

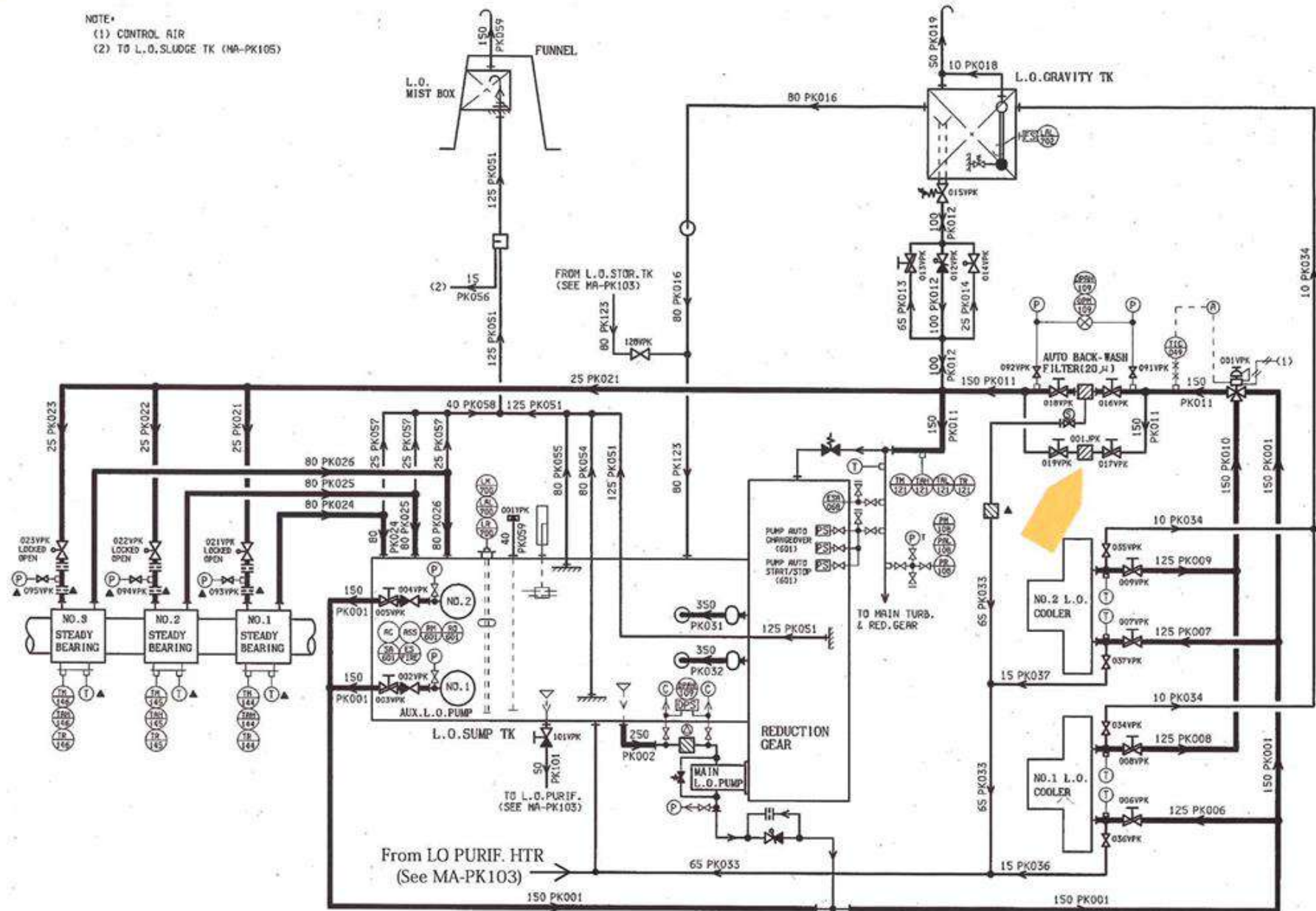
Current status of
NOTCHED WIRE ELEMENT
for LO 2nd MAXFILTER
and future proposal

document author: Hayato Serizawa
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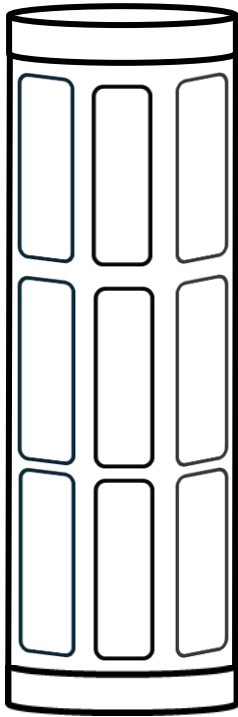
About of NOTCHED WIRE ELEMENT

The ELEMENT is currently widely used by filtration manufacturers in the shipbuilding industry. Since it is made by wrapping specially processed WIRE around a housing, it is relatively easy to manufacture, inexpensive and stable in supply, but without proper management and cleaning, there is a risk of gradual deterioration and breakage. Due to the mounting position of the LO MAXFILTER, if the ELEMENT is damaged, there is a high probability that wire or pieces of ELEMENT will pass through to the ENGINE, resulting in an ENGINE stoppage and, in the worst case, long term out of service. Niikura recommends that the ELEMENT be cleaned regularly by the ship's crew and that its condition be checked and replaced within a recommended period of approximately 2 years.

(1) CONTROL AIR
(2) TO L.O. SLUDGE TK (NA-PK105)



Components of NOTCHED WIRE ELEMENT



Aluminum casing



SUS304 wire



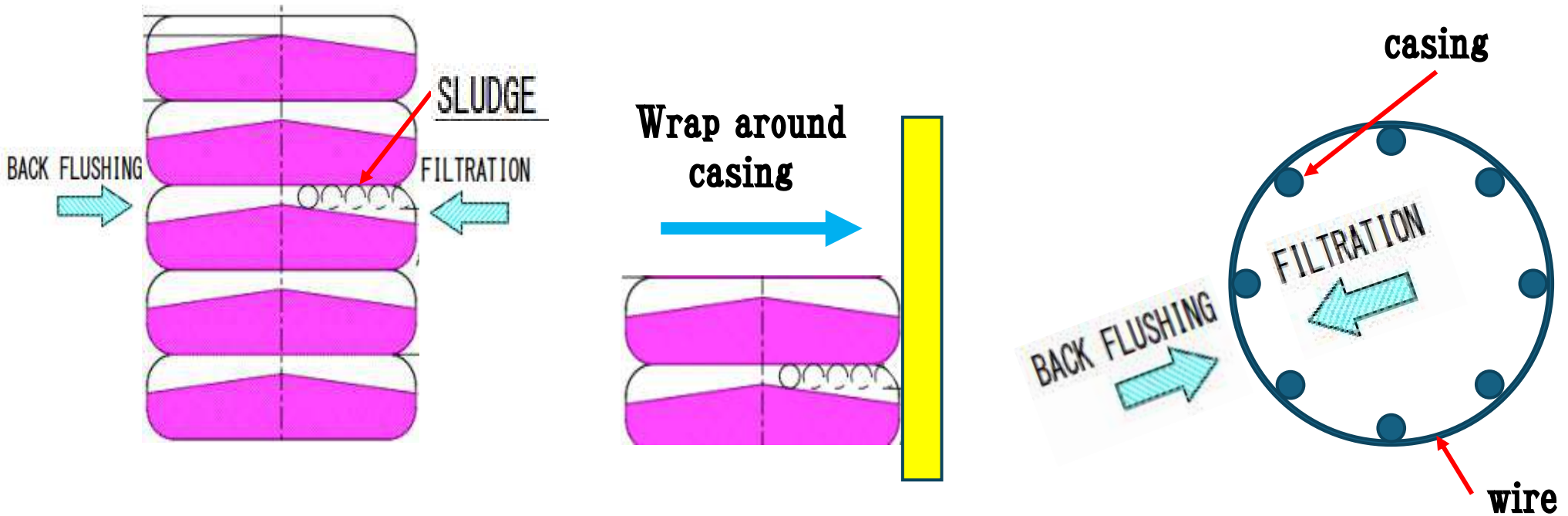
NBR O-ring

SUS304 wire is wound around the casing and secured by welding only the start and end points



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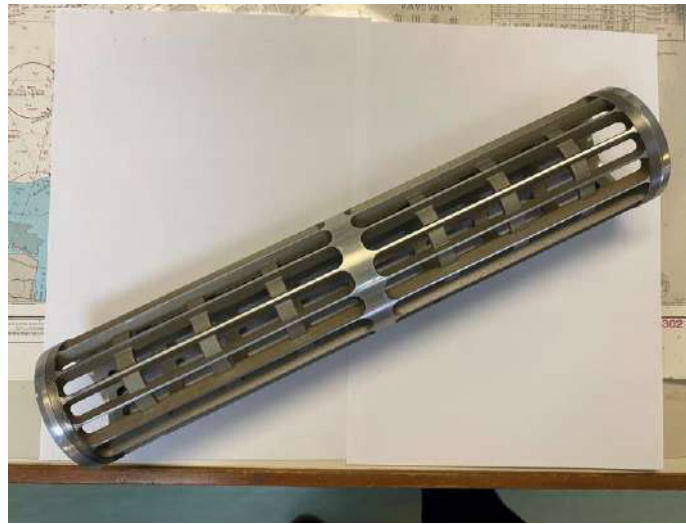
NOTCHED WIRE ELEMENT cross-sectional view



ELEMENT Damage Case (1) - 1



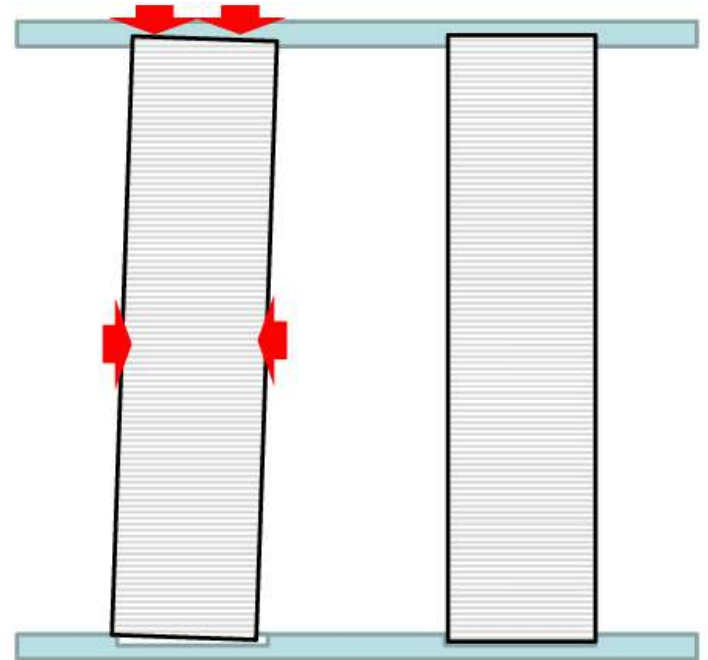
Occurred in June 2023. A wire as shown in the left figure was added to the FILTER in the LO main pump strainer on a ship in service in 2002. Based on the flow of the line, it was assumed that the wire had frayed on the ELEMENT of the LO 2nd MAXFILTER. Emergency docking was performed in August and the ELEMENT was confirmed to be without any wire as shown in the figure below and the ENGINE OH and ELEMENT were replaced. In the meantime, the vessel was off-hire (inoperable).



ELEMENT Damage Case (1) - 2



Abnormal wear of the casing, possibly caused by poor installation, was observed on the same vessel. In the case of the situation shown on the left, because of the possibility of reduced filtration performance and unexpected damage to parts of the casing, we recommended and implemented immediate replacement of the casing.



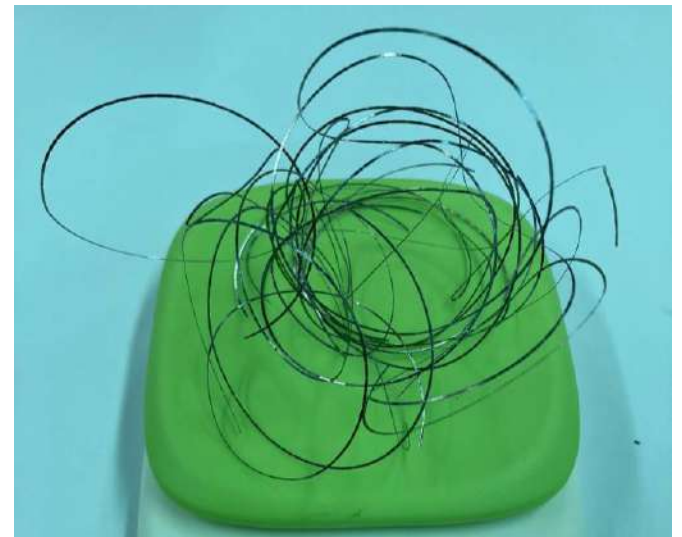
ELEMENT Damage Case (2)



Fig.1 Damaged filter element

Occurred in April 2024. On a ship commissioned in 2009, an open inspection according to PMS was performed and 8 ELEMENTS were found in an abnormal condition, as shown in the left figure. As there were only two spare ELEMENTS on board, the filter was stopped and filtered with a BYPASS FILTER. The ELEMENT was immediately replaced with a new one.

After entering service in 2009, only 3 ELEMENTS have been delivered in 15 years (18 on board). Frayed wires were also found on the SLUDGE COLLECTOR, as shown on the right.



ELEMENT Damage Case (3)



Occurred in April 2024. On a ship that entered service in 2008, a rotational failure of the ENGINE was confirmed. After inspecting each part, an ELEMENT with a wire falling off was found, as shown in the left figure.

The ENGINE was immediately overhauled under the guidance of the ENGINE manufacturer.

We dispatched our engineer to investigate the cause and provide guidance.

All the wires were replaced with new type of WEDGE WIRE ELEMENT.

In the 16 years since the vessel entered service in 2008, ELEMENT has delivered only 8 units (48 units onboard).



Niikura Kogyo recommended preventive measures

1. Periodic Replacement of NOTCHED WIRE ELEMENT
This ELEMENT will be discontinued on 2025.03.31.
2. Modification of existing LO 2nd MAXFILTER
3. Replacement with new WEDGE WIRE ELEMENT

Niikura Kogyo recommended preventive measures

1. Periodic Replacement of NOTCHED WIRE ELEMENT

This ELEMENT will be discontinued on 2025.03.31.

2. Modification of existing LO 2nd MAXFILTER

3. Replacement with new WEDGE WIRE ELEMENT



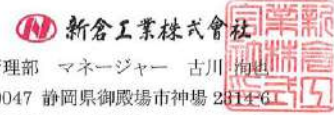
1. Periodic Replacement of NOTCHED WIRE ELEMENT

Niikura Kogyo has established a recommended replacement period for NOTCHED WIRE ELEMENTS of approximately 2 years.

Based on this guideline, we recommend replacing the ELEMENT with a new one when the visual condition of the ELEMENT or the expected aging deterioration of the ELEMENT exceeds the recommended period.

2023 年 12 月

お客様各位



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Maxfilter ノッチドワイヤエレメントの交換推奨時期について

拝啓 貴社益々のご清栄の段、大慶に存じます。

平素は格別のご高配を賜り、厚く御礼申し上げます。

標記の件について、使用環境、使用状態にもよりますが、潤滑油こし器及び燃料油こし器 Maxfilter 用ノッチドワイヤエレメントは2年を交換推奨としています。

エレメントワイヤーのホツレ、ケーシングの損傷が発生し、万が一、エンジン関連機器へのトラブルを避けるために、定期的な開放点検の実施、及び、別紙の「エレメント E3 の点検ポイント」をご確認いただき、保守点検を行っていただきますようお願い申し上げます。

敬具



NIIKURA KOGYO CO., LTD.

1. Periodic Replacement of NOTCHED WIRE ELEMENT

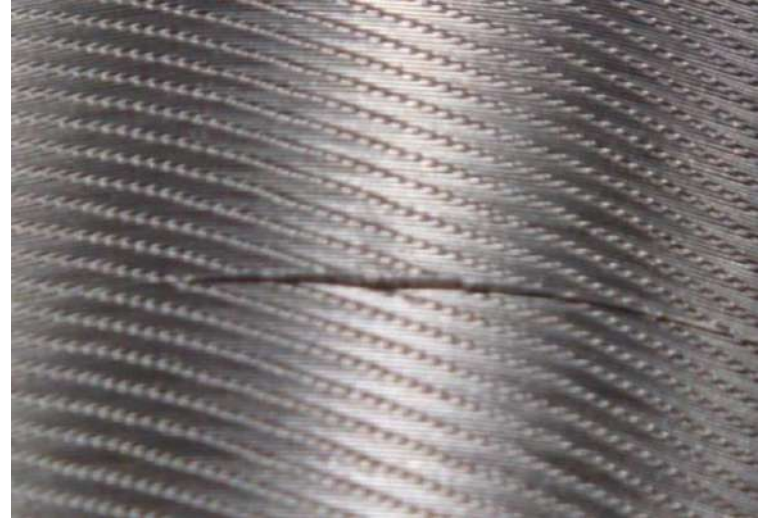
In addition, we have decided to discontinue production of this ELEMENT as of 2025.03.31, and we have received many orders for the number of units that can be manufactured before the end of production. If we do not have enough stock, we will automatically switch to the new WEDGE WIRE ELEMENT.

1. Periodic Replacement of NOTCHED WIRE ELEMENT

ELEMENT's recommended replacement guideline (1)



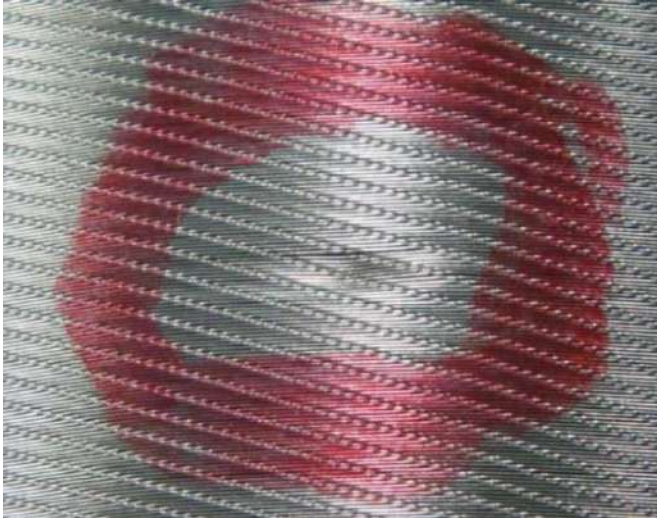
WIRE is broken and
there is a gap.



WIRE is raised and
has gaps

1. Periodic Replacement of NOTCHED WIRE ELEMENT

ELEMENT's recommended replacement guideline (2)



ELEMENT has been dropped or otherwise damaged, such as dents or other external damage.



ELEMENT oil in storage has dried up and is discolored.



NIIKURA KOGYO CO., LTD.

Niikura Kogyo recommended preventive measures

1. Periodic Replacement of NOTCHED WIRE ELEMENT
This ELEMENT will be discontinued on 2025.03.31.

2. Modification of existing LO 2nd MAXFILTER

3. Replacement with new WEDGE WIRE ELEMENT

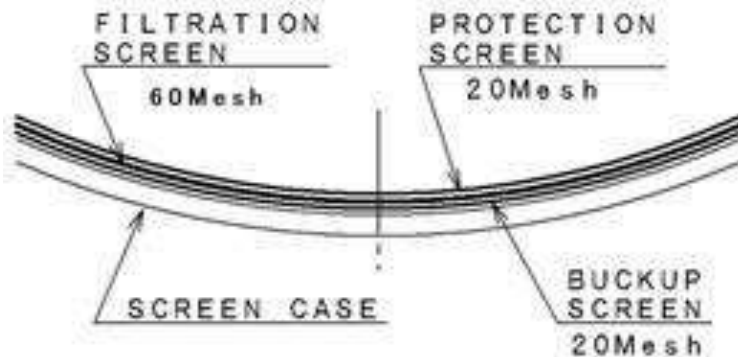


2. Modification of existing LO 2nd MAXFILTER

Installation of additional guard screens



DETAIL OF SCREEN



In the unlikely event of a WIRE fraying, another screen will be installed in the main unit to capture the frayed WIRE before it heads to the main engine or LO sump tank.

【 Installation method 】

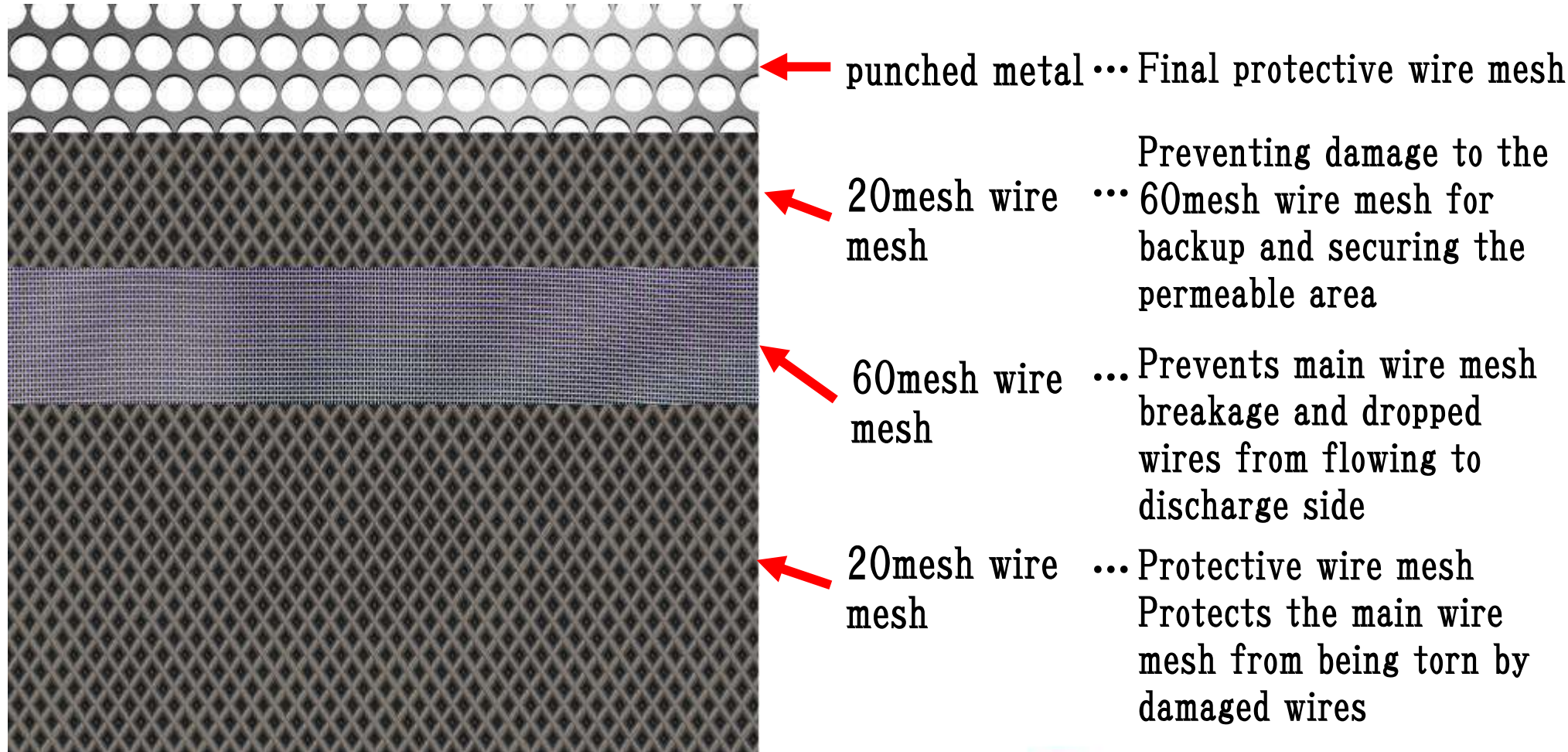
- Please install inside the ELEMENT HOLDER of the existing Niikura LO-MAXFILTER.
- Some products may not be able to be installed, so please contact us in advance.

【Maintenance method】

Please check the condition of the ELEMENT when replacing or cleaning to ensure that it is not damaged or clogged.

2. Modification of existing LO 2nd MAXFILTER

Guard Screen Structure and Function



Niikura Kogyo recommended preventive measures

1. Periodic Replacement of NOTCHED WIRE ELEMENT

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2. Modification of existing LO 2nd MAXFILTER

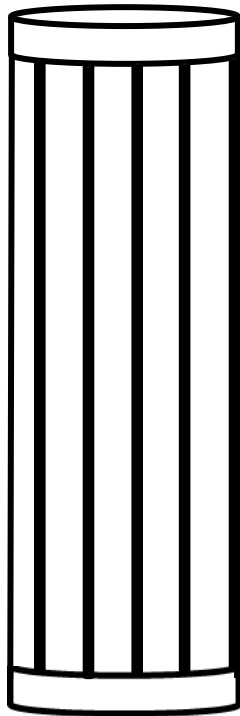
3. Replacement with new WEDGE WIRE ELEMENT

3. Replacement with new WEDGE WIRE ELEMENT

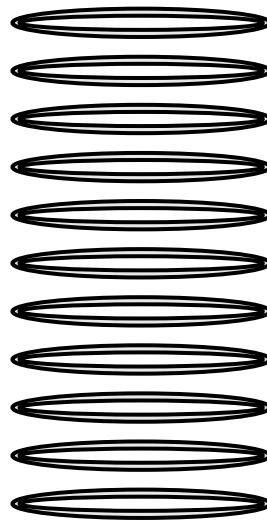
About WEDGE WIRE ELEMENT

Durability, which was the weak point of the NOTCHED WIRE ELEMENT, has been greatly improved. The durability of the NOTCHED WIRE ELEMENT is now several times greater than that of its predecessors. The support rod and wires are welded at all intersections during the manufacturing process, making the element extremely resistant to differential filter pressure fluctuations and breakage. As for the WIRE, the taper angle of the adjacent triangles is wider than that of the NOTCH WIRE ELEMENT, allowing fluid to flow more easily. The wider taper angle improves the backwash effect and facilitates sludge removal. Backwashing at low flow rates and low differential pressures can be expected to restore differential pressure. As of September 2024, only Niikura Kogyo has marketed this product in Japan.

Components of WEDGE WIRE ELEMENT



SUS304 support rod



SUS304 wire



NBR O-RING



3. Replacement with new WEDGE WIRE ELEMENT

1, Characteristic

Compared to NOTCHED WIRE ELEMENT, it is a product with high strength, low passage resistance, and high cleaning effect.

Although the passing area is small compared to the surface area, it can be compensated for because the passing resistance is lower than that of the NOTCHED WIRE ELEMENT (the flow rate per unit area is higher).

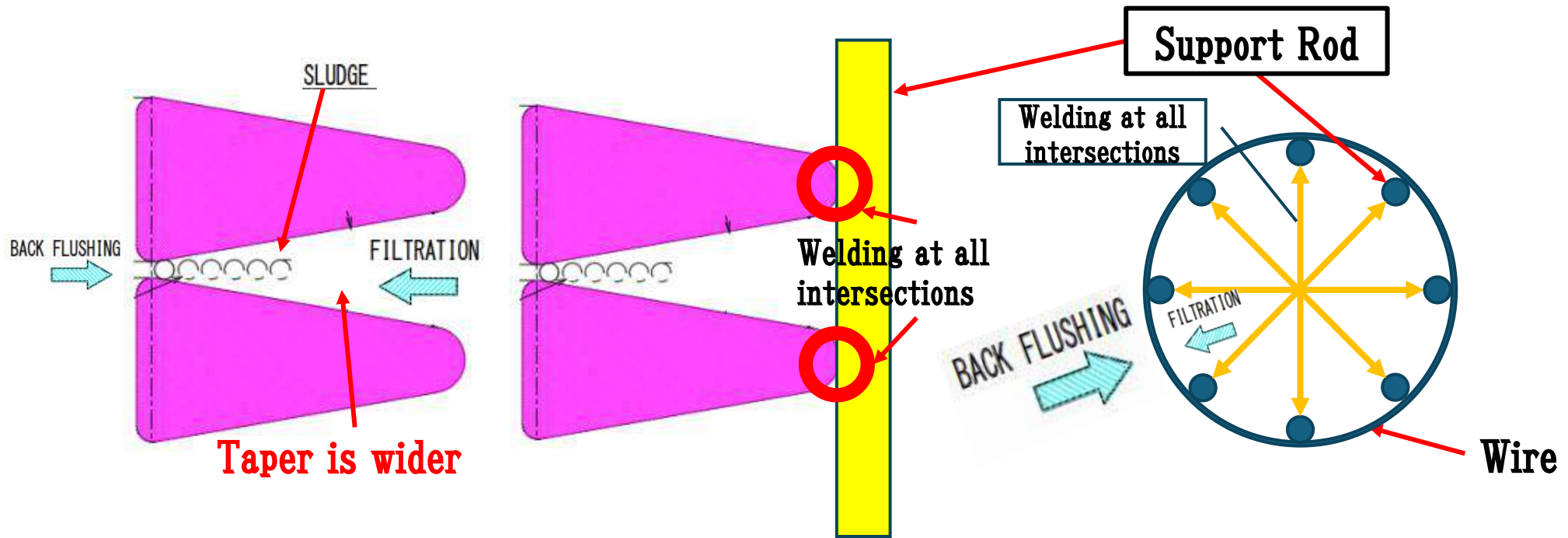
2, Material

NOTCHED WIRE ELEMENT → ALUMINUM, SUS304

WEDGE WIRE ELEMENT → All made of SUS304

3. Replacement with new WEDGE WIRE ELEMENT

WEDGE WIRE ELEMENT cross-sectional view



3. Replacement with new WEDGE WIRE ELEMENT

Advantages of Wedge Wire Element

- **Almost no worries about frayed wires**

WEDGE WIRE ELEMENT is all composed of SUS304 material, which is a high-strength ELEMENT that is resistant to differential pressure fluctuations. (Thicker and stronger wire is adopted)

- It enhances the backwashing effect and facilitates the removal of sludge.
- Differential pressure is eliminated by backwashing at low flow rate and low differential pressure.

- **Reduction of maintenance man-hours**

- Wide taper makes it easy for fluid to flow

WEDGE WIRE ELEMENT:

RECOMMENDED REPLACEMENT PERIOD OF 4 YEARS OR MORE

NOTCHED WIRE ELEMENT:

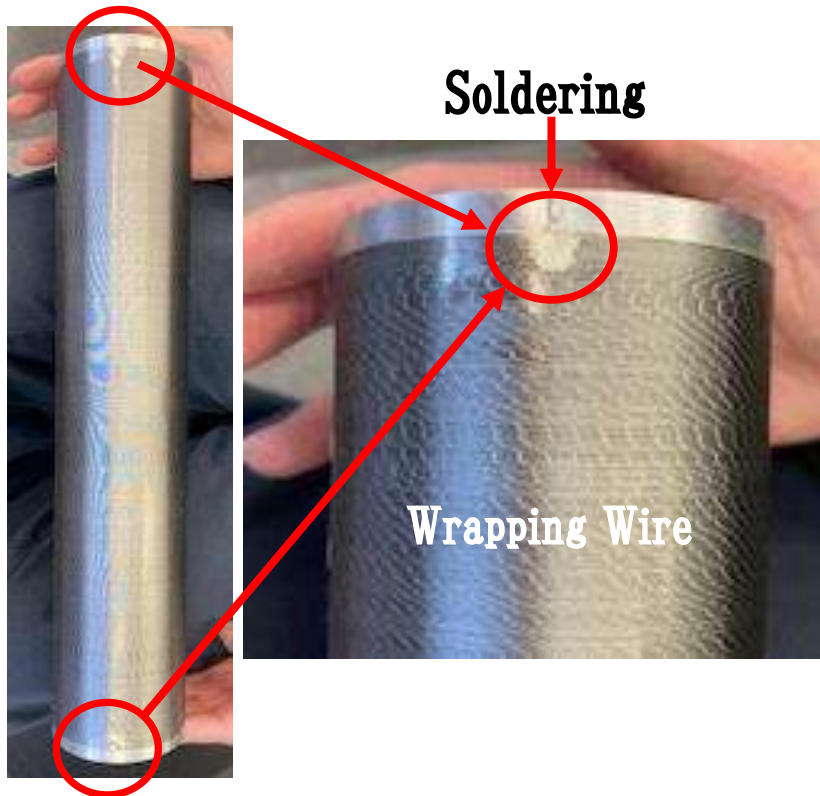
RECOMMENDED REPLACEMENT PERIOD APPROX. 2 YEARS

(Due to the structure, fraying may occur.)

3. Replacement with new WEDGE WIRE ELEMENT

Structural differences

NOTCHED WIRE ELEMENT



Soldering the start and end points of the wire

- Structure that wraps the wire around the casing

WEDGE WIRE ELEMENT



Weld all wires and support rods at intersection points

- THICKER WIRE THAN NOTED WIRE = MORE DURABLE

3. Replacement with new WEDGE WIRE ELEMENT

Installed results



The new ELEMENT has already been installed on more than seven ships, and has not been operated at all for two years, including a single differential pressure switch.

※When replacing, there are conditions regarding the specification of one copy.