

# LVA - Longwall Visual Analysis

## Information Sheet



## Using the LVA Gauges

for LVA versions 7.39 and later

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# 1. Introduction

This LVA info sheet describes the function, use and configuration of the LVA gauges and face snapshot, which are normally displayed across the top of LVA.

## 2. The gauge bar area

The gauge bar area at the top of the LVA screen is always visible in LVA. It shows a “Live/Historical” section at left, a gauges section, and a “face snapshot” section on the right, like this...



The Live/Historical section – Normally you’ll have “Live” selected to show the current status of the longwall. You can select the duration of data to display on most of the main tab sections below the gauges bar (Trending, Face Scan, 3D Images etc). Select Historical mode if you want to review past data from the current or a previous panel.

The Gauges – show the status of various parameters that help monitor conditions on the longwall. Generally when a gauge is in the green to orange areas conditions are fine, and in the red means you might want to see if something needs extra attention. You can configure which of the gauges to show or hide, adjust sizes, and whether they display as a gauge, box, hybrid or hybrid with pop-up (described in more detail below). Each gauge can be configured for the conditions that will cause it to go red.

The Face snapshot – shows leg pressures and/or DA Ram values across the face, along with shearer position, how many shears have been detected over the selected time duration, and the location on the face of some of the gauges when they go red.

## 3. What each gauge means



There are seven gauges and the face snapshot currently available to display in LVA, though you can choose to hide some of them...

- a. Face snapshot: (on the right) Shows leg pressures and/or DA Ram values across the face, shearer position and direction, how many shears have been detected over the time duration selected in the Live/Historical section, and the location on the face of

some of the gauges when they go red (weight on face, weight developing, and cavity risk).

- b. Low Set Pressure: This gauge goes red when there are many shields below set pressure, which may indicate inability to set some shields to the roof (e.g. cavities) or hydraulic issues.
- c. Rapid Set to Yield: Goes red when many shields have reached yield pressure quickly, which may indicate significant weighting conditions.
- d. Hydraulic Health: Goes red when many shields have been identified as having poor hydraulic health. There is a separate LVA Info Sheet which describes in detail how the Hydraulic Health is determined; in summary each shield's hydraulic health is calculated from a combination of low set pressure, leaking, number of hi-sets, not yielding when it should be, low pressure compared to its neighbours, poor pressure sensor calibration, and slow LAS (lower-advance-set) times.
- e. Face Variability: This is the standard deviation of leg pressures across the face. If all pressures are the same, the face variability would be zero. The gauge goes red when the standard deviation is high, indicating significant variation of leg pressures across the face. This can be the result of cavities or inability to set some shields adequately to the roof.
- f. Weight on Face: This is the location and value of highest local average weight on the face. It goes red when the local average weight is high, indicating significant weighting on the face. The gauge name is coloured purple, and when in the red LVA will draw a purple line on the face snapshot to indicate the location, as shown in the image above.
- g. Weight Developing: Goes red when weight on the face is increasing rapidly in a section of the face. When red it also shows the location in the text on the gauge, and on the face snapshot. The gauge name is coloured red, and when in the red LVA will draw a red line on the face snapshot to indicate the location. Note the weight may not be high yet, but is increasing rapidly.
- h. Cavity Risk: Goes red when conditions indicate a higher than normal risk of cavities developing within the next few hours. The gauge name is coloured blue, and when in the red LVA will draw a blue line on the face snapshot to indicate the location, as shown in the image above.

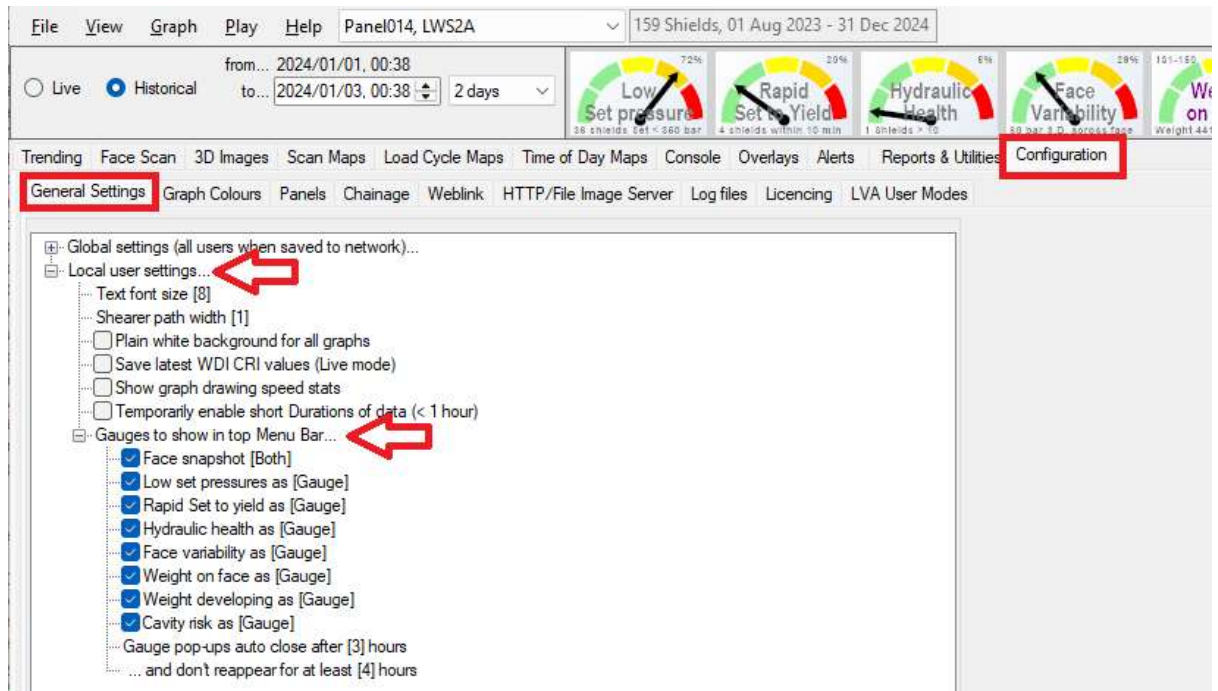
## 4. Gauge display options (Local settings)

Note that all the display configuration settings in this section are "Local user settings", meaning each LVA user can have their own separate settings.

### a. Select which gauges to display

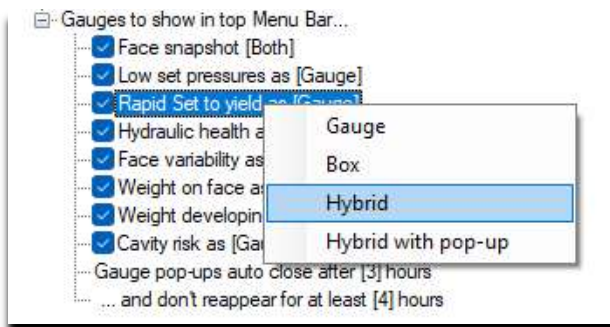
Each LVA user can select which of the gauges to display or hide, and what style the gauge should be (gauge/box/hybrid/pop-up – see later). Go to "*Configuration/General settings/Local user settings/Gauges to show*", and set the checkboxes on or off.

You can also select whether to show or hide the face snapshot. See screenshot below...



**b. Display style – Gauge, Box, Hybrid, Pop-up**

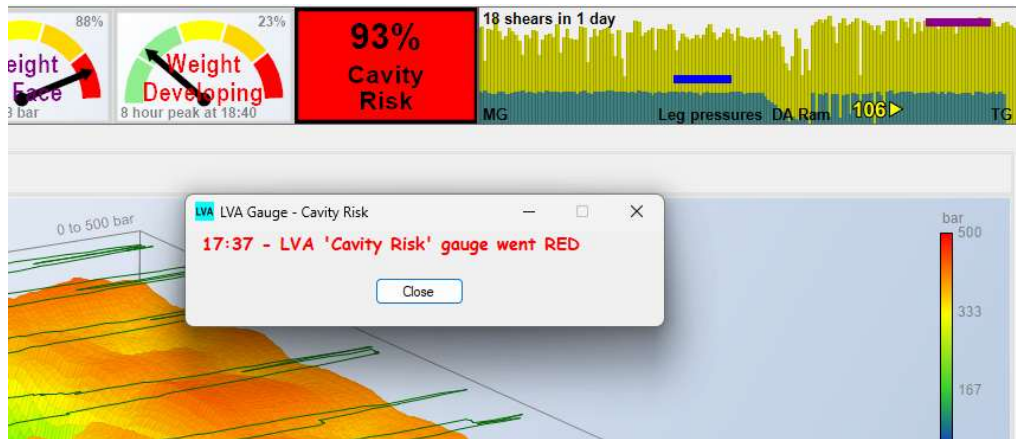
In the configuration section shown above, right-click or double-click “Face snapshot” to select between displaying Leg pressures, DA Ram, or Both. Also right-click any gauge to bring up a menu and choose the display style of the gauge, from these options...



- Gauge – normal gauge with five colour zones and needle.
- Box – shows a basic box coloured green/yellow/orange/red according to its value, like this showing normal gauge vs box...

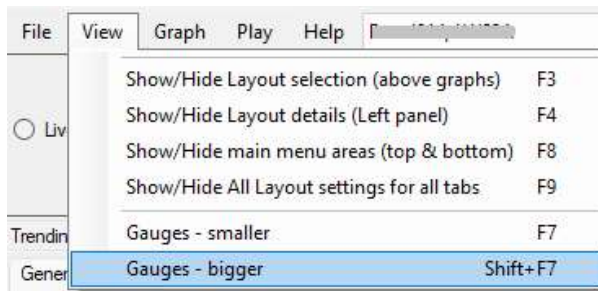


- Hybrid – displays as a normal gauge when not in red, or as a Box style when red, which makes it highly visible for selected gauges, e.g. like Cavity Risk.
- Hybrid with pop-up – behaves as Hybrid, with the addition of a message window that pops up when the gauge transitions into the red zone for the first time in several hours. You must click a button to close the message window, or the message will auto-close after a set time. Set the auto-close wait times in the configuration section shown above.



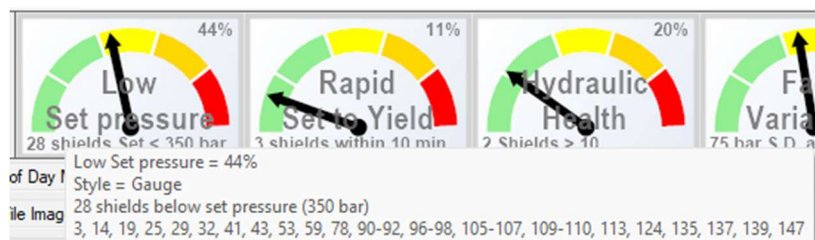
c. Adjust sizing

Select the sizing options under the “View” menu item, as shown below. Or press the F7 key to make the gauges smaller, and Shift+F7 to make them bigger.

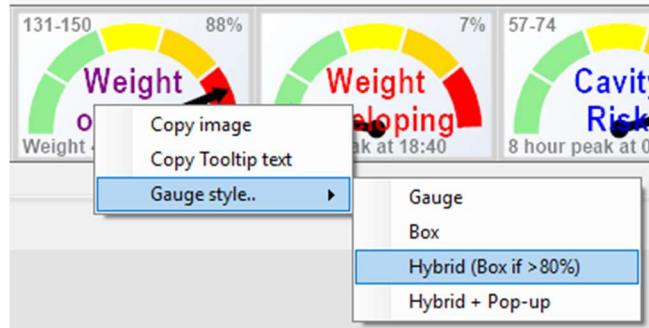


d. Mouse options

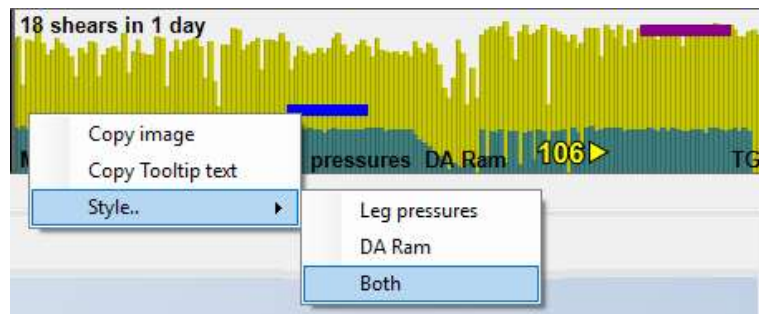
- Hover the mouse over any gauge, or the Face snapshot, to display some additional details as a Tooltip, e.g. showing individual shield numbers like this...



- Right-click on any gauge to copy the image of all gauges to the Windows clipboard, or to copy the displayed Tooltip text for an individual gauge, or to change the gauge style between gauge/box/hybrid/hybrid with pop-up...



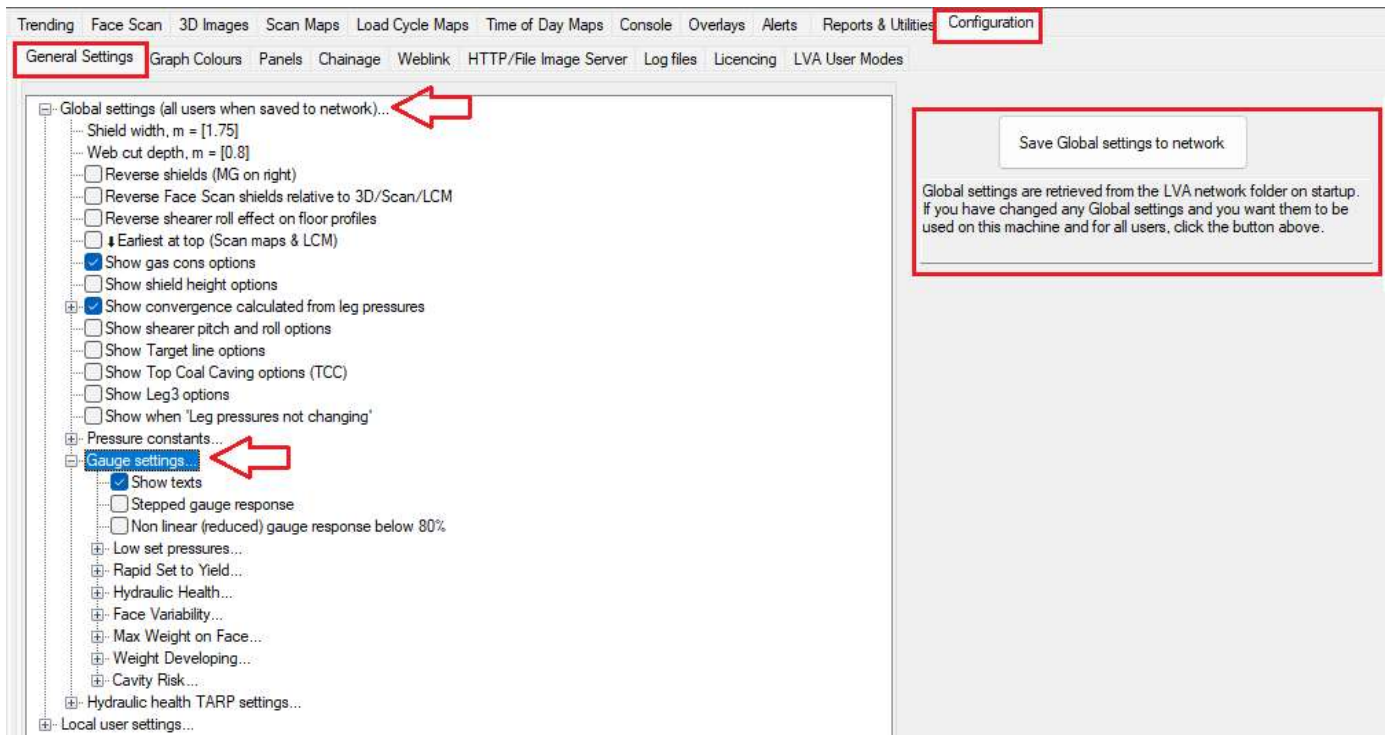
- Similarly with the face snapshot ... Right-click to copy the image to the Windows clipboard, or to copy the displayed Tooltip text, or to change the display style between Leg pressures, DA Ram, or Both...





## 5. Configuring the gauge responses (Global settings)

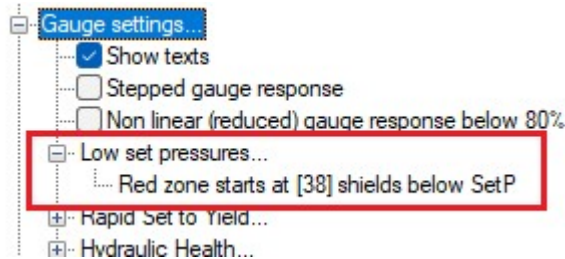
All the Gauge configuration settings shown in this section are “Global user settings”, meaning all LVA users will have the same settings once changes are saved to the network. Note that LVA must be in Server or Technical User mode to access these settings – in LVA go to “*Configuration|User Modes*” to change user modes.



- Show texts – toggle the extra texts around the gauge on/off
- Stepped gauge response – when checked ON, the gauge needle will move to the centre of its indicated colour band.
- Non-linear response below 80% - when gauge levels are below 80% the needle has an  $x^2$  response. This moves the needle further away from the red for lower values. The red range is not affected.
- After changing any Global settings, click “*Save Global settings to network*” so that all LVA users will load them next time they start LVA. Also see “*After changing Global settings*” below.

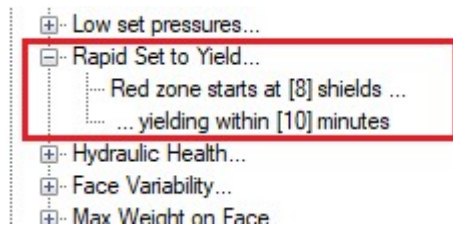
a. Low set pressures

There is only one parameter to set for the Low Set Pressure gauge. Double-click the line starting “Red zone starts...”, or right-click and selected Edit, then enter the number of shields below set pressure to cause the gauge to go red.



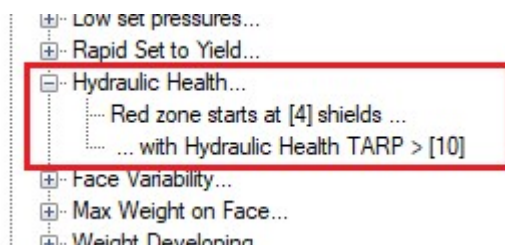
b. Rapid Set to Yield

Using the settings below, the Rapid Set to Yield gauge will go red when at least 8 shields across the face have had a yield event within 10 minutes after being set to the roof. Adjust the settings as necessary for your longwall conditions, and see “After changing Global settings” below.



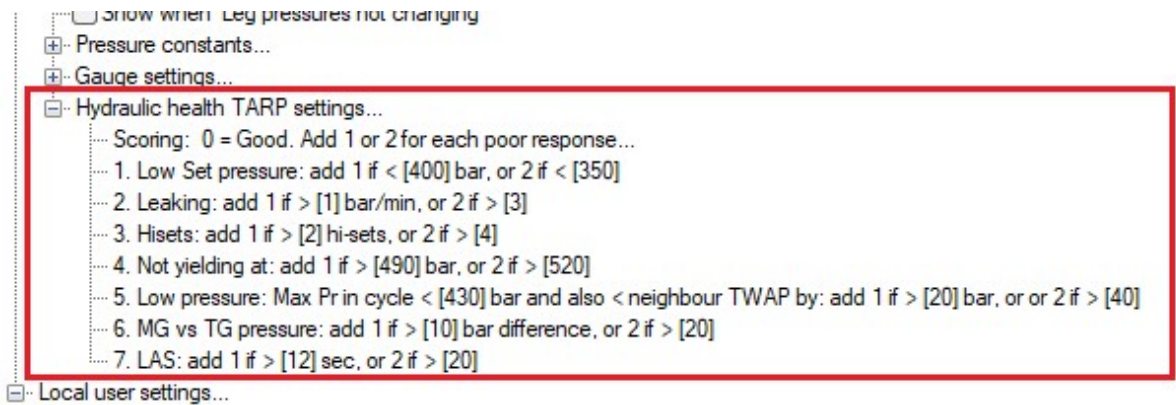
c. Hydraulic Health

A Hydraulic Health value between 0 and 14 is calculated for each shield across the face. A low value is good and a high value means hydraulic issues may be present. The example below means the gauge will go red if 4 or more shields across the face have a hydraulic health TARP value of 10 or more. Adjust as necessary for your longwall conditions.



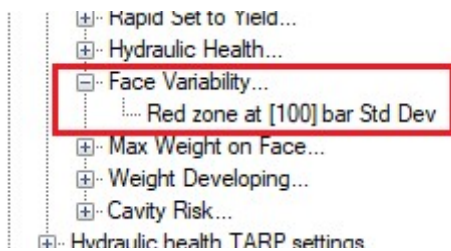
The Hydraulic Health TARP settings are also configured under these Global settings. Refer to the separate LVA info sheet “LVA Infosheet - Hydraulic Health.pdf” for a full description of the hydraulic health feature. This is what the configuration looks like...





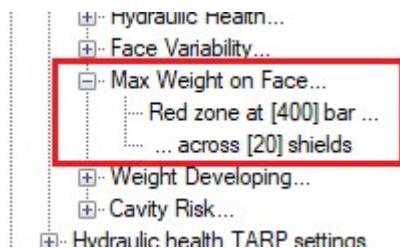
d. Face Variability

The face variability is the standard deviation of leg pressures across the face. The example below means the gauge will go red if the standard deviation exceeds 100 bar. Adjust as necessary for your longwall conditions.



e. Max Weight on Face

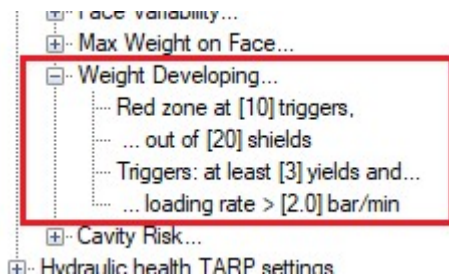
The Max Weight gauge looks for the highest local average weight on the face. The example below means the gauge will go red if the maximum weight exceeds 400 bar as an average across 20 shields. Adjust as necessary for your longwall conditions.



f. Weight Developing

The Weight Developing algorithm assigns “triggers” based on number of yields and the loading rate last time the shield was set to the roof, and then looks for an area across the face that has the highest number of these triggers.

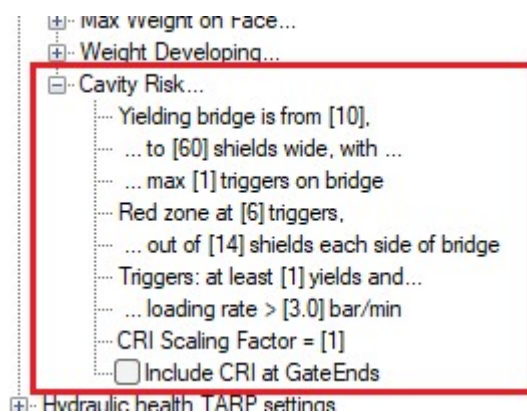
The example below means the gauge will go red if a section of the face 20 shields wide has at least 10 shields that have had both 3 or more yields and a loading rate exceeding 2 bar/min. Adjust as necessary for your longwall conditions.



g. Cavity Risk

The LVA Cavity Risk feature is a complex algorithm and we don't recommend trying to change any of the parameters without a specific analysis of the data. There is a published paper on how the algorithm works "[LVA-CavityRiskIndex-ICGCM-2011.pdf](#)".

LVA has a utility app that can review a panel's data, or a portion of a panel, and run a regression procedure to find the best parameters to use for that panel, and therefore any adjacent panels. Contact LVA for details. After that the recommended parameters can be entered into the configuration, e.g. like this...



## 6. After changing Global settings

After changing any Global settings, if you would like to roll them out to other LVA users then you need to copy them to the network folder...

Go to “*Configuration | LVA User Modes*” and click “*Save settings to network*”. You need to be in either Server or Technical User Mode to do this. Once saved, your LVA and other LVA clients will load these new settings the next time they start up.

If you don't save changes to the Global settings, then next time you start LVA you may lose your changes as it will load the current settings from the network folder.

