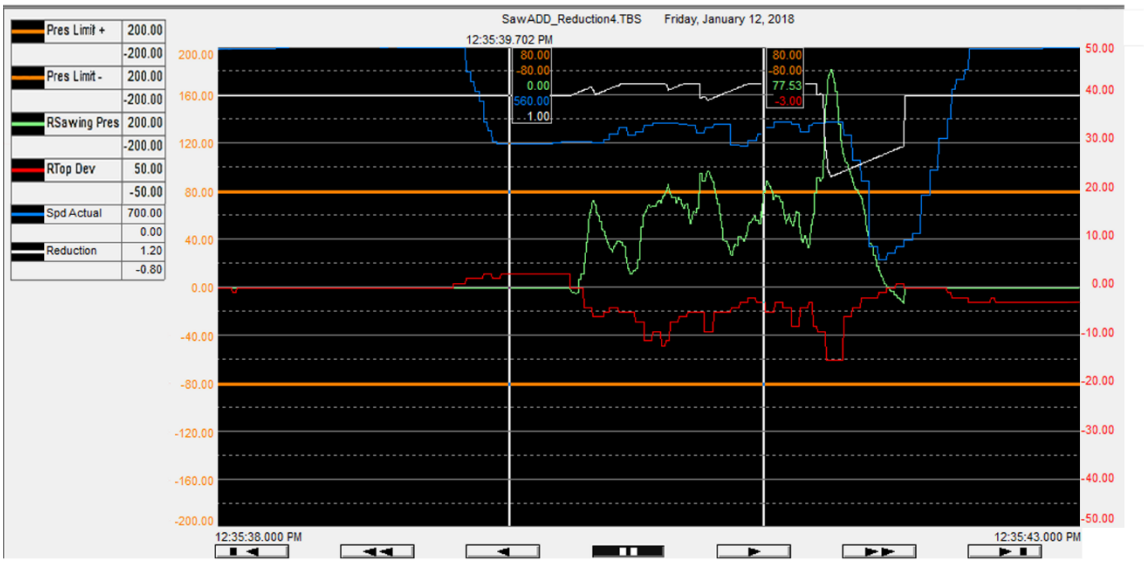
SawADD Performance

The following trend is an example of a typical log with SawADD speed control. It shows only one saw for simplicity, the right saw,

- leading pressure sensor green,
- top guide deviation sensor red,
- pressure limits orange,
- SawADD speed reduction multiplier white and
- actual speed from the drive blue.

The speed multiplier allows a speed increase after entering the cut by a percent Speed Adder parameter, in this case 5%. Each time the pressure exceeds the limit the reduction is proportional to the amount over limit. When the pressure decreases the speed is allowed to increase at a controlled accel rate. The reduction is at a decel rate as high as the drive will controllably allow. This will reduce peaks in deviation and bring it down quickly.

The top guide sensor will not see the maximum deviation which occurs closer to the bottom of the cut as the saw progresses through the cut meeting resistance and the gullet becoming packed. The SawADD senses pressure on the bottom guide which is closer to the point of maximum deviation.

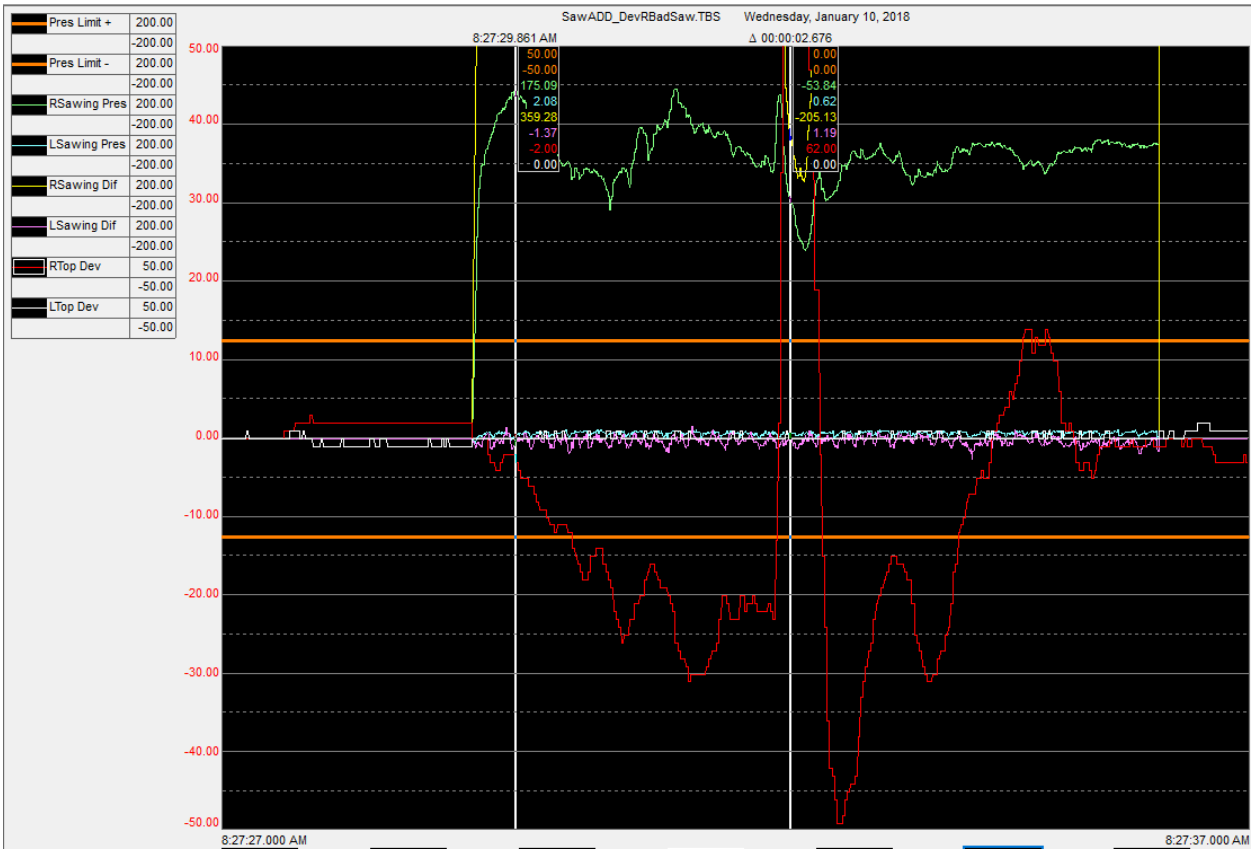


This smoking gun trend captured an example of how the fast response, high resolution and high deceleration rate, may have saved a saw from wrecking. The SawADD pressure in green can be seen to rise to a maximum of 175 lbs. in 0.428 seconds and the front/rear differential in yellow off the chart to 359.

The Top guide sensor in red is showing a minus 2.0 thou at the same instant. Although actual speed was not captured (because of limitation of data on one trend) the SawADD speed control was on and decelerating the feed speed at the maximum rate of the drive, 905 ft/min/sec. At that rate if the feed speed was at 500 ft/min entering the log then it would have decelerated to 30% or 150 ft/min, which was the setting at the time for max reduction allowed.

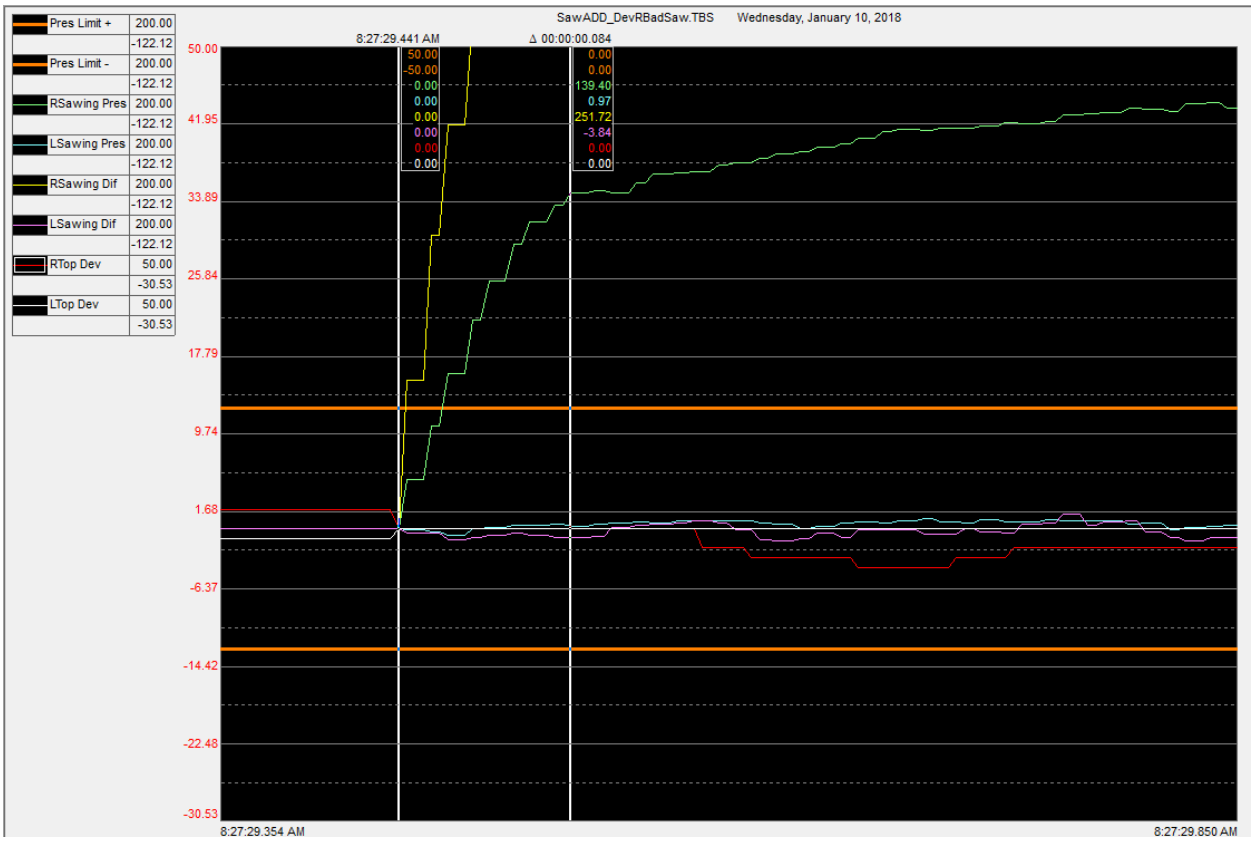
The Top guide sensor in red shows the deviation continued to rise even at 150 ft/min and reaches minus 30 thou before it jumps to 62 thou positive 2.676 seconds later (for this to happen the log must have rolled) and then back to almost minus 50 thou. For this to happen at about 150 ft/min I believe that at 500 ft/min there would have been a saw wreck. This shows very clearly that pressure is seen first and then deviation increases over time.

The deviation seen by the top guide sensor is never the largest deviation in the cut because the point of measurement (where the sensor is mounted) is close to the top guide. The blade bends away from the guide on an angle pivoting from the guide. The deviation increasing through the cut only allowing a small portion to be seen near the guide.

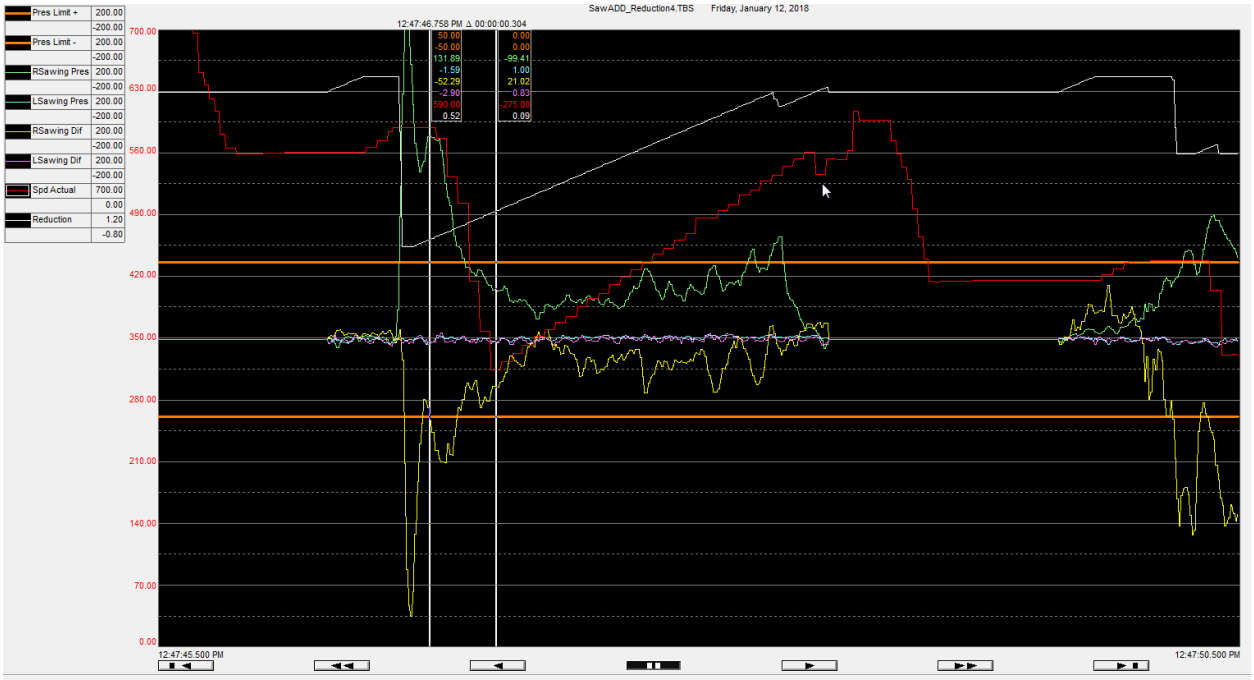


It should be noted that the time stamp on the trends is for the time zone they were reproduced which is Pacific Coast, not where they are generated and saved. The time in Blue Ridge would be one hour later.

By zooming in the following trend shows the delta time of 84 msec for 139 lbs of pressure to be reached in the previous example. The differential reaches 251 in the same time. Either of these values are high enough to cause the maximum reduction in feed speed.



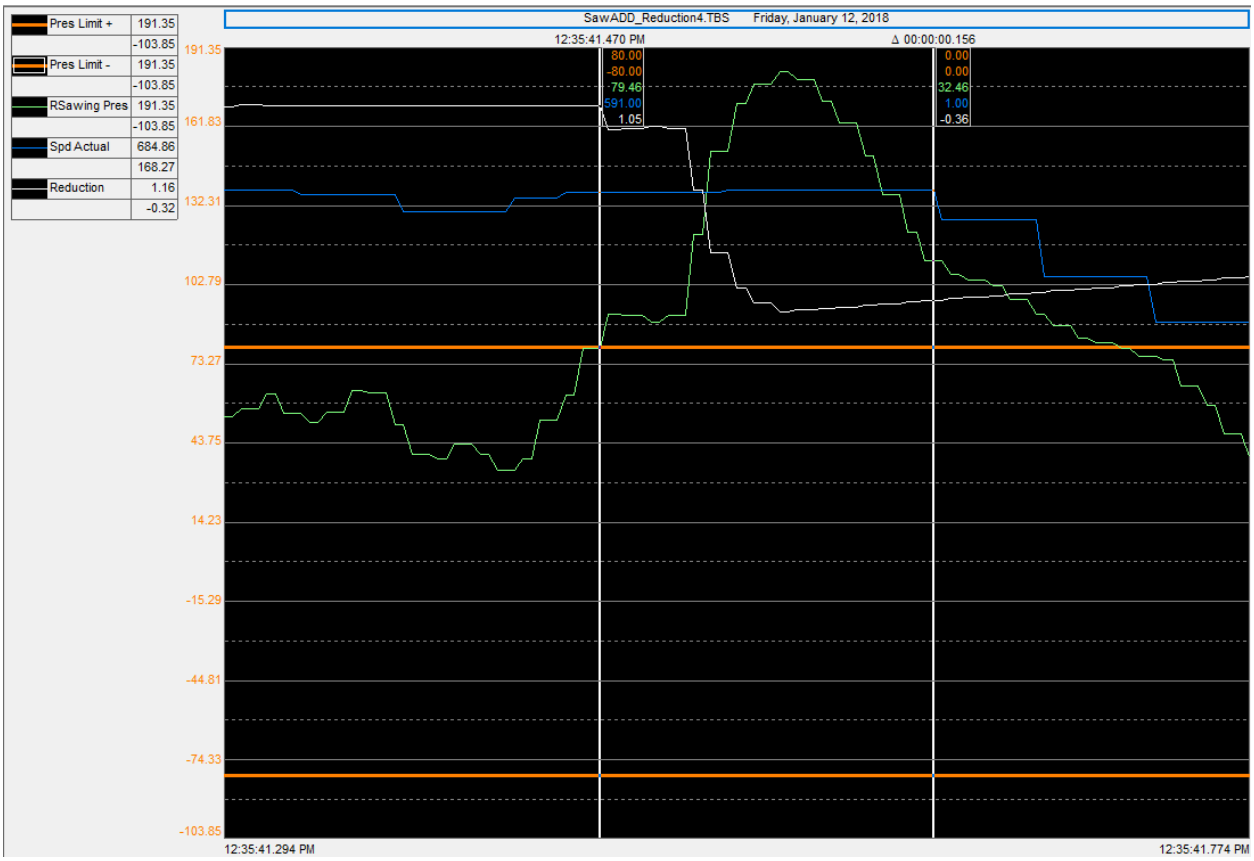
The trend below shows a high pressure in green over the chart max of 200 lbs. causing a reduction from SawADD of 50% in white of the 590 ft/min actual speed in red. This causes a deceleration of 275 ft/min to 315 ft/min in 0.304 seconds producing a decel rate of 905 ft/min/sec. Notice the pressure in green dropping from 131 at almost the same rate as the decel of the actual speed. When the pressure dropped low enough the reduction in white began to accel. After an inertial lag the actual speed began accelerating, reaching the entry speed before completing the cut.



It should be noted that both these examples are of a single side cut which creates an unbalance force on the log causing it to move in the cut if not guided securely. This can be a great diagnostic for excess deviation on single board solution.

Saw ADD on Small Log High Speed Line

This trend shows the lag between the SawADD reduction in white and the actual speed measured by the drive to be 156 msec. Since the drive communication is in both direction and the drive must sense the speed to returned it to the PLC, the actual speed change probably happens in half the time, 78 msec.



The following trend show the lead of 152 msec when using the differential in yellow (between the front and rear SawADD sensor) to reduce speed, before the Top Guide sensor exceeds 20 thou.