TOYO SEIKO CO.,LTD.

Portable Pneumatic needle-Peening (PPP)

Equipment to reinforce treated surface bycontinuously-peening the welded toe.

Strength improvement of welded part

Feature

- Improves the fatigue life of welded toe (See: Advantage-1)
- Quick treetment
- Space-saving & easy to carry
- AC power / AA size storage battery or commercial dry battery

Advantages

- Reduction of stress concentration factor by deforming the welded toe geometry, and also improves fatigue life of welded part by compressive residual stress.
- Closes small cracks at welded toe.(See: Advantage-2)
- Decrease of stress corrosion cracking.

Functionality

- Battery enables outdoor working or working at any place that has no electronic power supply.
- Ergonomic design in consideration of safety and easy access to target area.
- Control box controls peening power for stable working.
- Quick-change peening head needle (consumable parts).
- 5m air hose from control box to peening head.

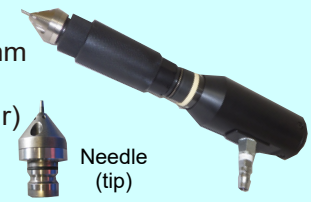
Applicable target

- Bridge, shipbuilding, plant, rail vehicle and so on. (For welded structures)

PPP Specification

Peening head

Size : (Max Length)297mm, (Max dia.) 55mm
Weight : 2.0kg
Power source : Compressive air (Factory air)
Needle(Pin) : 3mm
Needle(Pin)tip radius : R1.5



◆Peening head transfers impact energy of piston to needle on the tip, and makes the needle continuously-peen the object surface.

Control box

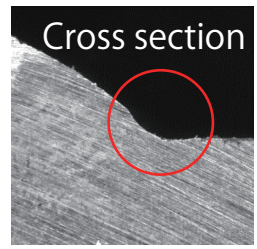
Size : W420 H345 D175(mm)
Weight : 7.5kg
Power source : ACPower / AA size storage battery or commecial dry battery
Accessories : eneloop pro® BK-3HCD(Panasonic)
Fast charger for eneloop, others
Control function : Air pressure, Air flow rate

◆Control box coordinates and monitors compressive air provided to peening head. It will prevent peening head from working with over controlled flow rate by setting compressive air control range.

Appearance after PPP treatment

Before PPP treatment (As weld)

After PPP treatment



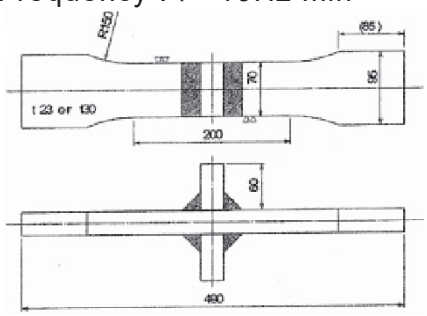
Advantage-1 (Fatigue test result)

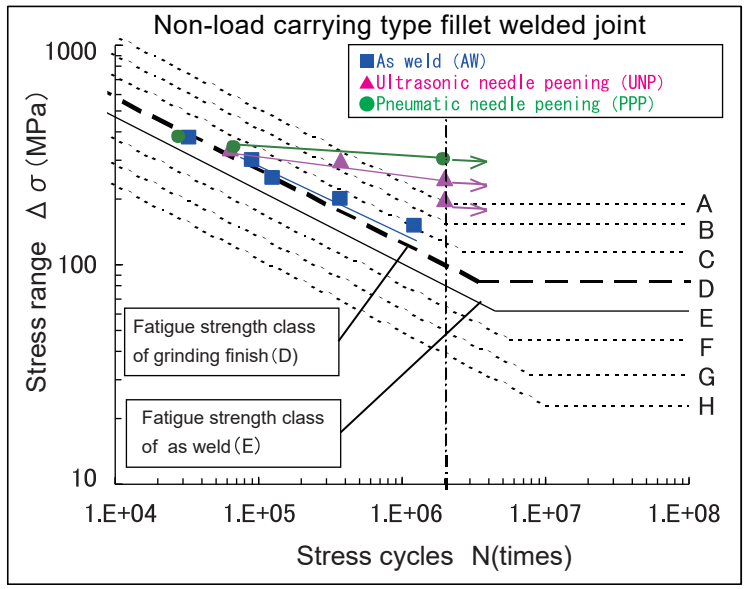
1.Test piece

Material SN490(Thickness30mm max)
Non-load carrying type fillet welded joint

2.Test condition

Load type :pulsating tension
(Stress ratioR=0.1)
Stress rangeΔσ :100～300MPa
Frequency : f =10Hz min

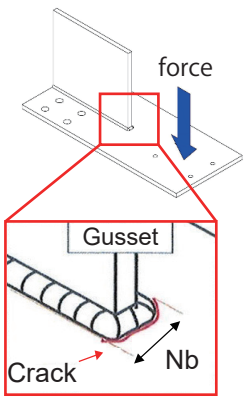




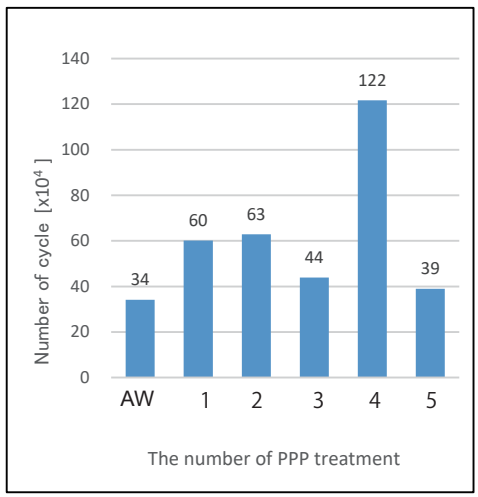
Advantage-2 (Small fatigue crack closure by PPP treatment)

Test piece

Out-of-plain gusset (welded test piece)



Crack shape that can be expecetd to be closed by PPP



Fig：The fatigue test results at Nb

【Explanation】

Fatigue test was conducted with as-weld test piece. When the fatigue crack length became Nb, the crack was treated by PPP. After the fatigure crack closure by PPP, fatigue test was repeated.

As a result of 5 repetation of crack closure, each fatigue life was longer than as-weld condition.

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