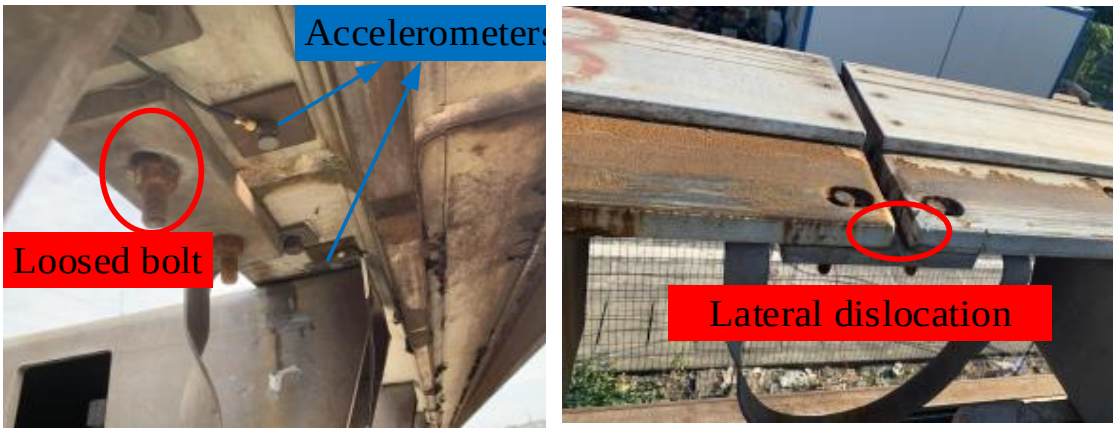
Manual of using database of damage detection on maglev rail joints

Two types of maglev F-type rail joint damage were observed in on-site experiment. One is the rail step due to the bolt looseness (shown in Fig. 1 (a)) and the other is the lateral dislocation due to the misalignment of installation (shown in Fig. 1 (b)).



(a) rail step (b) lateral dislocation

Fig. 1 The damage of maglev F-type rail joints

This database can be used to analyse the dynamic characteristics of damaged and undamaged rail joints based on the obtained acceleration data, here gives the detailed step-by-step procedure for using the database. Noted that the environment is required to be set up with DeweSoftX and MATLAB (2018b).

a) Download the dxd format files about the acceleration data, install DeweSoft and Matlab software.
b) Open one file in the DeweSoft software, click the "export" button on the top then click the "File export" button, choose the Export Type as ". mat". In the Channels Panel on the right side, choose "yes" only for Ch. no AI A-2 (normal condition), Ch. no AI A-7 (found lateral dislocation) and no. AI B-2 (found rail step).
c) Decide the export file name (format example: 20_1 for the file under the first 20km/h testing operation), then save the exported file in the specific directory.
d) Repeat the step (b) and (c) for other dxd format files in DeweSoft software, make sure all dxd format files are converted to the mat format.
e) Change the path name to the directory where contains exported mat format files, then make the specific directories for saving the time-series and the divided mat format file of each channel.
f) Open the mat format file and fill the variables of time and data, then make the specific directories for saving the statistics on time domain analysis (TDA) of each channel.
g) Change the path name to the directory where contains the divided mat format files, then make the specific directories for saving the power spectral densities (PSD) of each channel.
h) Repeat the step from (e) to (g) for other mat format files in Matlab software.