# Boiler Tube Leak Detection System

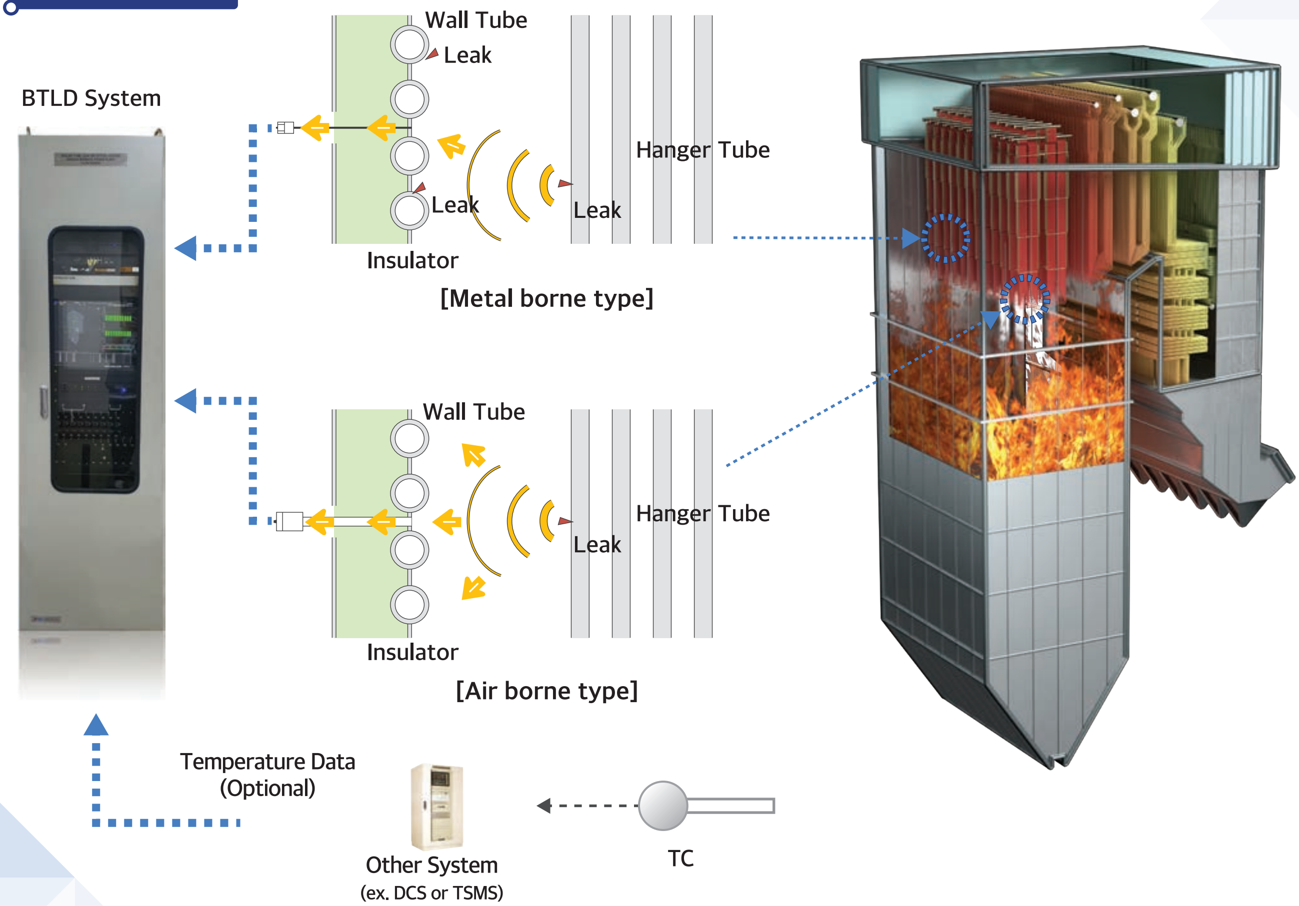
ORBIS Co., Ltd.

# Boiler Tube Leak Detection System

## SUMMARY

The boiler tube is connected with many tubes welded to each other and is always subjected to thermal stress due to expansion and shrinkage during start-up and shut down. The radiant heat transfer of combustion gas, high temperature and high pressure steam flowing inside the tube causes many problems to the tube such as deterioration, corrosion, abrasion clinker fall etc., that finally leads to tube leakage. The leakage expands to adjacent tubes and huge accident shall occur resulting in significant losses by longer repair time, higher repair cost, and higher power generation loss. The Boiler Tube Leak Detection System detects the leakage and location early, also giving an alert preventing defects to adjacent tubes and utilization fall rate of the plant reducing the loss dramatically. Therefore, most large-capacity power generation boilers install and operate the BTLD.

## COMPOSITION




## BENEFITS

- **Early detection of leakage & location with alert**
  - Prevents 2nd, 3rd failure extension to healthy tubes and large accidents
  - Reduce repair time and costs
  - Reduces the amount for power generation loss and prevents power plant utilization rates from deterioration.
- **Linkage with the Boiler Tube Temperature Monitoring facility**
  - During operation, it is possible to identify the deflection of the flame
  - It is possible to Improve the operation and combustion condition, thereby improves operation efficiency
- Predicting and notifying the feasible leak of tube area through an algorithm that utilizes accumulated temperature data and operating parameters of the boiler, it is possible to prevent leakage of the boiler tube in advance by precisely inspecting the part during overhaul and replacing the weakened boiler tube.

## CHARACTERISTIC

- **Hybrid Detection System consisting a combination of Metal Borne & Air Borne**
  - Metal borne and Air borne sensor can be installed individually or in combination depending on the location.
- **Accurate judgment of leakage, estimation of leak area and alarm alert through noise filtered frequency analysis**
- **Data linkage with Boiler Tube Temperature Monitoring Facility**
  - Higher reliability on tube leak detection
- **DCS & ICMS linkage**

## MAIN COMPONENTS


- **Metal Borne Sensor & Preamplifier**
  - Type : Acoustic Emission
  - Frequency : 0.5~33kHz
  - Operating Temp : -55°C~250°C
  - Frequency Range : Wide Detection
  - Recommend : Boiler Header, Wall Tube

- **Air Borne Sensor(Included Preamplifier)**
  - Type : Micro Phone
  - Frequency : 0.1~20kHz
  - Operating Temp : -40°C~85°C
  - Frequency Range : Narrow Detection
  - Recommend : SH, RH Area, HRSG

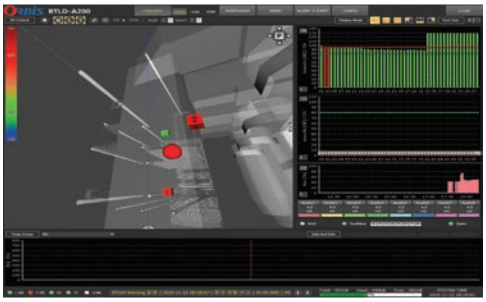
- **Data Acquisition Unit**
  - Data Analysis Unit
  - Signal Condition Unit
  - I/O Unit
  - Terminal Board
  - Signal Distribution Board
  - BNC Board

# Boiler Tube Leak Detection System

## SOFTWARE

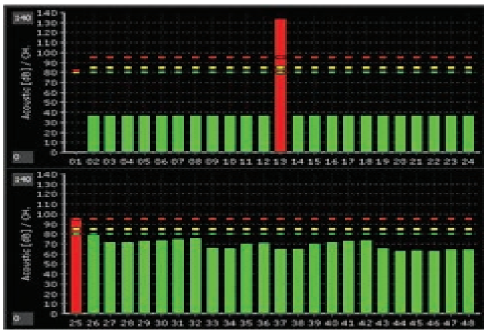
### Overview

- Display of 3D sensor map
  - Sensor location, Leak location
- Display of Aux. Input signal for boiler operating parameters
  - Analog Value : Generated Power(MW), Steam Flow(t/h), Feedwater Flow(t/h), Makeup Flow(t/h)
  - Digital Value : Soot Blow
- Display of alarm, Signal level(dB) for each Sensor



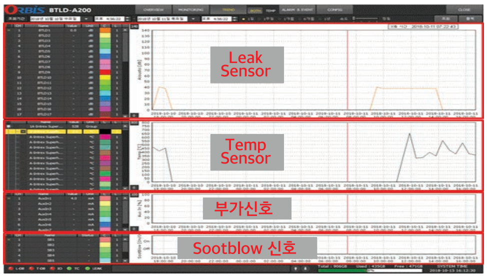
### Bar graph & Alarm

- Color change of each bar & leak detection according to signal level
- Detect leakage of the whole band(0.2~33kHz) and spectrum analysis
- Setting the signal levels & alarm for each sensor depending on the site condition
- Records the alarm & event
- Interface dialogue with DCS, ICMS and alarm transmission



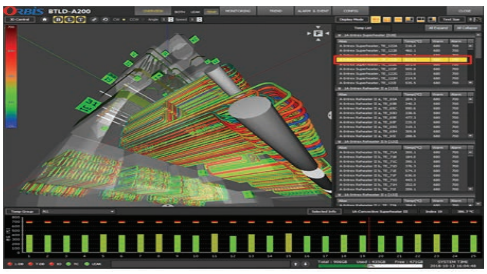
### Trend

- Each signal change of the sensor at difference location is detected
- Analyzes the change in time, daily, weekly and annually
- Data storage & capacity supervision according to first-in, first-out(FIFO)
- Storage of analysis data up to 2 years




### Boiler Tube Temperature Monitoring (Option)

- Boiler Tube 3D Modeling
- Boiler tube temperature distribution monitoring
- Monitor specific tubes with 3D rotation
- Boiler tube temperature data linkage



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