

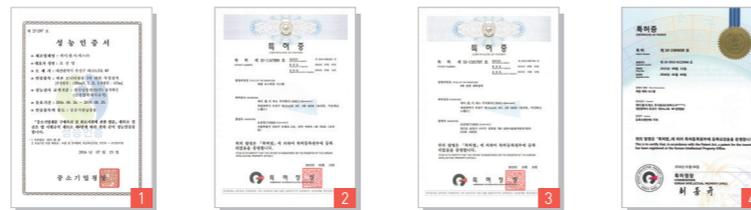
04

Track Record

2018	GGP	- Goseong Hai power plant #1, 2
	KOSPO	- Samcheok power plant #2
2017	KOEN	- Yeongdong power plant #1
	KHNP	- Hanul power plant #1, 2 - Shingori power plant #4
2016	United Arab Emirates KHNP	- BNPP power plant #1, 2
	KOMIPO	- Boryeong power plant #7, 8
	KOEN	- Yeosu power plant #1
2015	KHNP	- Hanul power plant #1
	Malaysia TNB Research	- Janamanjung #2
2014	KOSPO	- Hadong power plant #1
	Hyundai Engineering Co., Ltd.,	- Yeongheung power plant #5, 6
	POSCO E&C	- Ansan power plant
2013	KOEN	- Samcheonpo power plant #3
	KOWEPO	- Taeon power plant #3
2012	KOMIPO	- Boryeong power plant #4
	KOEN	- Yeongheung power plant #1~4 - Samcheonpo power plant #1, 5 - Yeosu power plant #2
	KOMIPO	- Boryeong power plant #3
2011	KOEN	- Yeongdong power plant #2 - Samcheonpo power plant #4
	2009	Malaysia TNB Research

05

Certificate and Patent



- 1 EPC(Excellent Performance Certification)**
Pipe monitoring, tri-axial displacement measuring device
- 2 Patent** Pipe monitoring system
- 3 Patent** Tri-axial displacement measuring device
- 4 Patent** Load measuring system

SPPMS

Smart
Power
Pipe
Management
System

KLES.



KLES Inc. 271-23, Munji-ro, Yuseong-gu, Daejeon, 34050, Rep. of Korea
 TEL. +82.42.671.1122 FAX. +82.42.671.1133 HOME PAGE. www.kles.co.kr/eng

SPPMS

Smart Power Pipe Management System

SPPMS(Smart Power Pipe Management System) is a pipe management system geared to the thermal power plants, beefed up with realtime pipe status monitoring and life assessment technology. Power piping bridging boiler header to turbine inlet, carrying hot and high-pressure steam way long, is subjected to the degradation and deformation at ease, which would cause fatal damage to the piping eventually. Damage to the piping can trigger the failure of the main unit or peripherals, and even worse, likely leading to the shutdown of the power plant to incur huge socio-economic losses. SPPMS monitors the condition of pipes in realtime to prevent such pipe accidents predictably, which comprise a '3D Pipe Displacement Measuring Device' managing realtime 3D movements of power piping, a 'Temperature Monitoring Sensor' sensing the temperature, and an 'Applied Load Measuring Device' monitoring the self-weight and the load. Each measuring device puts forth basic data through which enabling to comprehensively assess and interpret the pipe conditions.



01

Why Required?

01 / Influences of piping failure on the thermal power plants

The piping gets to be exposed to many kinds of impacts. Contractions and expansions to temperature changes, vibrations during operation, and damages coming from natural disasters like earthquakes can bring about sudden impacts on piping, which is bound to trigger piping accidents. In addition, it may as well give rise to vibrations on the turbine or damages to the Super-heater connections. Therefore, it is required to carry through systematical management for sorting out the causes of piping damages, and analyzing & diagnosing thereto, in order to prevent piping accidents.

02 / Socio-economic losses due to piping failure

Unexpected pipe damages or failures may cause the plant to shut down, which will cost the power plant huge economic and time-consuming losses. By sizing up the factors that can afford to directly affect pipe life, and thereupon looking out for their management practices, you can minimize such socio-economic losses resulting from pipe accidents.

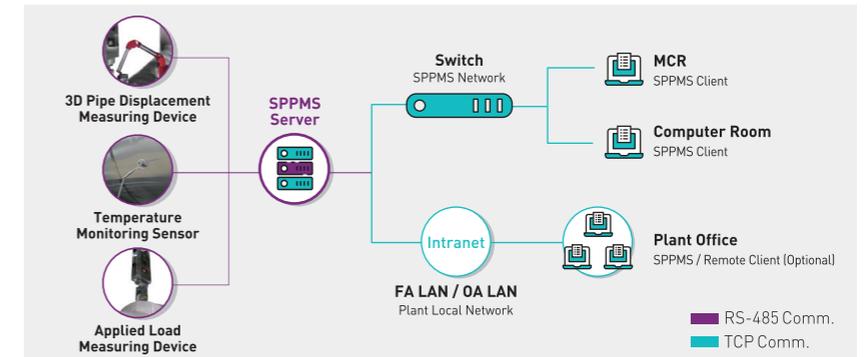
03 / Lack of awareness of the needs of maintenance for piping support devices

In line with the power plant piping system, a large number of hangers and snubbers are to be put up to support the piping self-load and live load. Most piping supports are located in hazardous locations, such as at high places in high temperatures, allowing themselves less accessible, where consequently leading to difficulties to check them up properly. This would leave the required maintenance work for the piping support unattended until it's too late.



02

SPPMS Configuration



01 / 3D Pipe Displacement Measuring Device, taking care of pipe service life

A system that monitors 3-axial changes of piping in realtime generated by repeated injections and discharges of the heat. The displacement data collected by the device can be used to gauge the condition of the pipe, the degree of displacement, and so on. Based on this, you will be able to diagnose how to repair damaged piping.

02 / Temperature Monitoring Sensor, measuring up the temperature changes on the pipe

Measuring up the temperature of each point on the pipe to manage the histories and allow administrators to check it out in realtime when problems take place.

03 / Applied Load Measuring Device, monitoring the changes in the load

During the operation of the plant, the system monitors in realtime by gauging loads of support devices connected to the pipes, while, during overhaul, it diagnoses the reliability of the spring hanger. Data collected through monitoring makes it easy to diagnose the safety of pipes, reducing the time and cost required for maintenance.

03

Smart Intelligence System

01 / Realtime monitoring

Featuring realtime remote monitoring on changes in 3D movement such as pipe displacement, temperature, and load.

02 / Pipe integrity and safety secured

By way of a comparative analysis between the original design value set (design displacement) and the displacement resulted from the operation (operation displacement), the pipe accident can be predicted. Whereupon the measures required for such piping can be taken swiftly so that the integrity and safety of piping can be maintained in one piece.

03 / Works at high places minimized

Most pipe support devices are installed in hazardous areas such as high places and high temperatures /pressures, which makes it not easy to access. The introduction of SPPMS workable to monitor the piping remotely can afford to avoid safety accidents preemptively.

04 / Usable as the basic data to analyze causes of pipe stress and damages

Data purposed to diagnose the condition of pipes are being collected in realtime in SPPMS, which can be compatibly utilized as a basis for prognosing and sorting out the other pipe damage problems