

Monthly Meeting (August, 2020)

Date: August 25, 2020
Time: 2:20 pm - 3:20 pm
Location: Park Seismic Office
Attendees:

In the office: Choon Park and Jin Park
Via Skype: Josefin Starkhammar and Nils Ryden

Greetings: talking about school reopening in Sweden, updates on situation in America and Sweden regarding Covid-19.

Topics regarding Administrative work (All)

1. Jin asked Josefin if she has any plan to purchase a long list of hardware components soon. If so, she (Josefin) needs to prepare a detailed invoice just like the one prepared in March to purchase the PXI system. Josefin replied that she does not have such a plan. Instead, she will purchase a small item related to the Wifi communication, which will cost a relatively small amount. She will send the invoice or paid receipt for that. Josefin also mentioned she will soon need to purchase cables needed to build the MEMS microphone array. She will send the invoice in a similar format used in March.
2. At the end of the meeting, Jin mentioned that she would expect to receive the invoice package for the month of August within the next two weeks.

Topics regarding Technical work

1. NRRRA Presentation on September 3rd, 2020:
 - Choon mentioned that we need to prepare the presentation at NRRRA Pavement Workshop scheduled on September 3. It is a 1-hour presentation including about 15-min Q&A after presentation. He mentioned that his part will take about 25-min after Jason's 5-min introduction. So, he suggested that the Team Sweden prepare a presentation of about 15-min duration. He would cover the general aspects of this project including contents focused on the software development and suggested that Josefin cover the hardware development and Nils cover the most recent field surveys by using the old system. He mentioned that he prepared summary slides for the two field data sets collected in July and August. He would send them to Nils so that he can use them for his own preparation. Josefin mentioned that she can cover most recent development in the acquisition control software.
 - Choon suggested that Nils cover details about the two field data sets and field operation as they are the main points audience would like to know about; for example, what obtained seismic field records and corresponding dispersion images look like. He also suggested both parties of Team Sweden and Team USA should be a backup to each party just in case either party cannot join the meeting because

of unexpected issues. So, both parties should share all presentation files beforehand. Choon proceeded to briefly talk about contents of his presentation file so that Team Sweden can grasp the core points of each slide.

- After his brief presentation (about 10 min.), Choon asked if there is another video clip that shows more details about the impact source of the bouncing ball. Both Nils and Josefin replied there may be one or two and they would search for them around. All agreed to continue to discuss the presentation for the coming one week to finalize the contents and format.

2. Software (ParkSEIS-HMA) and Acquisition Module

- Choon started to talk about a power-point file that he sent a few days ago to Team Sweden. It briefly described the general framework of the acquisition part of the ParkSEIS-HMA and the PXI-control module that Josefin wrote, which is basically the acquisition software that controls everything related to the acquisition hardware components. Choon explains that the ParkSEIS-HMA software will sit on the laptop (i.e., "C" drive of laptop), while the PXI-control module will sit on the PXI drive (i.e., "C" drive of PXI), which will be connected to the laptop as a network drive (e.g., as "D" drive in laptop). Then, the ParkSEIS-HMA will launch PXI-control module via a network communication. At the beginning of survey, the ParkSEIS-HMA will write a text file called "arm.txt" on the PXI drive, and then PXI control module grabs it for all acquisition-related parameters (e.g., sampling interval, recording time, etc.). Josefin asks if ParkSEIS-HMA can sit on the PXI system so that some potential issues can be avoided. Choon answers "No" because the laptop will be the ultimate unit that hosts both ParkSEIS-HMA software and acquired field data so that the user can bring it in the office after field operation for subsequent other tasks (e.g., downloading results, checking data quality, exporting results in different formats, etc.). He explained that acquired seismic data will be saved in a folder of PXI drive in TDMS format (e.g., *.tdms) and then ParkSEIS-HMA will grab the saved file and convert it into ParkSEIS (PS) format for subsequent analysis purposes within a local folder in the laptop.

3. Field Data Collected on a New Asphalt Road (August 12th, 2020)

- Choon showed slides of most recent data set collected during August. He commented that overall quality of the data is still excellent, but there are some points he wanted to clarify and that's why he prepared the presentation file. He mentioned that the overall phase velocity of Lamb waves is lower, by as much as by 400 m/s, than those collected during July when the pavement temperature was lower. He asks Nils if it was mainly due to the higher temperature. Nils confirmed it was the case. Choon commented that it is very surprising to know temperature can make that much big difference in Lamb wave velocity. Choon asked about the triggering channel if it was still in #1 channel as with previous surveys. Nils and Josefin replied that it was at #24 channel to be located as much at the center of both forward and

reverse shots as possible. Then, after data collection, both channels (i.e., #1 and #24) were swapped when making a regular seismic data file. Choon asked about the pre-trigger delay time if it was still set to 1 ms as before. Nils replied that it was set to 0.5 ms this time because it is set to 10% of total recording time, which was set to 5 ms this time instead of 10 ms as previously set. Choon requested that the pre-trigger time should be longer like 1 ms so that his automatic muting algorithm can operate most effectively especially when there is significant noise involved in the record.

- Nils commented that temperature can reduce the overall amplitude of seismic waves so significantly, there has to be a certain sequence of calibration before actual survey takes place. For example, by using stationary impact, the voltage levels of seismic waves and ambient noise must be separately evaluated so that the triggering level and dynamic range can be properly set.
- Choon commented that time-domain display can be misleading because all matters is the dispersion image and those "noisy" time-domain records can still show good dispersion images. Nils commented that if we can utilize those field records of weak impacts that are generated when the source is not bouncing high enough but almost dragging near the surface, then we can have very densely sampled seismic data. He also commented that it will, however, become challenging on the part of software because it will be tough to distinguish air waves from Lamb waves for the accurate air-wave mute purposes. Choon commented that he will work more on such data and see how much effectively those weak impacts can be handled.

Agreed to do:

1. Continue to communicate for the next one week to discuss contents of the NRRRA presentation files.
2. Share power-point files between the two teams.

The meeting adjourned at 3:20 pm.