Hampson-Russell Software
Data Conditioning Workflow

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This document provides a step-by-step workflow through the data conditioning process in Hampson-Russell. The parameter used in the following exercises are only valid for this dataset.

The data conditioning workflow is designed to reduce noise in the seismic in order to obtain better AVO Attribute and Inversion results.
Create a New Project

From the Geoview window, click the Create New Project icon.

Select a data location to write the project to.
Create a New Project

Select the project

Click Open selected from the bottom left hand corner.
Loading seismic

Open the seismic data by clicking the **Seismic** Tab and then, at the base of the window, click **Import Seismic > From SEG-Y.**
Loading seismic

Once the file is selected click **Next**.
Select the geometry type and click Next.

Specify the right parameters in the highlighted area and click Next.
To check the header byte locations, slide the bottom bar from left to right. Then choose Next. The software will now scan the data.
Well Map Table

Once the data is loaded, check the well mapping menu under Project > Well Map Table to be sure the wells are spotted in the proper location. If the data loaded correctly, this window will appear automatically.
Import Horizon

Examine the seismic for problems such as improper NMO correction and low frequency noise on far offset traces.

If there are horizon files available, import them by choosing the Horizon tab on the left of the window and then the Import / From File option at the bottom.
Select the horizon from the left window and add the selected file to the right window. Click Next.
Depending on the Horizon file type, you may need to set the parameters to match the header.
Import Horizon

After the horizon is imported, it should be displayed on the seismic window. If the horizon does not appear then the file did not load correctly or the display settings under the eyeball icon need to be set correctly.
Horizon Picking

Horizons can also be manually picked and automatically extended through the entire volume.

From the Horizon tab select Pick Horizon > New > Horizon Name.

Click Ok and Yes in the next confirmation window.
Horizon Picking

Select the Horizon name, picking Mode and Snap.

Pick the event you are interested in. Then you can run the Automatic Picking option on the horizon.

For this case we select Options > Automatic Picking.
Data conditioning

The data conditioning workflow shown below gives you a general idea of the available process conditioning processes in Hampson-Russell. The application of these processes will depend on data quality, your criteria, and your individual goals when conditioning the data.

Below is the recommended workflow for conditioning gather data in order to improve the AVO and Inversion response.

- Mute - Trace / Angle Mute
- Band Pass
- Super Gather
- Trim Statics
- Parabolic Radon Transform

This process can be run manually as on the left or as a Workflow or Chain Processes as on the right. For this exercise, we will run the process manually.
To eliminate noise on the far offset traces, we will apply a mute. There are two mute options, Mute and Angle Mute. First we will run the Mute option and secondly the Angle Mute. Select Process > Utility > Mute. In this version you can manually pick the points on the seismic to apply the mute to the data.

This is done by choosing the pencil icon and then manually picking the traces to be muted on the screen.
Trace Mute

The values will be added to the table automatically. Click OK to run the process. This should be done on several inlines and crosslines.
When the process is finished, we will be able to compare the result of the mute.
A second way to eliminate noise on far offset traces is through the Angle Mute process. Select Process > Seismic processing > Angle Mute. Note: You need a velocity model for this process.

Specify the input and output data and the parameters depending on your needs.

Before choosing the angle value to apply the angle mute, you should know the correct value to apply. If this is not known, the incident angle tool will provide the needed angle value.
Click the eyeball icon.

In the Color data volume select Incident Angle. Click Apply.
Angle Mute

The color bar shows the incident angle of the data.

By running the cursor across the window, you can choose the angle value to use. The green dot positioned (from the cursor) above the target horizon shows the largest angle value generated from the velocity control used. On the bottom of the window we can see the value for this angle is: *Color Amp.: 42.8131.*
Angle Mute

In order to select your velocity model, click the `Edit Velocity` button.

Now that we know the correct angle, you can select the velocity to use on the Angle mute process.
For this example we will use P-Wave velocity but notice you can also use a velocity table or volume.

Define the parameters and click OK.
Click OK to run the process.
Angle Mute

The result of the angle mute process will appear in the right window.
To remove noise we can apply a band pass filter. First view the amplitude spectrum.

Select the trace rate, time window and offset range. Click OK.
Determine the frequency you would like to save, and enter the correct values into the band pass filter options.

Click **OK**.
A very useful technique to suppress random noise is the Super Gather tool. Select Process tab > Seismic Processing > Gather > Super Gather.
To set the process parameters, name the Output file (in this case mute_filter_super) and set the maximum offset to 4500 meters and number of offset to 25. Click OK.
Super Gather

Before Super Gather

After Super Gather
The Trim Statics process can fix migration move-out problems on pre-stack data. To start the Trim Static process select Processes > Seismic Processing > Trim Statics. Assign the proper input parameters to your data set. Click OK.
Trim Statics

With this process we can adjust the time an event occurs by controlled parameters. This is a beneficial tool for flattening the far offsets. The cross correlation options depend on your criteria. We recommend that you QC the output results to make sure the stretching is not affecting other events.
Parabolic Radon Transform

The Radon transform is a tool used for noise suppression. In order to apply the filter select Process > Seismic Processing > Filter > Parabolic Radon Transform. For this exercise the parameters below should be used. Choose OK.

Note: The parameters displayed here are an example of what should be used.
Parabolic Radon Transform

Before Radon

After Radon

Residual (noise removed)
Conclusion

Data conditioning fulfills these purposes:

• Remove noise from the data.
• Flatten events.
• Scale the amplitudes globally.

Proper Data Conditioning can make a big difference in the quality of your attributes.

We recommend:
• To test the parameters used in each process.
• To create a small sub-volume to test each process before applying it to the full volume.
• To QC the outputs to make sure we didn’t remove coherent events.
Support Offices

For information, purchase inquiries or technical assistance on a specific software product or tool, please contact your nearest Hampson-Russell Technical Support or Sales representative:

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