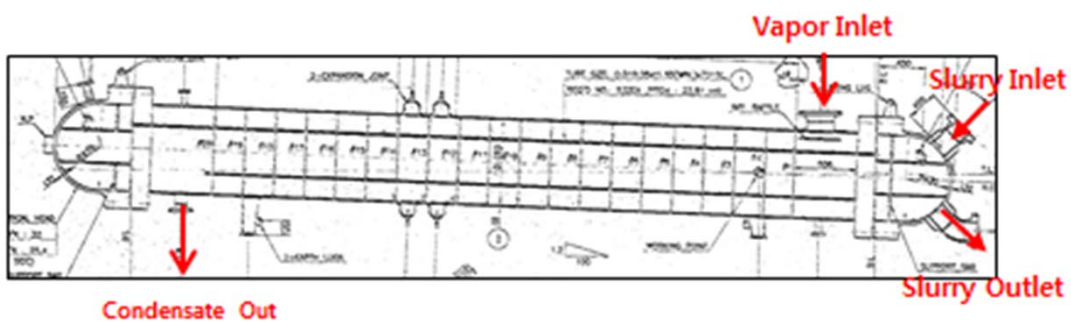
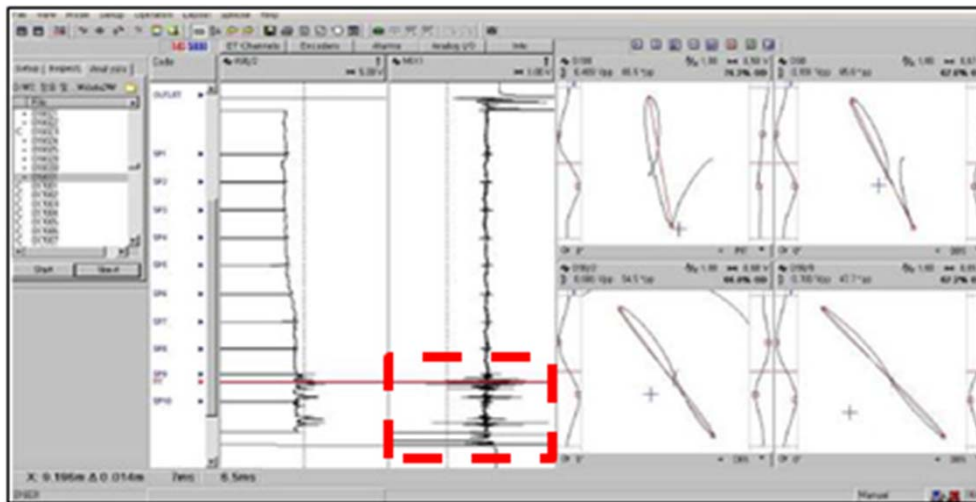
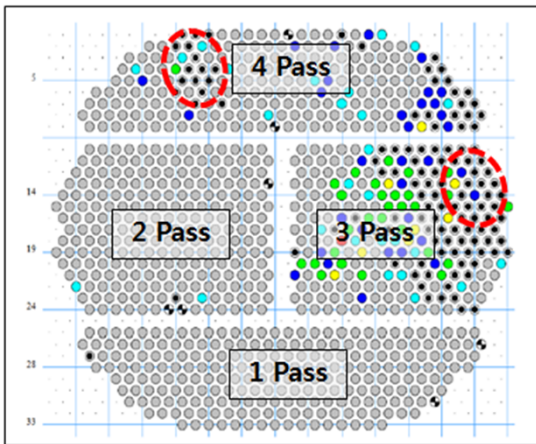


## TUBE FAILURE STATUS

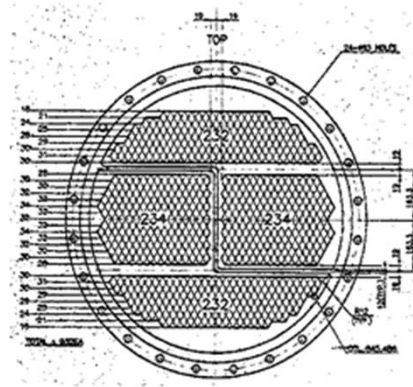
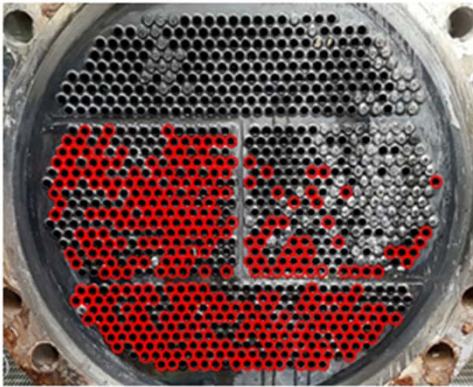
Since Heat Exchanger operation in 2001 year, for 15 years Tube failure occurred in drain outlet where located between Tube sheet and 2ND baffle at 3, 4 pass area particularly as much as 8~10 tube leakage yearly.

Currently total Tube Plugged q'ty is 127 of 932 tubes.





### 3) Tube Plugging Status for 3 months Operation



<1 Pass>

Tube : 232ea

Metal Plugged Tube : 1ea

T.A Plugging : 148 ea

<2 Pass>

Tube : 234ea

Metal Plugged Tube : 1 ea

T.A Plugging : 132 ea

<3 Pass>

Tube : 234ea

Metal Plugged Tube : 91ea

T.A Plugging : 46 ea

<4 Pass>

Tube : 232ea

Metal Plugged Tube : 36 ea

T.A Plugging : 0 ea

※ Tube Plugged Increased for Operation

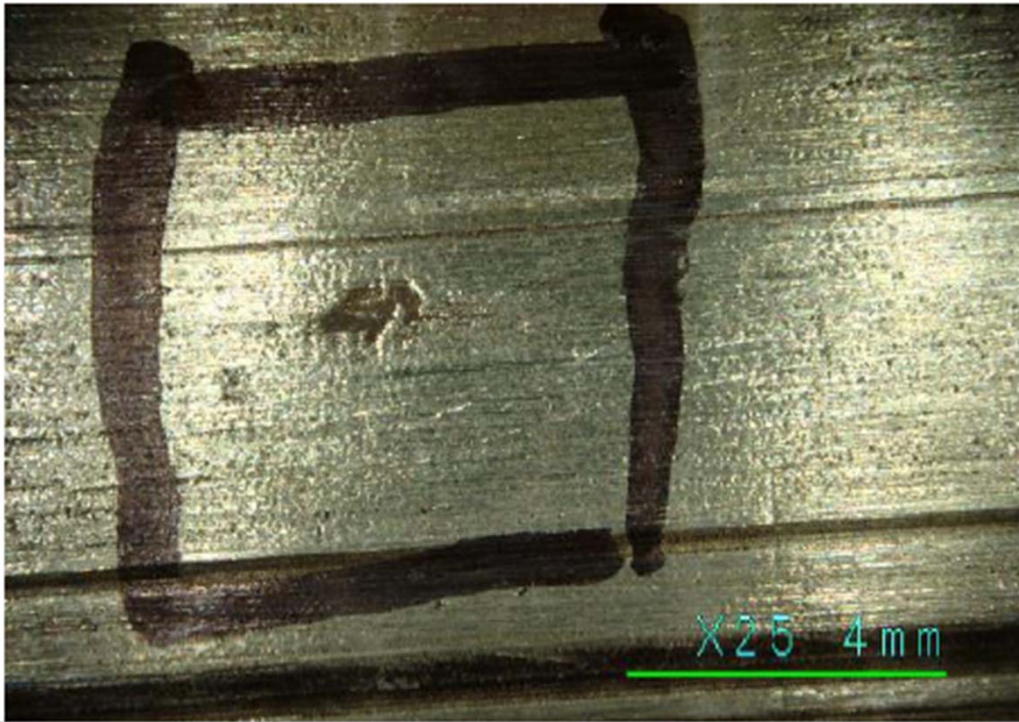
2005.10	2007.09	2009.01
2012.05	2014.05	2016.05

- 118 ● Plugged
- 7 ● Obstructed
- 1 ● 80 < Defect <= 100
- 8 ● 60 < Defect <= 80
- 29 ● 40 < Defect <= 60
- 33 ● 20 < Defect <= 40
- 27 ● 0 < Defect <= 20
- 709 ● Defect = 0
- 0 ○ Default

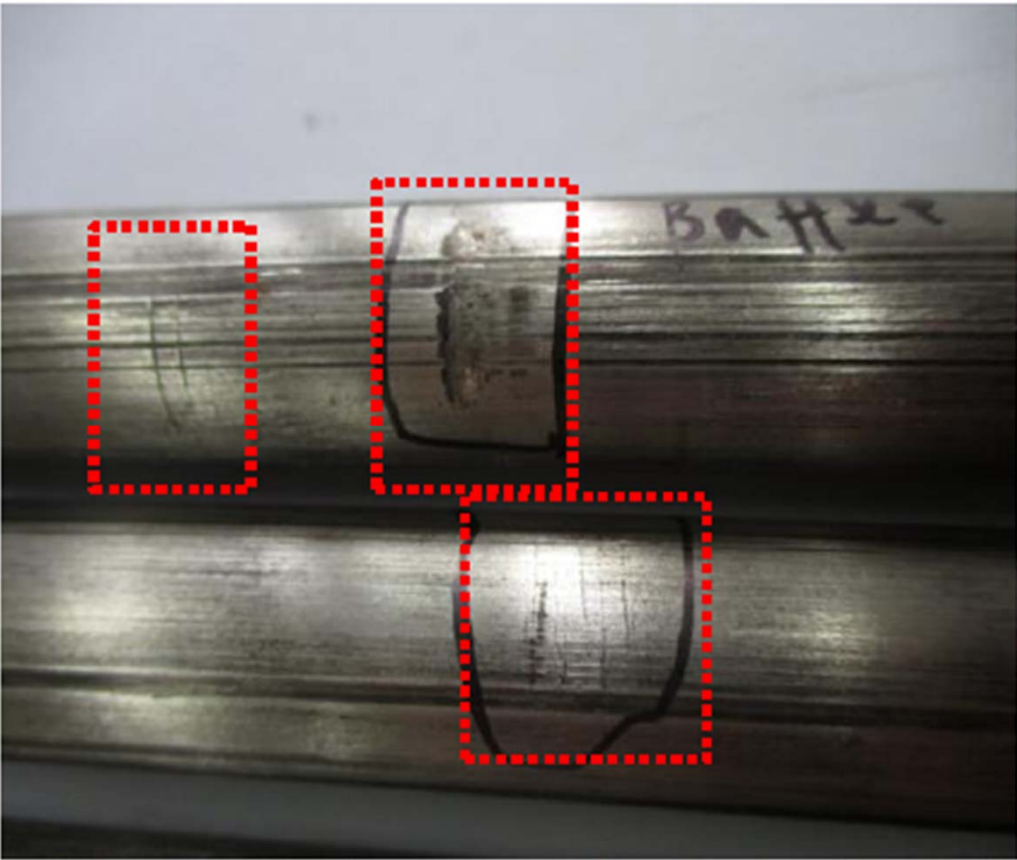


1. Tube Surface Pitting

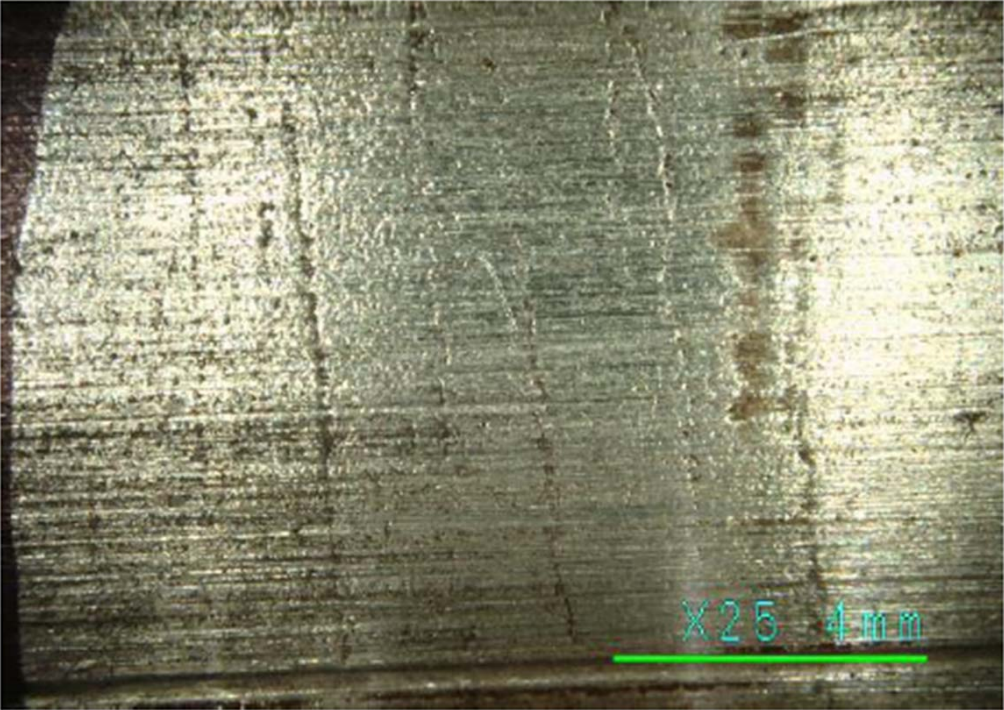
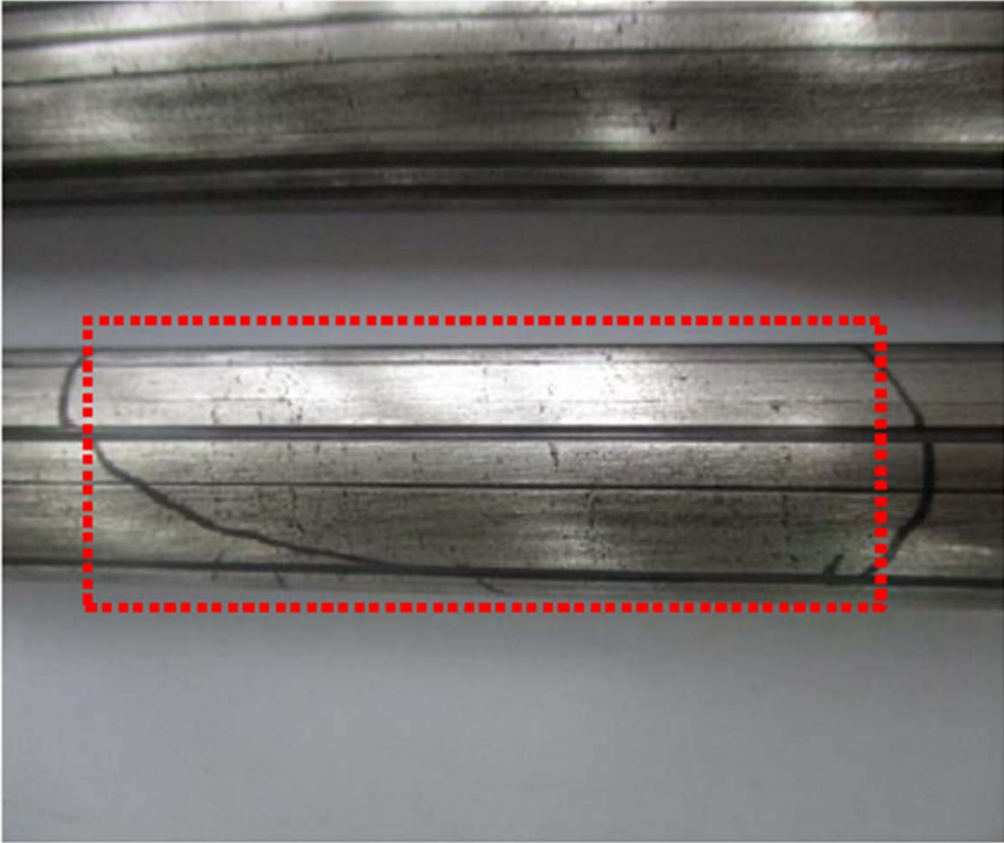




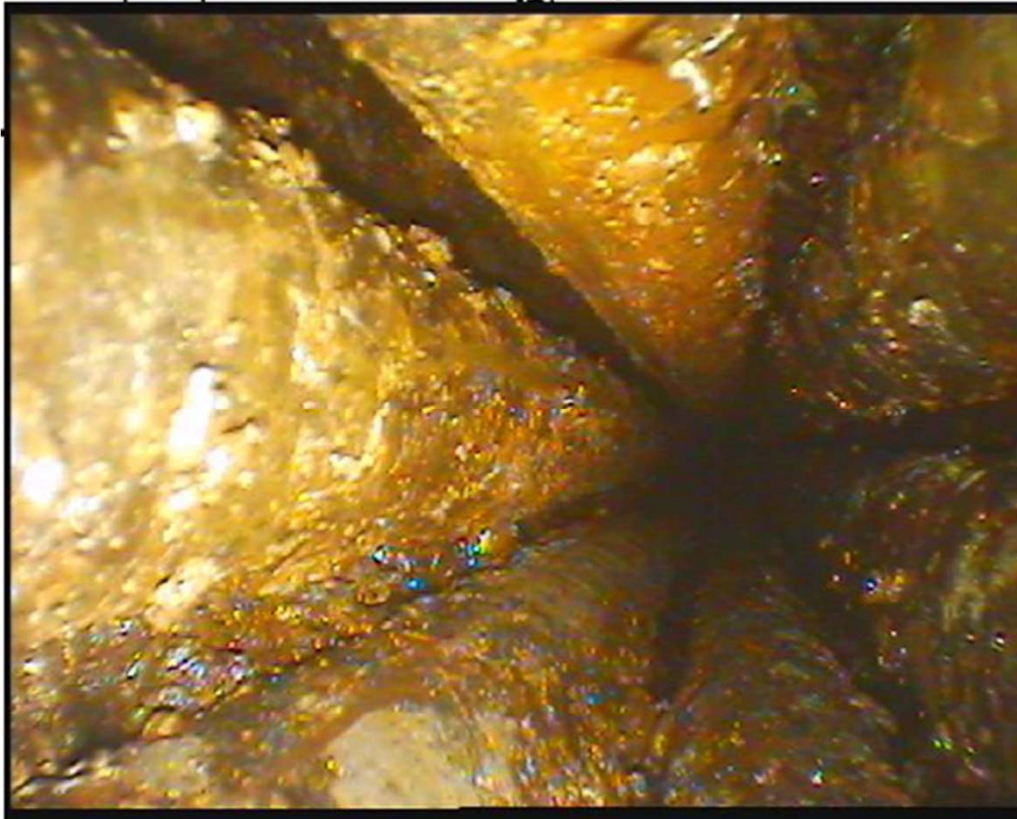
2. Friction Damage at Baffle



3. Tube Surface Pitting and Micro Crack



4. Tube Surface near by Tube Sheet







5. Micro Crack (Max. 1.1mm)

