CUSTOMER SUPPORT NOTE

Modelling a Local Discontinuity in a 3D Volumetric Model

Note Number:	**CSN/LUSAS/1013**

This support note is issued as a guideline only.

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1. Introduction

This support note describes a method for modelling a local discontinuity within a 3D volumetric model. The technique can be applied, for example, to model a localised crack or a deliberately introduced discontinuity. The approach presented here utilises the *Unmerge* command. A simple example is provided below to illustrate the procedure.

2. Description

The 3D volumetric model shown in Figure 1 consists of four fully connected volumes that share common surfaces, lines, and points. A local discontinuity needs to be introduced along the red line. This can be done by applying the *Unmerge* command and following the steps outlined below.

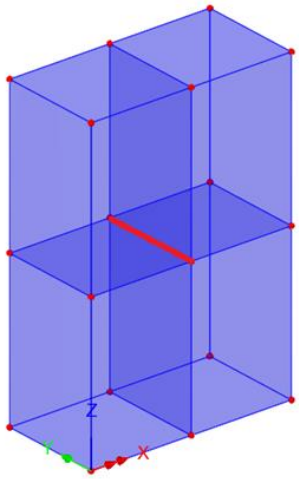
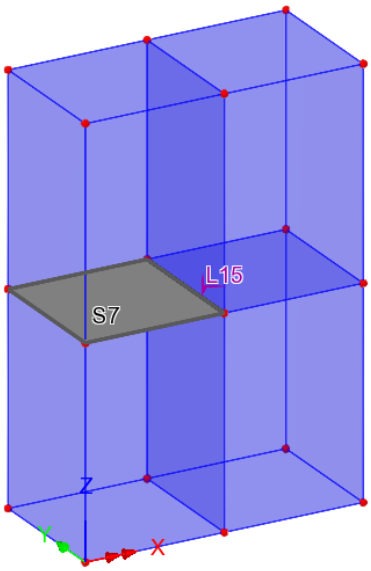


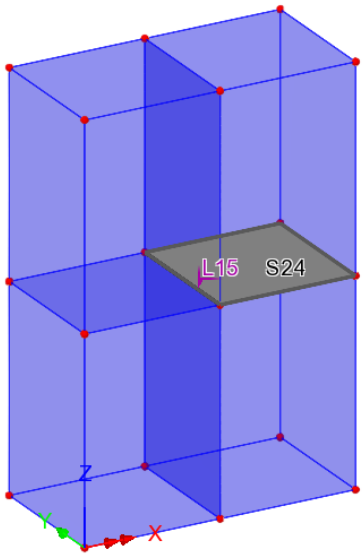
Figure 1 – 3D volumetric model.

Steps:

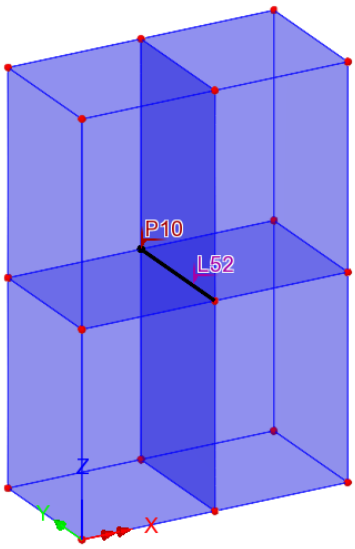
Select **Surface 7** and **Line 15** (red line in Figure 1), then go to Geometry > Line > Unmerge to unmerge them.



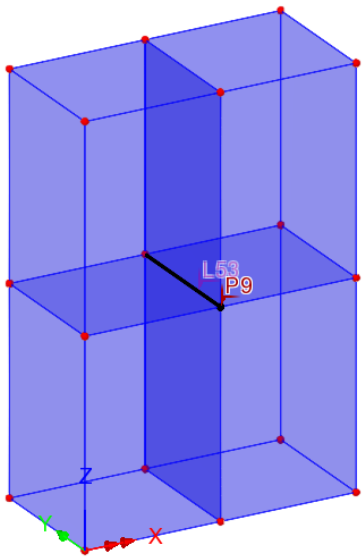
Select **Surface 24** and **Line 15** (red line in Figure 1), then go to Geometry > Line > Unmerge to unmerge them.



Select **Line 52** (one of the two new lines created in the previous steps) and **Point 10**. Then, go to Geometry > Point > Unmerge to unmerge them.



Finally, select **Line 53** (one of the two new lines created in the previous steps) and **Point 9**. Then, go to Geometry > Point > Unmerge to unmerge them.



The previous steps remove the line shared by the four volumes and create two separate lines. To verify that the discontinuity has been modelled correctly, select the two new lines and move them in opposite directions (+X and –X), as shown in Figure 2. The volumes are disconnected at the vertical surface interface, while the upper and lower points and lines remain connected. Refer to Customer Support Note 1036 for guidance on checking feature connectivity.

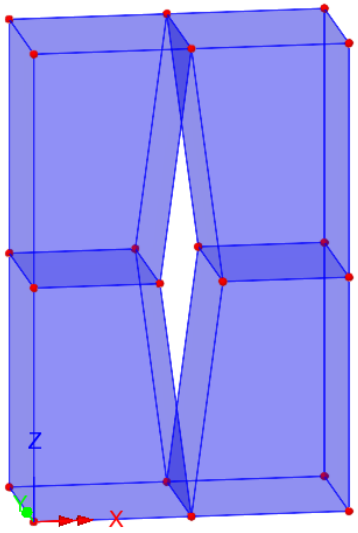


Figure 2 – Discontinuity in 3D volumetric model.

3. Summary

Modelling a discontinuity within a 3D volumetric model:

- Select the required geometric features (points, lines, and surfaces) and apply the *Unmerge* command.
- After unmerging the required features, verify that the discontinuity has been modelled correctly by moving the appropriate lines.

If you have any doubts or require specific advice for your type of analysis, please contact the LUSAS Technical Support team at support@lusas.com.