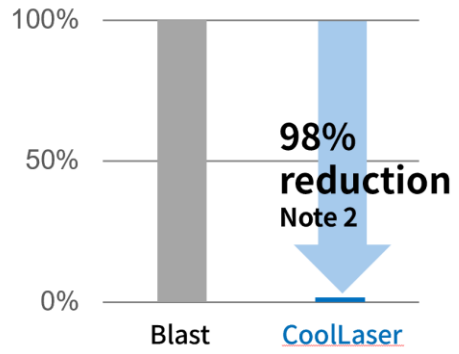


* Uses CW (continuous wave)

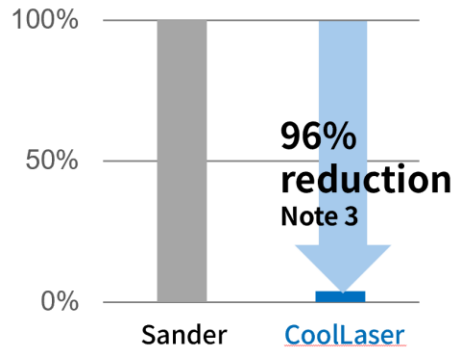
Industrial waste disposal costs and CO2 emissions



Removal of salt that can cause rust to reoccur



Reduction of lead, PCBs, etc., which are harmful to workers



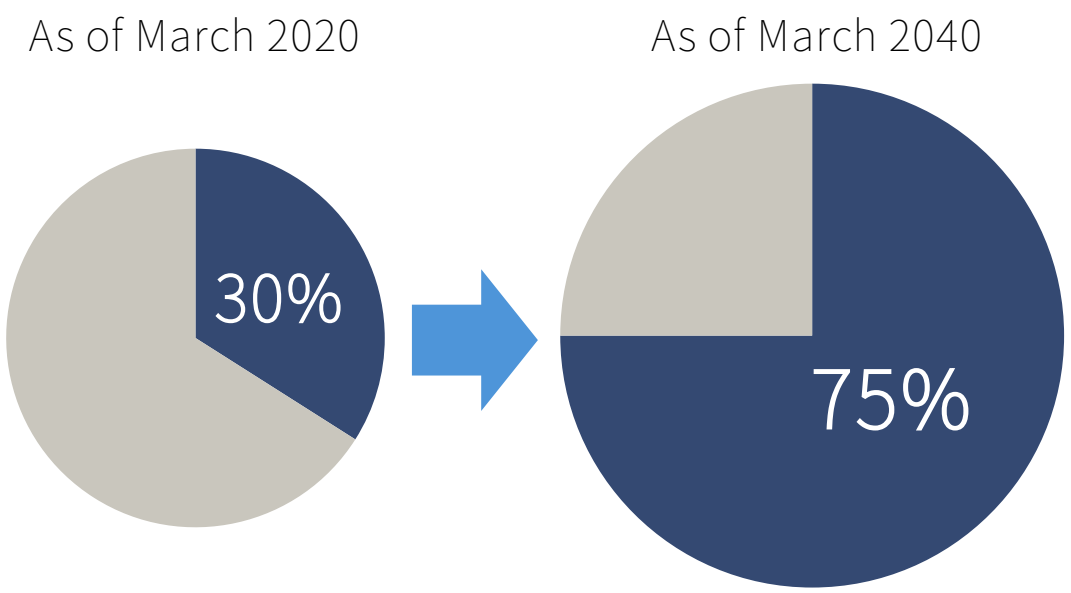
Rust corrosion is causing problems all over the world. There were many collapses of social infrastructure and fatal accidents.

Fatal bridge collapses occur one after another in the United States and Taiwan. The cause of the collapse is corrosion caused by rust. Aging infrastructure has become a social issue around the world. Currently, rust removal work is considered 3Ds (Dirty, Dangerous, Demeaning) work, and there is a shortage of workers to carry it out.

Source: The Minneapolis Expressway collapse accident that occurred in Minnesota on August 1, 2007 (Photo by Mike Wills on August 2, 2007)

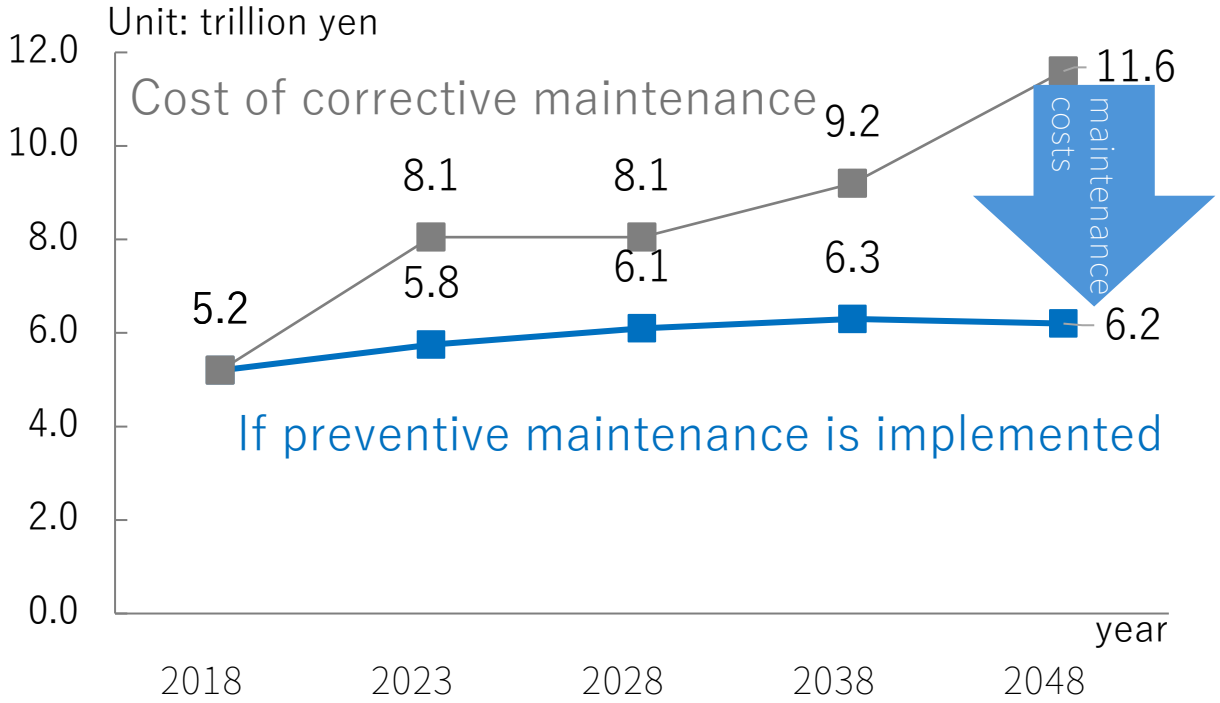
The aging of social infrastructure and preventive maintenance work are likely to increase in the future in an accelerating manner.

Percentage of road bridges that were built more than 50 years ago Note1



Fifteen years from now, 75% of all buildings will be 50 years old or older.

Estimates of future infrastructure maintenance and renewal costs Note2



The need for CoolLasers, which are used for preventive maintenance, is expected to continue to increase in the future.

Note 1: October 2023, "Infrastructure management adapting to new ways of living - Towards promoting infrastructure consolidation and reorganization -"
P.4 Percentage of road bridges (bridge length 2m or more) that have been in operation for more than 50 years

Note 2: Calculated from "Estimates of future maintenance and renewal costs for social capital in areas under the jurisdiction of the Ministry of Land, Infrastructure, Transport and Tourism (November 30, 2018)" based on the difference in maintenance costs for corrective maintenance and preventive maintenance 20 years from now (FY2038).

Laser technology does not produce waste and can even remove salts that cause rust to recur.

The CoolLaser is the world's most powerful high-power laser and can quickly and cleanly treat bolts and other complexly shaped areas where rust could not be removed in the past.

Laser technology produces no industrial waste[Note] and can even remove the salt that causes rust to recur.

Note: Tomomi Kibata and Yasutaka Sasaki (2016) " Effect of reducing industrial waste containing harmful substances such as lead and PCBs using the Circulation Eco Clean Blasting Method " According to page 2 in https://www.cbr.mlit.go.jp/kikaku/2016kannai/pdf/in05.pdf, blasting requires 40kg/ m2 of abrasive material to remove 1kg/ m2 of paint from 1m2 . The amount of CO2 emissions required to transport industrial waste to the landfill site is 1kg/ m2 for CoolLaser ÷ 41kg/ m2 for blasting = 2.4% , a 98% reduction compared to blasting.

CoolLaser is the world's highest-class power laser, and can quickly and cleanly remove rust from complex shapes such as bolts, which was previously difficult to remove.

Click here to watch the CoolLaser introduction video.
*YouTube will open

Source：Japan Video Topics
“Technology to protect infrastructure”
URL：https://web-japan.org/jvt/

CoolLaser has been granted the IP right in Japan and the US.
This product stands out in the market by specializing in outdoor processing.

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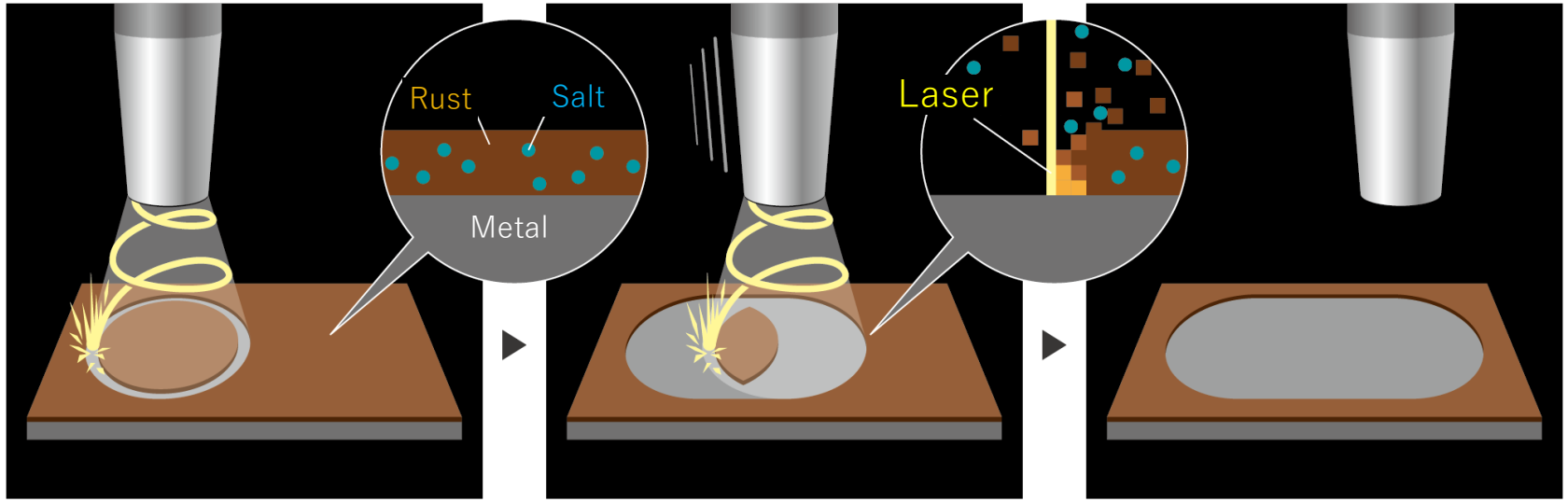


CoolLaser is a revolutionary technology that uses laser light to remove paint, rust, and harmful substances from the surface of steel by melting, evaporating, and thermally crushing them, while minimizing the thermal impact on the steel itself by using ultra-high-speed circular rotation scan.

Intellectual Property Rights Status

As at the end of Feb 2025

Unit: item	Domestic	abroad
Already acquired	17	6
Pending	11	5
total	28	11

CoolLaser solves various customer needs and on-site pain points

Major construction equipment rental company

Machine sales

Installs multiple units and rent them to construction companies

A major construction equipment rental company in the industry has a corporate culture that is proactive in adopting innovative new technologies, and has installed multiple CoolLasers.
The construction equipment rental market is expected to grow in the future, driven by the trend of the sharing economy.

Major electric power group company

Machine sales

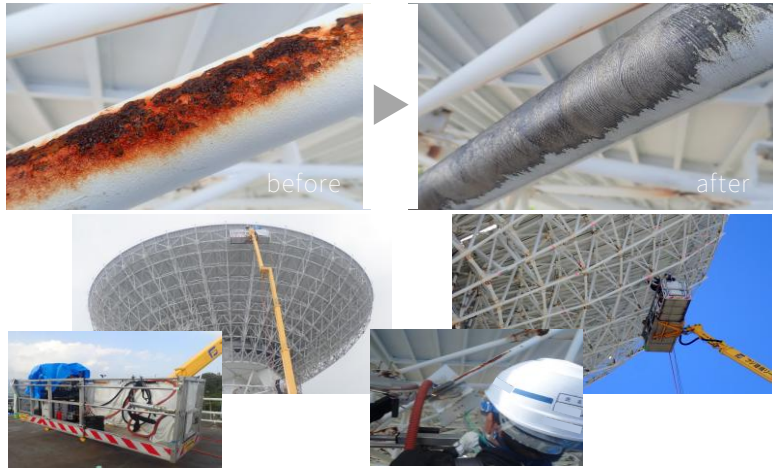
Applied to hydroelectric power generation facilities and power transmission towers

By improving the quality of processing work in the maintenance of hydroelectric power generation equipment and transmission line towers, the company hopes to prevent the recurrence of rust and reduce the life cycle costs of infrastructure.
In a society with a declining population, the introduction of new technologies will help secure workers to cope with the declining number of workers.

Major space development organizations

Processing sales

Applied to communication towers where rust could not be removed



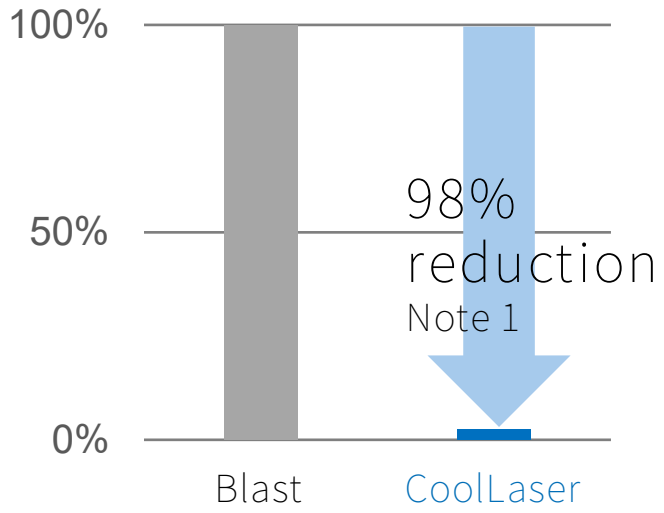
40m-tall parabolic antenna is constantly in motion, temporary scaffolding could not be set up, and the thick rust that is typical of coastal areas could not be removed.
CoolLaser does not use abrasives, so no dust is scattered, allowing work to be done without scaffolding, reducing processing time and costs.
This type of need for partial repainting exists in many places.

CoolLaser is more environmentally and worker-friendly than existing methods, and reduces waste costs and LCC.

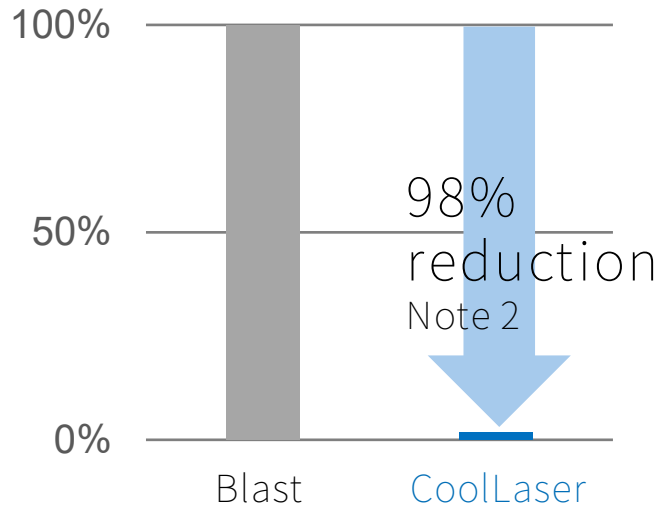
CoolLaser changes the 3Ds (Dirty, Dangerous and Demeaning) in the workplace to 3Cs (Cool, Clean and Creative) , contributing to the well-being of workers.

Removing salt prevents the recurrence of rust and reduces life cycle costs, contributing to the maintenance and management of infrastructure within limited budgets.

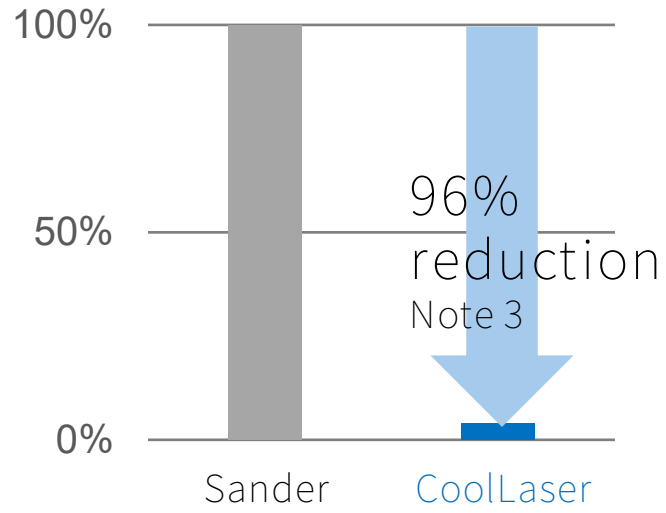
Industrial waste disposal costs and CO2 emissions



Removal of salt that can cause rust to reoccur



Reduction of lead, PCBs, etc., which are harmful to workers

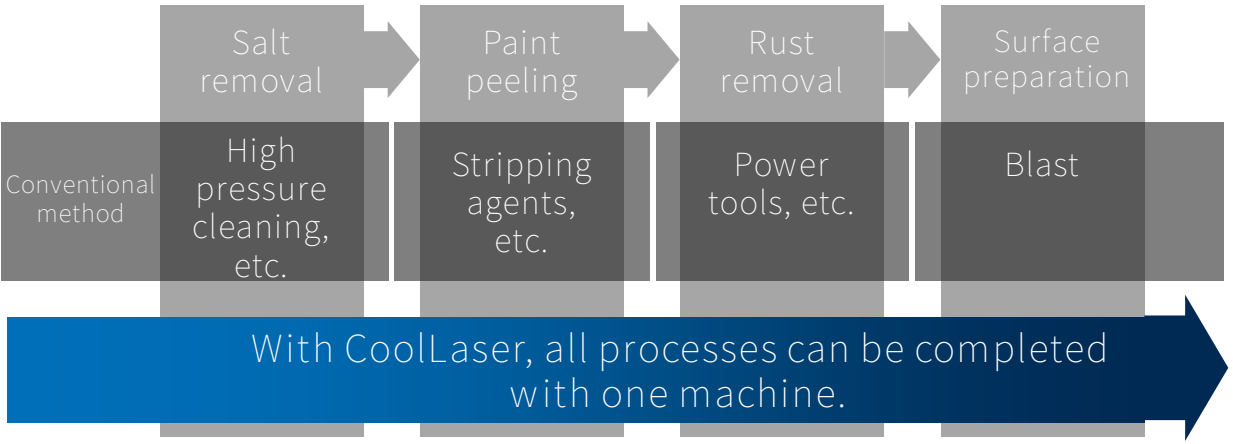


Note 1: 40kg/m2 of abrasive material used to remove paint using the sand blasting method ÷ (1kg/m2 of paint + 40kg/m2 of abrasive material) = 98% reduction. Source: Tomomi Kibata and Yasutaka Sasaki (2016) "Effect of reducing industrial waste containing harmful substances such as lead and PCBs using the circulating eco-clean blasting method"
Note 2: 1-Laser hybrid (CoolLaser + cup wire) method 0.6mg/m2 ÷ Sand blasting method 35.4mg/m2 = 98% reduction. Source: Civil Engineering New Technology Showcase 2023 in Tokyo (Date: 2023/09/27 Organized by: Public Works Research Institute) "Substrate preparation technology using laser surface treatment technology"
Note 3: 1-CoolLaser 2.4mg/m^3 ÷ Lead concentration when using power tools (diamond tools) 61mg/m^3 = 96% reduction. Source: Environmental Management Center Co., Ltd. "Work environment measurement during paint removal work (2024/3/25)"

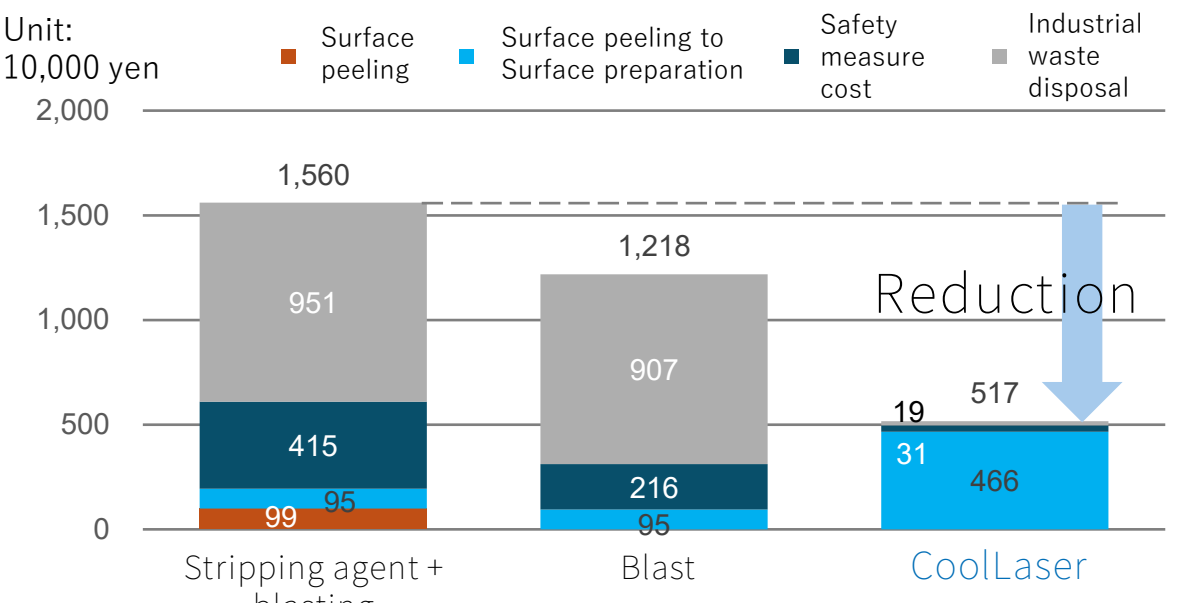
CoolLaser can handle all processes in one go and reduce costs.

Conventionally, surface preparation required changing equipment for each process, but with CoolLaser, the entire process can be done in one go.
It also reduces costs such as industrial waste disposal fees, and taking into account other advantages, there are great benefits for all three parties: the client, the workers, and the users.

Substrate preparation process



Cost comparison by processing method Note 1



Note 1 : Source: In -house calculations assuming girder end (treatment area : 73 m2), old paint film : 300 µm (containing PCBs). Assumes that crushed slag and garnet (non-metallic abrasive) will be used as the abrasive for blasting.

The infrastructure maintenance market that CoolLaser targets is vast and numerous.

With iron and oxygen, any structure will corrode through rust.
There are a wide range of maintenance needs for outdoor structures, and our company focuses on the following

Note:
The amount could be even larger if markets that could not use BLAST are also included.

Domestic numbers
Markets where BLAST is used

Note: Global blasting sales market size 8.7 Billion USD (a) × 145 yen/USD (2024/9/27 TTM Mitsubishi UFJ Research & Consulting) × 6.4% (b) = Domestic blasting sales market size 80 billion yen
(a) Maximize Market Research Global shot blasting machine market (2023) (b) Kobunsha "Takayoshi Sato's Overseas Construction Market Series (3) - Market Size Edition (2015)" Japanese construction market size 257.6 billion USD ÷ Global construction market size 4 trillion USD The market size is a figure calculated by our company using the above calculation method based on public information or data created by a third party, etc. There are limitations to the accuracy of statistical surveys and data created by a third party, and it is an estimated value calculated based on certain assumptions or assumptions by our company, so it may differ significantly from the actual market size.
Sources: Roads = Ministry of Land, Infrastructure, Transport and Tourism "Road Statistics Survey (March 2022)", Railways = Ministry of Land, Infrastructure, Transport and Tourism "Railway Statistics Annual Report (FY2021)", Communications = JTOWER Business Plan (May 2024), Power Transmission = Ministry of Economy, Trade and Industry "Current Status of Technical Standards for Steel Towers and Utility Poles (November 2019)", Maritime = Japan Federation of Coastal Shipping Associations Maritime Statistics Handbook (2019), Docks = Ministry of Land, Infrastructure, Transport and Tourism Ports and Harbors Bureau (April 2023), Plants = Agency for Natural Resources and Energy "Electricity Survey and Statistics (2019)", Storage = Agency for Natural Resources and Energy "Petroleum Facilities Survey (March 2020)"

"CoolLaser Method" selected as a semi-recommended technology for FY2025 by the Ministry of Land, Infrastructure, Transport and Tourism (released April 21, 2025)

Of the 3,716 construction methods registered in the "NETIS (New Technology Information System)" operated by the Ministry of Land, Infrastructure, Transport and Tourism (as of the end of March 2025), the CoolLaser construction method was selected as a "semi-recommended technology" for FY2025 with the aim of promoting its use as an excellent new technology in public works and other projects.

The adoption of the CoolLaser processing method will be an added point for processing companies, providing an incentive to adopt the CoolLaser processing method.

Release from the Ministry of Land, Infrastructure, Transport and Tourism regarding the selection of recommended and semi-recommended technologies for FY2025

NETIS 国土交通省新技術提供システム

登録番号 ：CB-230005-A
新技術名称 ：回転式レーザー素地調整工法（CoolLaser工法）
登　録　日 ：2023年5月19日

国土交通省

ホーム ▸　国土交通省について ▸

報道・広報

ホーム > 報道・広報 > 報道発表資料 > 令和７年度推奨技術・準推奨技術として計23技術を選定
～過去最多の選定数で工事等技術の一層の強化へ～

令和７年度推奨技術・準推奨技術として計23技術を選定
～過去最多の選定数で工事等技術の一層の強化へ～

公共工事等における優れた新技術の活用を促進するため、外部有識者の審査を経て、推奨技術が15技術、準推奨技術が８技術の合計23技術を選定しました。推奨技術の選定数は過去最多となりました。

1

CB-230005-A

回転式レーザー素地調整工法
（CoolLaser工法）
（橋梁などの鋼構造物における再塗装前の素地調整工法）

本技術は、高出力の連続波レーザーを回転させて鋼構造物のサビ、塗膜と腐食の要因となる塩分を除去できる素地調整工法である。従来技術は残留塩分に課題があった。本技術の活用により、塗膜再劣化が抑制でき、鋼構造物の長寿命化とライフサイクルコスト軽減が期待できる。

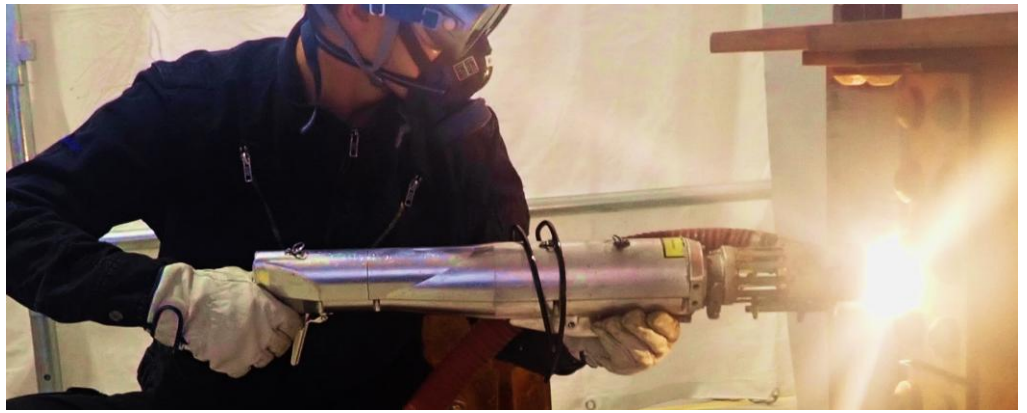
レーザーヘッド

レーザー照射

Source: TOYOKOH website April 21, 2025 "Cool Laser Method Selected as Semi-Recommended Technology for FY2025 by the Ministry of Land, Infrastructure, Transport and Tourism"
https://contents.xj-storage.jp/xcontents/AS05463/8b87505b/6c58/44eb/9056/aeefb0fb3bdd/140120250421518877.pdf

Greenhouse gas reduction effect

Annual reduction of 287,200t of GHG (greenhouse gas) Note1



If blasting is replaced with CoolLaser in the annual market size of 6 million m2 for bridge repainting work, GHG emissions can be reduced by 287,200 t (7.98 kg/m2).

This is equivalent to

1. In terms of car mileage, this is the distance traveled by approximately 40,000 cars in one year.
2. The amount of electricity used by approximately 20,000 households per year

Note 1 : Avoided emissions of 287,200 tons / year = A : GHG emission reduction per 1 m2 of rust removal (functional unit) of 7.98 [kg/m2] (B : Electricity used by the blasting method: 45 kW x 50 % x 5 hours / day = 112.5 [kWh/ day] - C : Electricity used by CoolLaser: 50 kW x 50 % x 5 hours / day = 125 [kWh/ day]) ÷ Area of rust removed per day: 10 [m2/ day] x CO2 emission coefficient: 0.533 [kgCO2/kWh] + (B : Amount of waste generated: 41 kg/m2 - C : Amount of waste generated: 1 kg/m2) x CO2 emission coefficient: 0.2161 [kgCO2/kg] x D : Amount of use: 6 million m2 Note 2 (annual amount of rust removed) x E : Useful life : 6 years.
Note 2 : Source: Yamada Infrastructure Technos Co., Ltd. "Reducing waste and changing the world !! " p.20 https://cpds.kentsu.co.jp/assets/img/technology/45/document_pdf/ecoclean.pdf

CoolLaser Dust Collection Technology

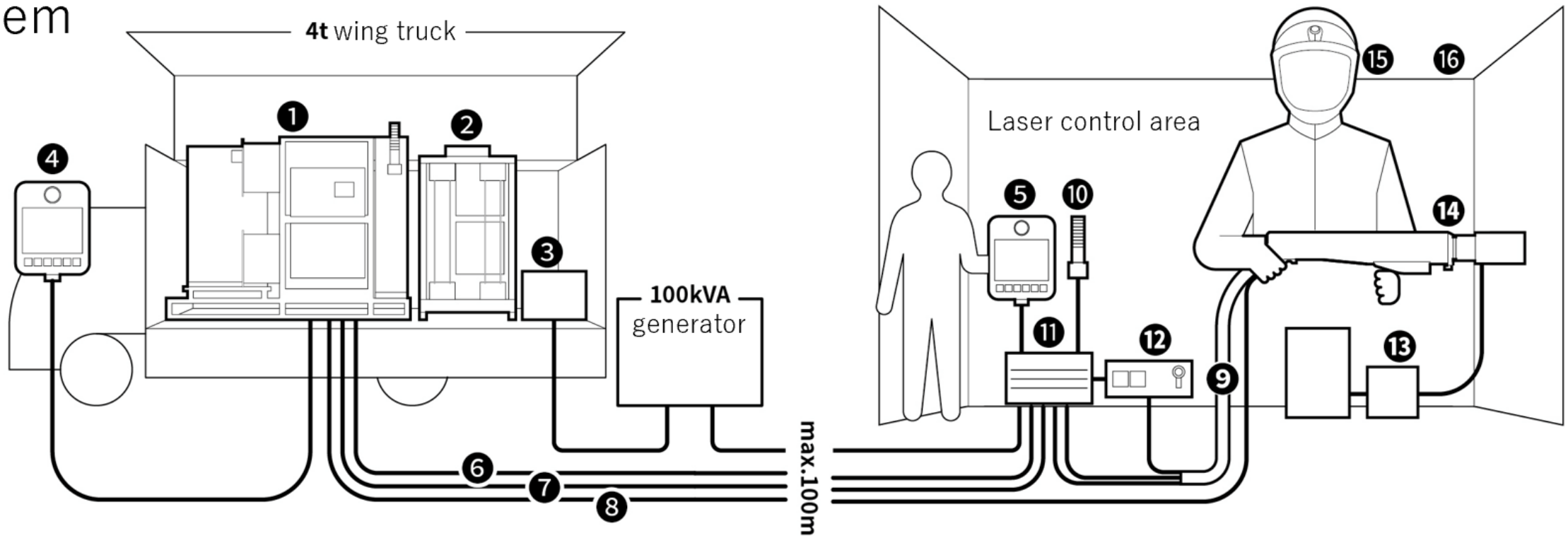
With or without dust collectors, the load on workers and the atmospheric environment changes.

With Dust Corrector

Without Dust Collector

CoolLaser Configuration

System



Truck mounted
①System
②Laser oscillator chiller
③ Transformer

Touch Panel
④Touch panel A
⑤Touch panel B

Cables
⑥Air hose
⑦Communication cable
⑧Optical fiber
⑨Connection cable

Laser Control Area
⑩ Signal Tower
⑪ Control box
⑫ Head chiller
⑬ Dust collector

Laser head
⑭ Laser head

Safety measures
⑮Protective equipment
⑯Shielding material

System Overview

Item	Specifications
Laser:	5.4kW near infrared light continuous wave (CW)
Loading dimensions:	Approx. 5,500mm (W) x 1,750mm (D) x 2,100mm (H)
Total weight:	Approx . 3,000kg
Power consumption:	50kVA (please use a generator of over 100kVA)

CoolLaser System

It can be loaded on a 4-ton truck and installed without the need for a plant.

Truck Mounted
①CoolLaser System
②Laser Oscillator Chiller
③Transformer
④Fiber Optics

System Overview Item Specifications
Laser 5.4kW near-infrared light continuous oscillation Loading Dimensions 5.5m(W)×1.7m(D)×2.1m(H) Total Weight Approx. 3,000kg Power Consumption 100kVA or more generator