

PRESSURE TESTING EXPLANATIONS

The following pages have a number of charts comparing the results of pressure testing carried out independent of First Thought Equine Ltd. The same saddle firstly flocked with wool and then flocked with Flair.

The tests were carried out on the same day using not only the same saddle but also the same horse doing the same exercises on the same ground and on the same rein whilst being ridden by the same rider.

The results for the saddle when flocked are excellent. It had only recently been flocked and was flocked "soft" to give the best possible readings.

Over a couple of weeks the wool flocking will settle and compress so providing an uneven panel which eventually will start to take on a lumpy appearance. Pressure testing of such a saddle will not show the excellent results shown in these tests. Even foam saddle panels whilst providing a soft initial feel also compresses when a weight is applied and hence is unable to follow the horses movement and would therefore not achieve the results shown overleaf on a moving horse.

Apart from the landing from and jump and the jumping graph, all the charts shown overleaf are the "averages" of the various exercises i.e. neither the best or worst case readings.

On every page Flair is on the left hand side and the flocking is on the right hand side.

THE INDEPENDENT TESTS

Horse Eddie 16:2 TB/Welsh Cob Aged 12yrs
 Rider Female Height, 5ft 3inch, 1.6m Weight, 9 Stone, 126 lbs., 57.25Kg
 Saddle Event style, which correctly fitted the width of this horse.

Pressure, force and area readings were taken in...

1. Stand
1. Walk
2. Sitting Trot
3. Rising Trot
4. Canter
5. Event Canter
6. 3ft, 90cm Jump
7. 3ft, 90cm Jump

TABLE OF RESULTS

PACE	MEAN VALUE PICTURE		AVERAGE FORCE		AVERAGE AREA	
	Flock	Flair	Flock	Flair	Flock	Flair
Stand	1.595 psi	1.305 psi	119.15 lbf	104.76 lbf	181.04 sq in	173.60 sq in
Walk	1.378 psi	1.123 psi	121.21 lbf	117.75 lbf	213.28 sq in	215.76 sq in
Sitting Trot	2.031 psi	1.632 psi	200.80 lbf	196.12 lbf	223.20 sq in	230.64 sq in
Rising Trot	1.922 psi	1.668 psi	194.82 lbf	174.09 lbf	228.16 sq in	221.96 sq in
Canter	1.922 psi	1.704 psi	191.04 lbf	174.81 lbf	221.96 sq in	223.20 sq in
Event Canter	2.357 psi	1.777 psi	155.48 lbf	147.25 lbf	203.36 sq in	224.44 sq in
Jump 1	2.357 psi	1.777 psi	198.86 lbf	188.39 lbf	245.52 sq in	252.96 sq in
Jump 2	2.031 psi	1.632 psi	197.25 lbf	192.48 lbf	248.00 sq in	250.48 sq in

SUMMARY OF RESULTS

STAND; With the horse standing still with the saddle with Flair in gave a lower mean value picture (lower average pressure). The force was also reduced.

WALK; The Flair saddle gave a lower MVP, a lower force and had a greater surface area in contact with the horses back.

SITTING TROT; The MVP and Force were less in the saddle with Flair in but the surface area was also reduced

CANTER AND EVENT CANTER; The Flair saddle gave better results than the flocked saddle.

JUMPING; The MVP was reduced using the Flair saddle as was the force, the surface area was increased. On landing very high pressures and forces were recorded although they were slightly less the Flair the recovery of the Flair saddle to its' normal pressure was significantly faster.

THE MAT

The system is like a saddlecloth that comprises of a thin elastic mat containing 256 sensors which record measurements of pressure, force and area between the horse and the saddle. The sensors are scanned with a high scanning speed of 10,000 sensors per second or 40 complete frames per second. This means that dynamic measurements can be recorded for all paces.

MEAN VALUE PICTURE (MVP); For each sensor the mean (average) pressure is calculated over the frames during the data collection period when the sensor was loaded.

CENTRE OF PRESSURE; this depicts the path of the centre of pressure or force application. For each frame the centre of force application is calculated. Joining these centres between consecutive frames produces the Gait Line.

FORCE; For the MEAN VALUE PICTURE the mean (average) force is shown. For any other picture the force is calculated as the sum of the forces experienced by each sensor loaded at that time.

AREA; Area is calculated as the sum of the area of all loaded sensors shown in the adjacent picture.

MAXIMUM PRESSURE PICTURE; Shows the highest pressure that was reached for each sensor at any time during the data collection period. This is therefore an artificial picture that provides a summary of the highest pressures that were reached over the entire surface of the pressure mat.

Lbf = pounds of force / foot

PSI = Pounds per square inch

THE COLOURS

Grey to blue is good. Each square has a number in it denoting the pressure in lbs. per square inch. The lower the number the better. At 1.5lbs per sq. inch the scientists state that the pressure will compress the blood capillaries in the horse's skin. Over a period of time pressures over 1.5 lbs. per sq. inch will lead to low grade bruising and eventually white hairs. The colour green starts at 1.45 lbs. per square inch.

Accordingly you would like to get as much grey to blue as possible and very little if any green.

The central "spaghetti" shows where the rider's centre of gravity is and indicates how the motion of the horse is moving the rider's weight. Remember the stiller the rider the easier it is for the horse to stay in balance.

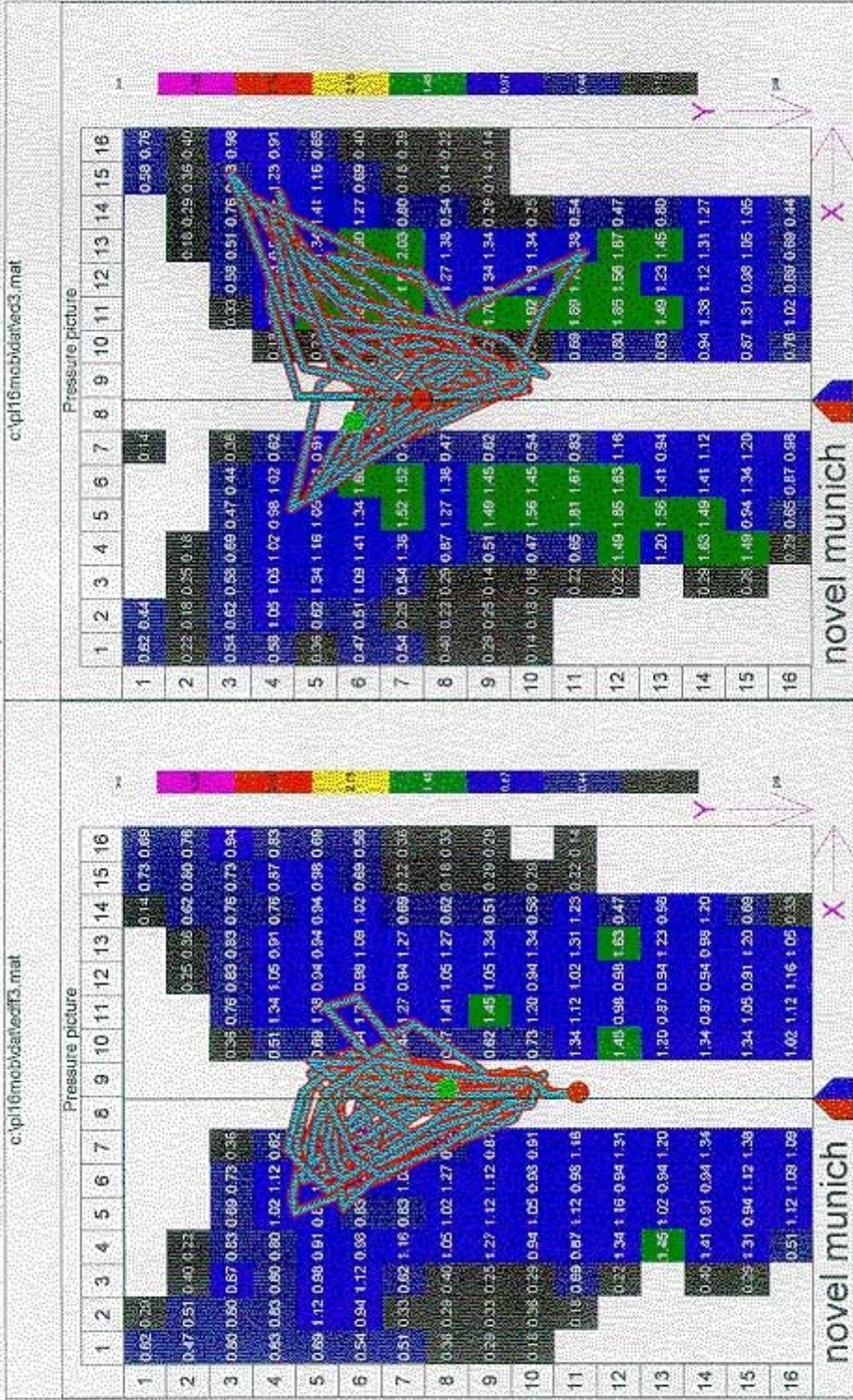
Don't forget this is the same rider on the same saddle on the same horse doing the same exercise. The only difference between the left and right hand side charts is that on the left the saddle has Flair and on the right picture it has flocking.

SITTING TROT - SPECIFIC AREAS TO LOOK AT.

SITTING TROT

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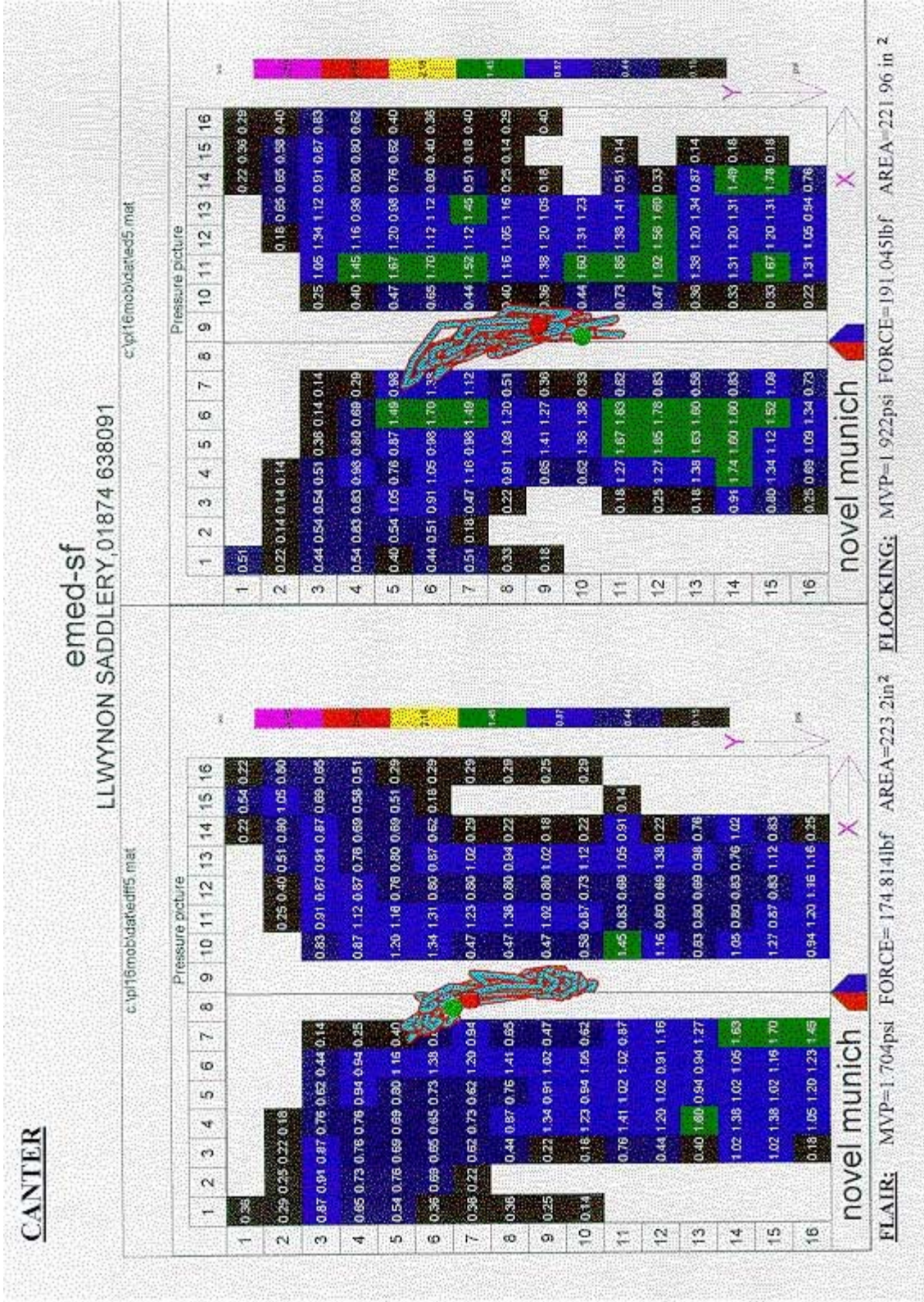
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FLAIR: MVP=1.632psi FORCE=196.126lbf AREA=230.64 in² **FLOCKING:** MVP=2.03psi FORCE=200.802lbf AREA=223.2 in²

The rider is working the horse on the left rein/circle so you expect to see more of the rider's weight on the inside of the circle ie. left side. Note how with the conventionally flocked saddle the rider is being tipped outwards on the circle. This is because the horse tips the saddle slightly outwards as the inner scapula rotates and as the flocked saddle acts as one mass the rider's weight is tipped outwards. With Flair the air panels absorb the movement of the scapula and hence the rider is not tipped to the same extent so can sit stiller and therefore be more in balance with the horse. Notice also the much lower pressure readings with Flair.

CANTER - SPECIFIC AREAS TO LOOK AT.

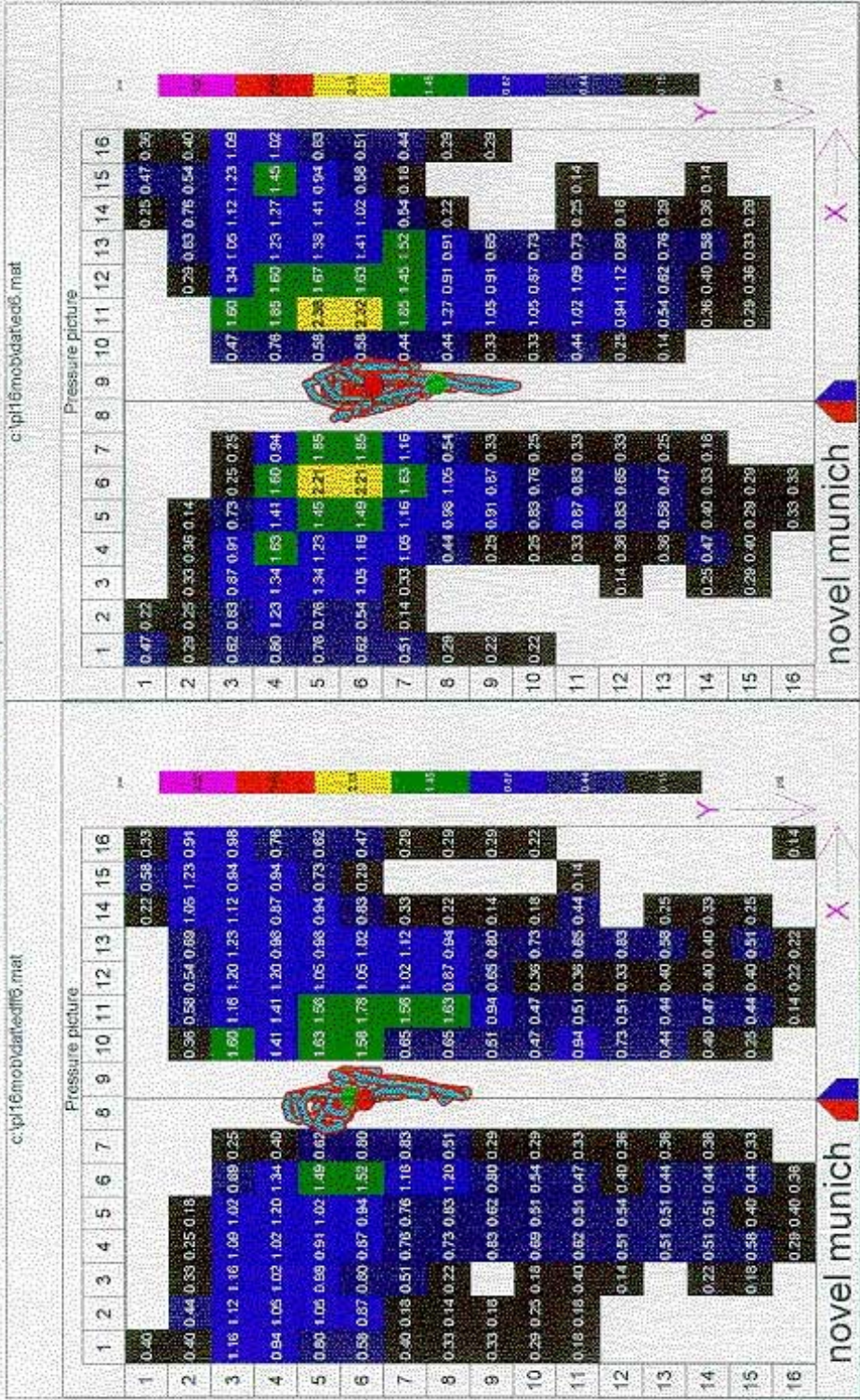


Again notice how Flair achieves much better pressure reading - see the much more consistent colours with almost no green. Notice also that the rider is sitting stiller with the Flair. The average pressure reading with Flair is 1.77psi whilst with Flocking it is 1.9psi. This doesn't sound much until you multiply that figure by the saddle panel area...

EVENT CANTER - SPECIFIC AREAS TO LOOK AT.

EVENT CANTER

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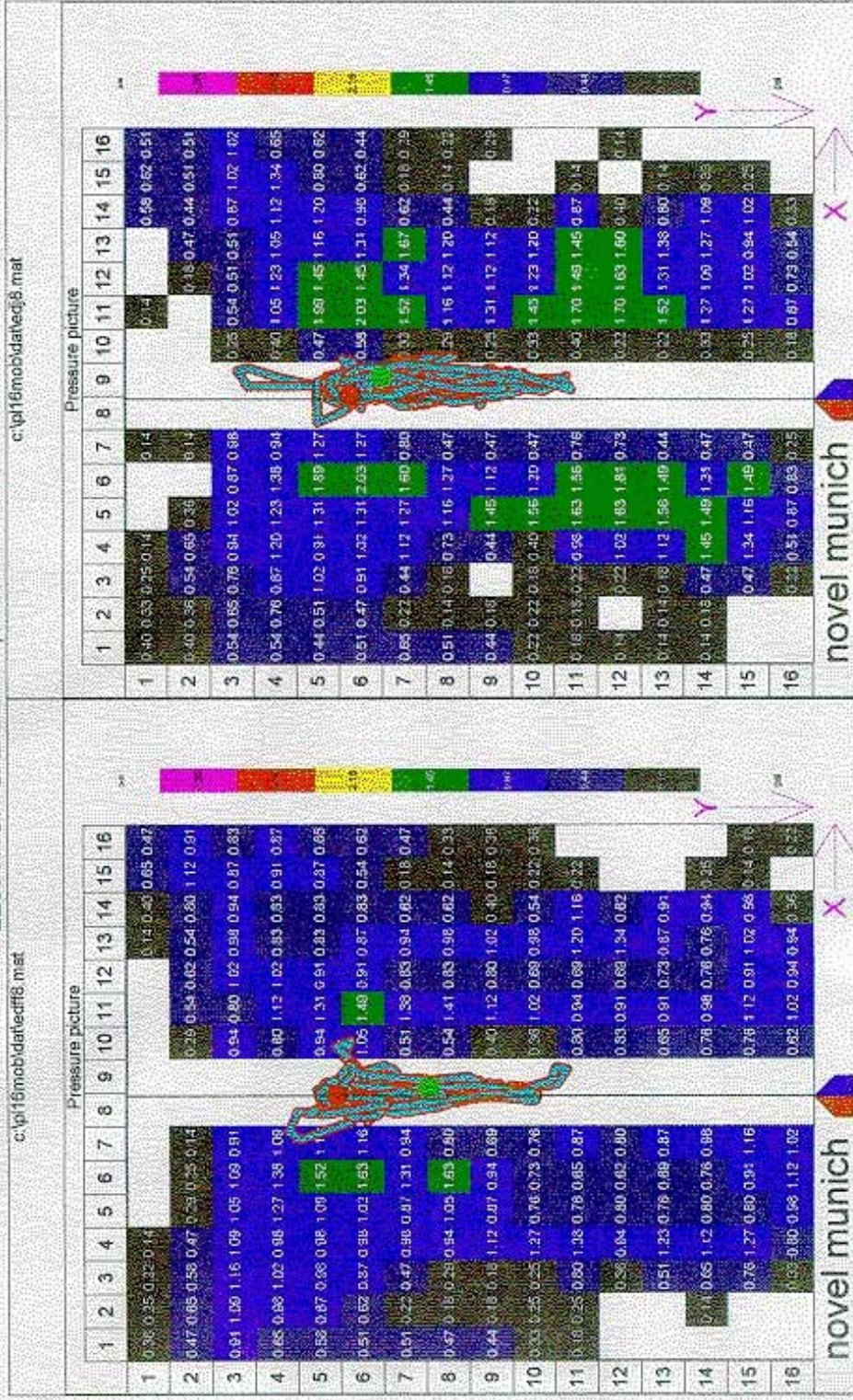
FLAIR: MVP=1.777 psi FORCE=147.252 lbf AREA=224.44 in² **FLOCKING:** MVP=2.357psi FORCE=155.48 lbf AREA=203.36 in²

At event canter the rider is standing in their stirrups. Look at the area where the stirrup bars are. Can you see how the pressure of the rider's weight is being reflected through the panels on the horse's back. Notice how Flair achieves much better pressure reading - Flair is able to disperse this pressure over a wider area so reducing the actual psi. The flocking is unable to do this. Compare also the average psi readings - Flocking = 2.357psi and Flair is a much better 1.777psi. Notice also that the saddle with Flair is not tipping and hence is achieving a much larger bearing surface.

JUMPING VIEW 1 - SPECIFIC AREAS TO LOOK AT.

JUMPING

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FLAIR: MVP=1.632 psi FORCE= 192.484 lbf AREA=250.48 in² **FLOCKING:** MVP=2.031psi FORCE=197.295 lbf AREA=248.00 in²

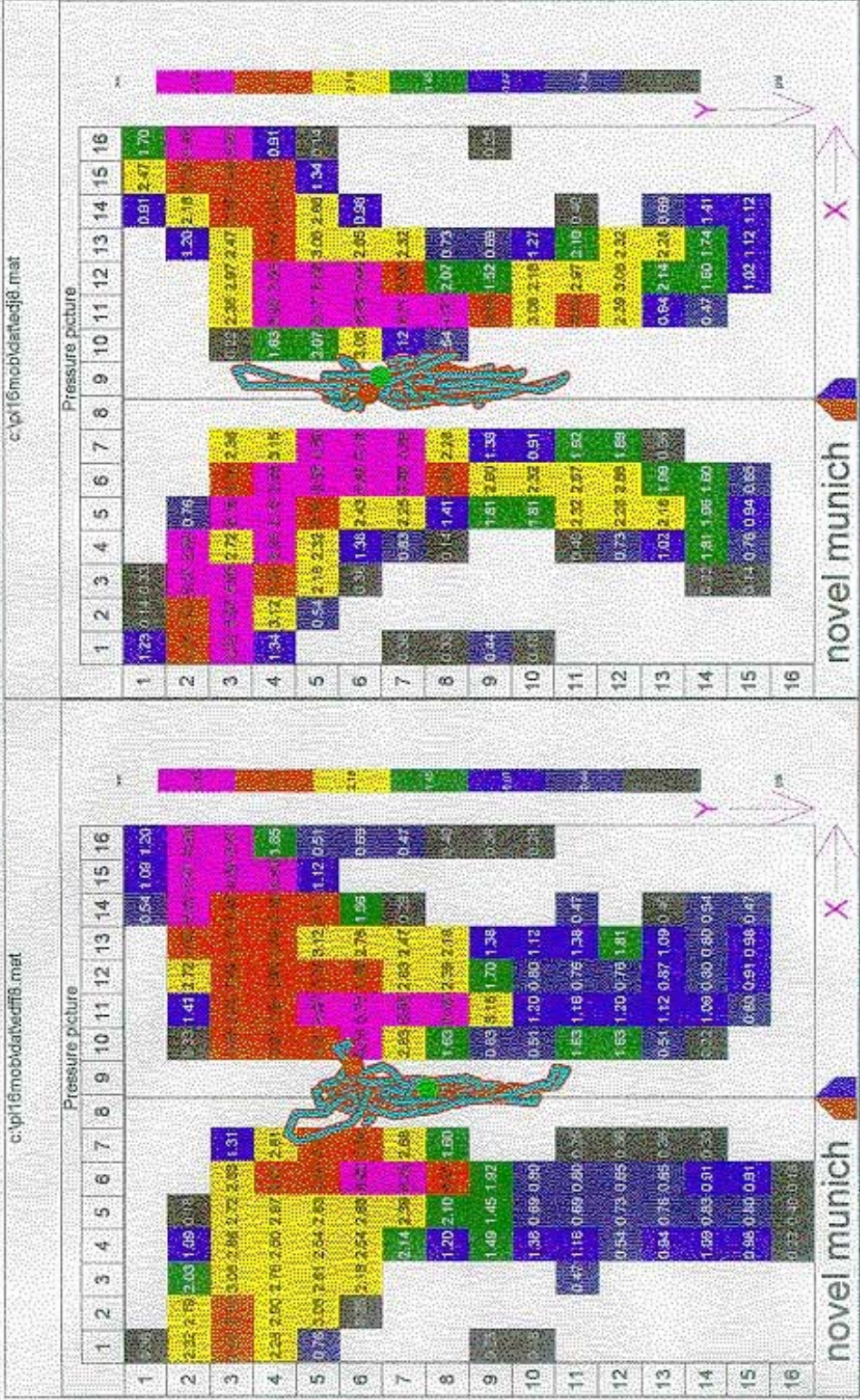
Like all the previous pictures you are viewing the average readings achieved for the exercise. There is too much going on in this picture to draw many conclusions but one can see that the overall average pressures are much lower in the saddle when fitted with Flair and that when it is fitted with Flair the saddle is not rocking off the middle as is shown when it had flocking fitted.

JUMPING VIEW 2 - SPECIFIC AREAS TO LOOK AT.

PRESSURE PICTURE ON LANDING AFTER JUMP

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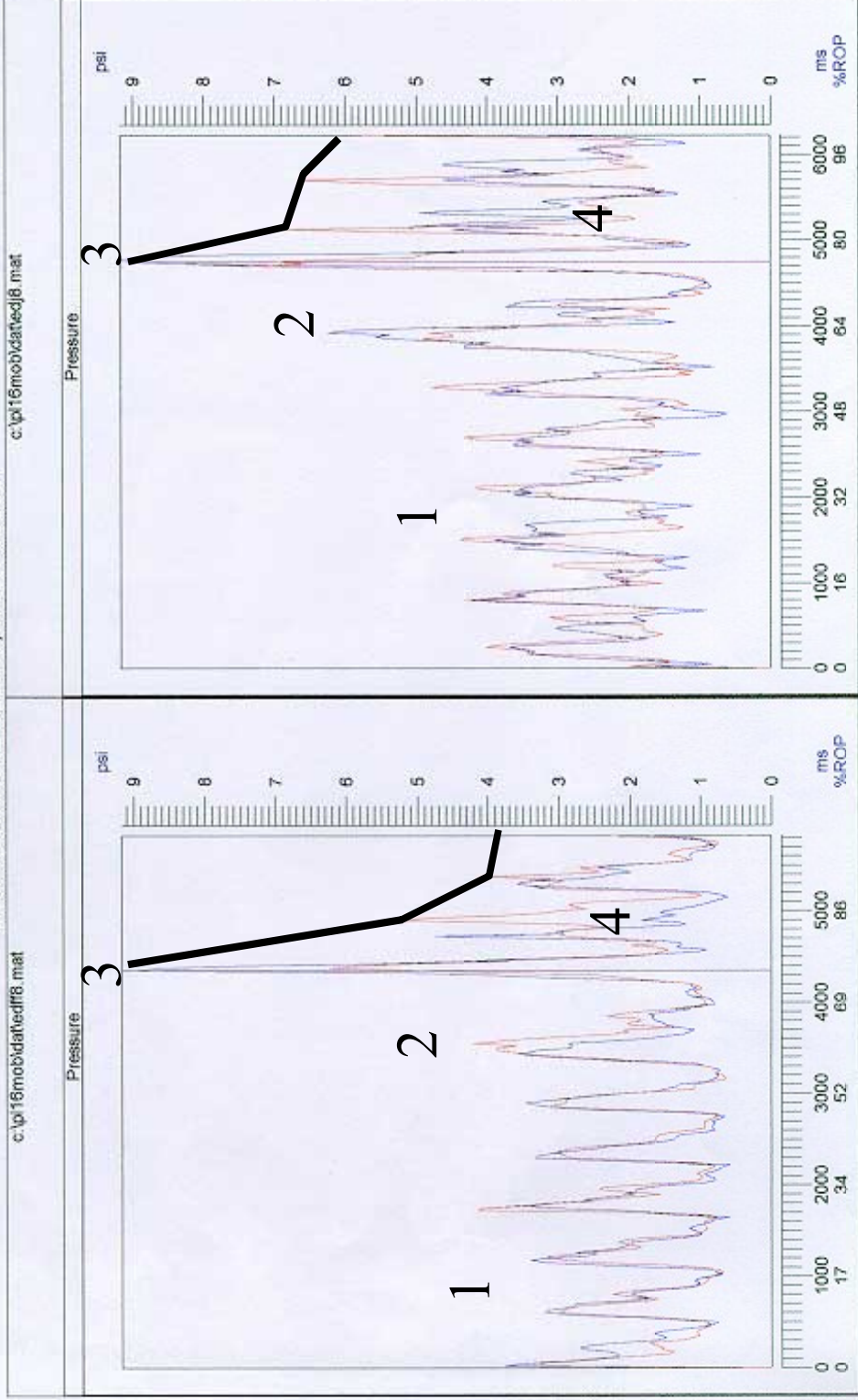


The point of impact! This is 1/40th second. Which leg did the horse land on? Remember that a horse only lands from a jump on one leg. With conventional flocking the saddle is coming off the horse's back at the rear and the full force of the both rider and saddle weight and gravity are pushing the saddle into the muscle behind the scapula and the muscle behind. With Flair fitted the panels are absorbing the some of the forces and dispersing the rest. The result is that the saddle is not pushed forward into the horse behind the scapula. You can see clearly that the horse landed on the right leg. Now turn the page and see how quickly, or not, that these landing pressures are dispersed.

JUMPING VIEW 3 - SPECIFIC AREAS TO LOOK AT.

JUMPING ; vertical line indicates where horse lands after jump
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Here we need to look at the both lines which shows the peak pressure exerted under the saddle on the left and right sides separately. As the horse approaches (1), take off (2), land (3) and move away (4) from the jump. The highest peak in both cases is at the point of landing (3). Notice that the scales are the same in both cases. It is the same horse, rider, jump and saddle the only difference is in the flocking/Flair. Look at the recovery to the normal pressure (thick black line), with Flair the return to the normal pressure is rapid. With a flock saddle the recovery can take up to 6 strides. It is for this reason that Flair is excellent for jumping the recovery to normal in such a short space of time means that the horse does not have pressure behind the shoulder. This pressure is the same as a driving seat encouraging the horse forward and to flat and lengthen the stride. This is the reason that horses jump better in Flair.