

# Workshop on Micro-Pressure Waves

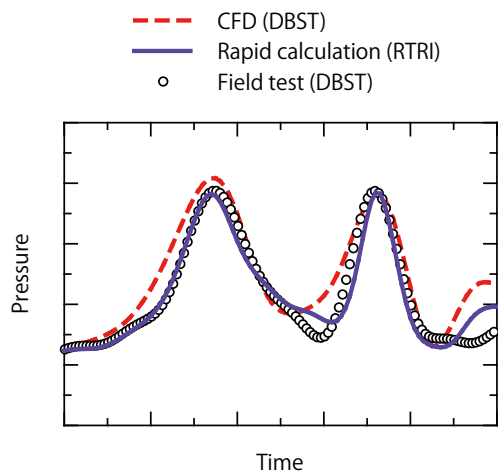
RTRI and DB Systemtechnik in Germany have been collaborating on prediction of micro-pressure waves (MPWs) since 2014. The purpose of this collaboration is to develop new measures for speeding up of the Shinkansen, to validate applicability of RTRI's prediction tools to overseas tunnels, and to investigate assessment tools of MPWs used in foreign countries. In this collaboration, RTRI sent a researcher to Munich for one year, and DBST and RTRI have analyzed the data obtained in German tunnels and shared knowledge with each other. The results obtained through this collaboration were published in two workshops held by both institutes



**Fig. 2: Workshop on Micro-Pressure Waves at RTRI, Tokyo in 2017**

## Outline of the research collaboration

RTRI has developed a rapid calculation method to predict MPWs based on acoustic theory in order to obtain prediction results quickly. DBST uses the CFD (computational fluid dynamics) technique to predict MPWs and design tunnel hoods.



**Fig. 1: Comparison of the MPW prediction results**

We have compared the speeds, accuracy and range of application of both prediction tools with the field tests results obtained in German tunnels. The calculation results were obtained in a few seconds to a few minutes by RTRI's high-speed calculation method, while it took a few days with DBST's CFD. It was also confirmed that, in predicting MPWs under conditions similar to the tunnels in Japan, the results obtained by the rapid calculation have the same accuracy as the one by CFD (Fig. 1). On the other hand, the application range and amount of information by CFD are respectively wider and larger than the rapid calculation. Going forward RTRI will be collaborating with DBST in expanding the coverage? Range of CFD technique, and use the results to enhance the accuracy of the rapid calculation.

## Workshops on micro-pressure waves

RTRI and DBST hold two workshops on micro-pressure waves to publish results obtained through the collaboration in 2015 in Munich and in 2017 in Tokyo (Fig. 2). Through these workshops, we have developed close relationships with foreign researchers. We plan to continue this collaboration, including other research organizations as well as DBST, and to accelerate research activities.