

Lean Wheelbuilding

Sustaining competitive advantage through new technology



The bicycle industry is witnessing a growing trend toward lean manufacturing. Driven by social and economic factors, bicycle factories and wheel builders are looking for lean production solutions.

Interesting is to study the reason why companies are going lean and to discover that the lean trend is not only picking up in the traditional “expensive” countries, but also in Asia.

Increasingly, shipping products around the world is not the most efficient way to use limited resources. From an economic point of view – as a result of rising labour costs in once low-cost countries and drastically increasing transportation fees, production in the Far East outweighs local manufacturing in Europe or North America less and less. Traditionally European and US OEM’s accepted long delivery times, inflexible deliveries resulting in high stock cost. But with the raise of manufactory cost in Asia, this is getting out of balance.

For some Asian companies it will be possible to further increase productivity to offset cost inflation, especially companies that could further automate assembly lines in their Asian operations. For example, in our sector of wheel and bicycle assembly, many companies’ production setup is still heavily labour-intensive or only partially automated. In their home markets in Europe or the United States, facilities are equipped with state-of-the-art assembly lines. However, facing high cost inflation in Asia, many companies have decided to gradually shift their production setup to a higher degree of automation. This is not only a defensive strategy to deal with labour costs, but also a proactive action to manage high labour turnover in Asia, and deal with shortages of skilled workers and operators.

Over the last years Holland Mechanics invested heavily in improving the “Wall To Wall” concept. Extending it from a fully flexible wheel production line to a fully flexible high-

volume production line. Especially in a situation where manufacturers are producing close to the market the series of bicycles to be produced are getting smaller and smaller, yet the volume to be produced doesn’t change.

This makes any change over in the assembly process, an unnecessary loss of production time, and the more work to change over the bigger the loss.

Driven by social and economic factors, bicycle factories and wheel builders are looking for lean production solutions.

With increasing labour costs and the diminishing availability of workers for “low end” jobs many companies are losing their competitive advantage. Therefore companies are implementing Lean Wheelbuilding solutions and are looking for new production technologies. The last year Holland Mechanics sees an increase in worldwide installations of Automatic Hubfilling Stations. Not only in traditional high labour costs regions but also in upcoming production countries like Poland, Turkey, China and Brazil. For bicycle manufacturers that are facing increasing of labour costs and shortage of available labour the hub-filling process is the most easiest process to automate.

With the introduction of the Robot Quattro a few years ago Holland Mechanics set a new standard for further automation of the wheelbuilding process. The Quad Tightening Technology changes the lacing process from the well-known HM Tight Lacing into Easy Lacing. The Quattro allows the operator to build low tensioned wheels which makes the lacing process more comfortable and increasing the output. After Easy Lacing the Quattro will tighten the wheel in a more consistent way compared to previous

introduced systems, delivering a high quality wheel to the robot that now only needs to true the wheel. The Quattro Line results in a predictable and continuous flow whereby every 40 seconds a high quality wheel is finished.

The Quattro Robot communicates with the Trueing Robot and both machines can share operations. For example if the Trueing Robot is still busy the Quattro will automatically change from “tightening mode” to “trueing mode”, helping the Trueing Robot. With an interactive production line like this companies will automatically reach a balance in the wheel assembly making long wheelbuffer-tracks between the machines unnecessary.

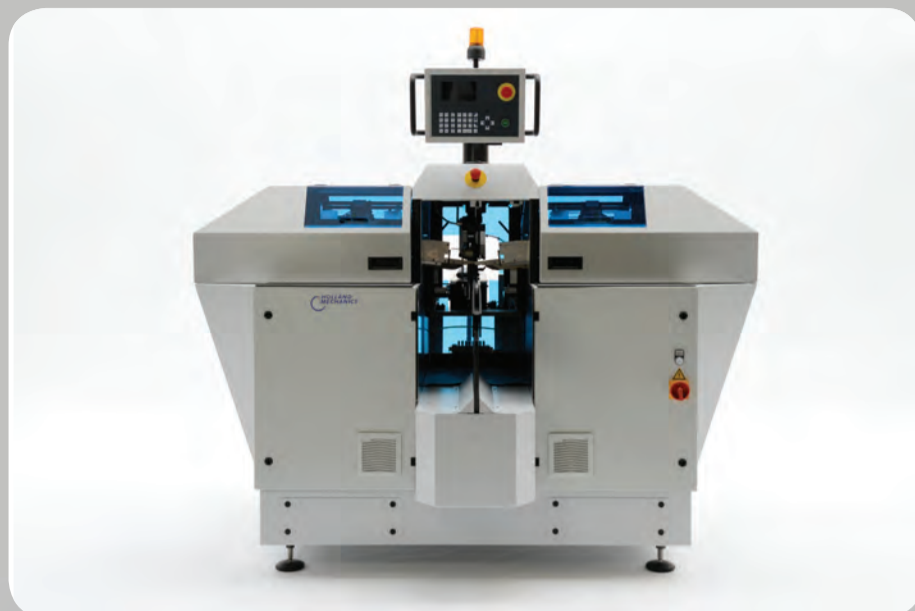
The strongest point of the Holland Mechanics “Wall to Wall” wheelbuilding concept is that it is a modular system. This means that the newest innovations can be integrated easily in existing Holland Mechanics lines.



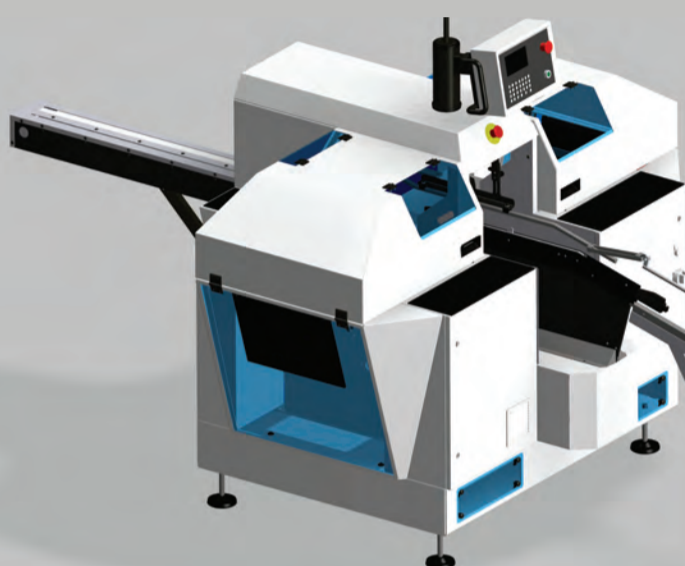
WALL TO WALL WHEELBUILDING

1 Hub Filling

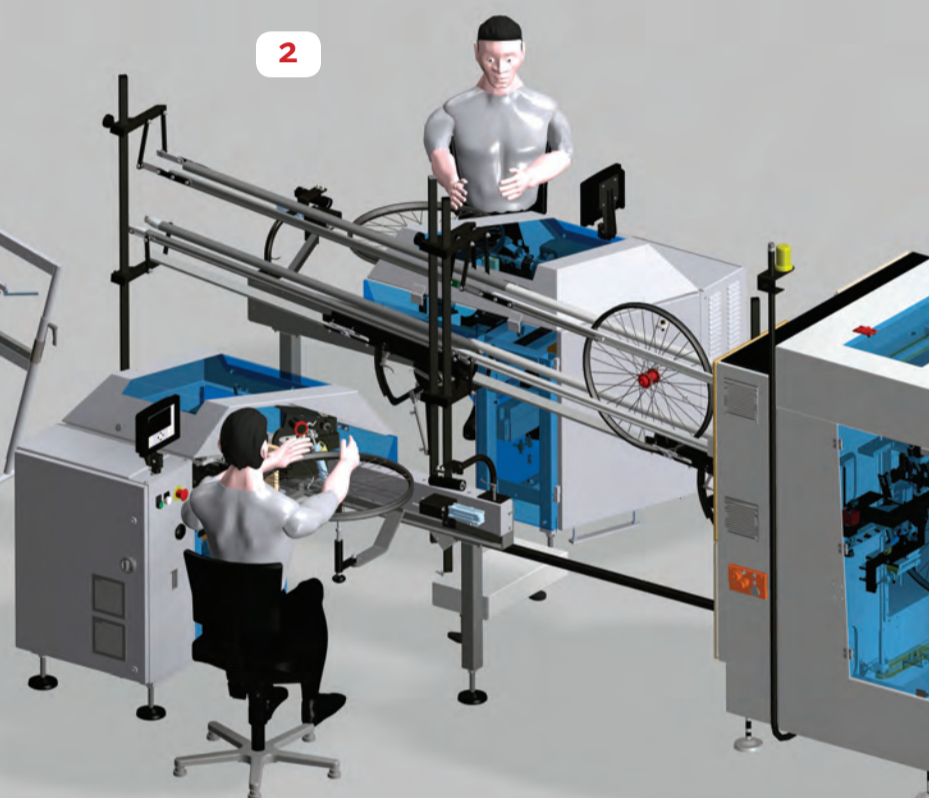
The HFS Hub Filling Machine is in operation in many bicycle factories in the world. Not only high labour cost countries but also Brazil, Poland, Hungary, Turkey, China, etc. Large and medium sized companies use the HFS for the labour intensive manual hub lacing because one operator can handle three machines. Smaller companies have one operator who is also responsible for feeding the other wheelbuilding machines. With 4 spoke inserters the HFS fills 36 spokes in a hub within 30 seconds.



1



2



2 Easy Lacing

In the Flexible Mass production line the lacing machines do not need to deliver tight wheels. Because of the separate 4 Hand Quad Tightening machine the lacing process is easier because of looser lacing. As a result of this it is easier for the operator to lace wheels and he can reach a higher output. This new set-up creates a balanced process whereby the operator will be more productive while his work is less strenuous.



FLEXIBLE MASS PRODUCTION LINE

3 Tightening & Trueing

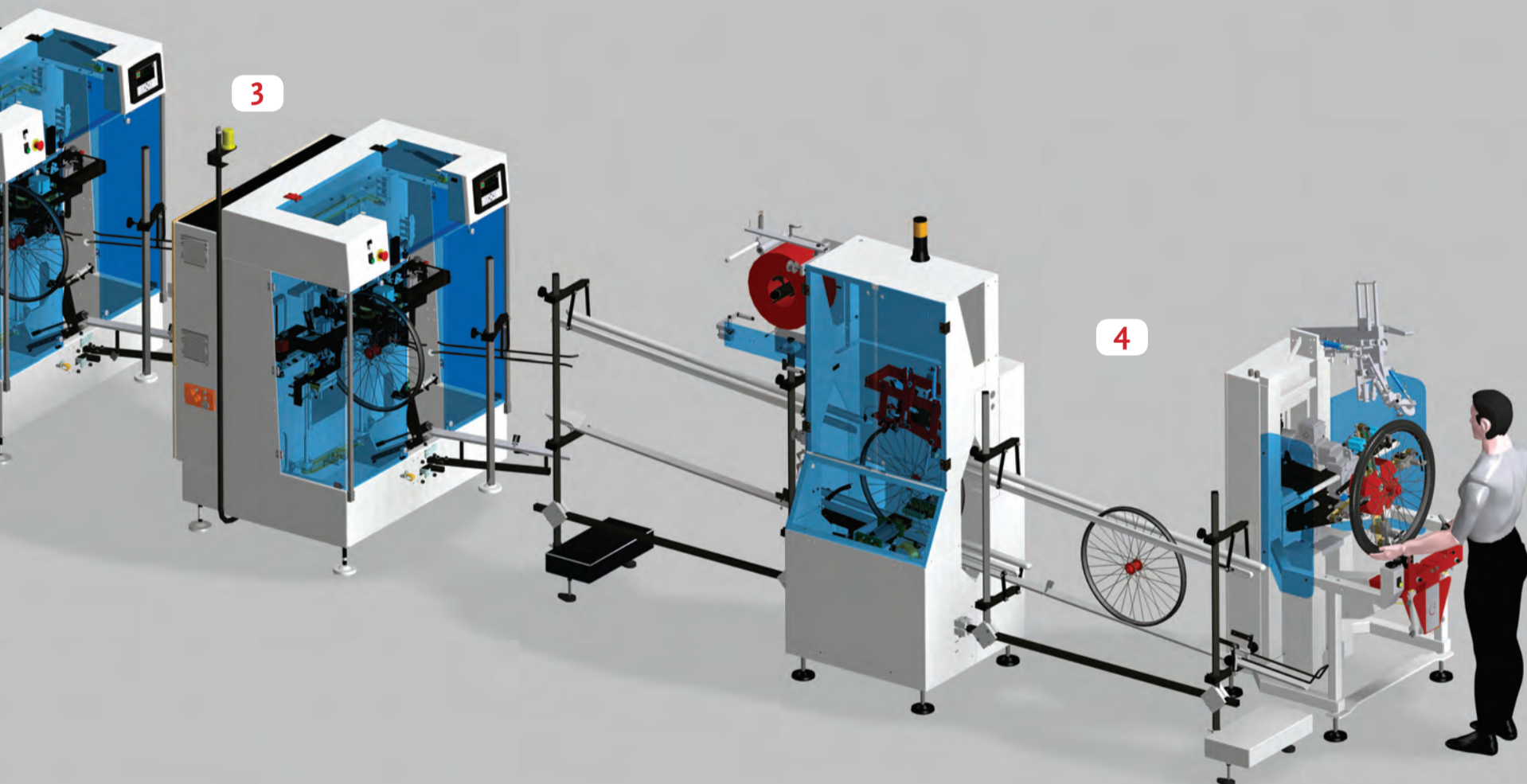
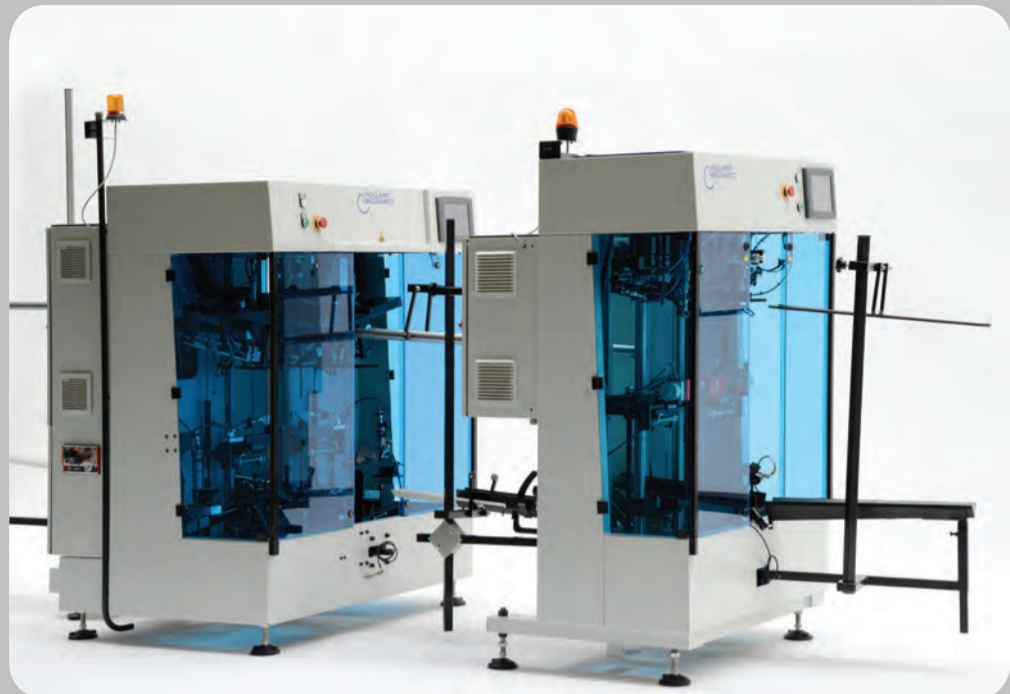
The flexible tightening machine the Robot Quattro in combination with a QUATTRO READY Trueing Robot. In this way Holland Mechanics created a “Flexible Mass Production Line” where quality, flexibility and speed are combined.

The Quad Tightening Technology makes it possible to build wheels into three steps:

- Step 1 Easy Lacing (see 2)
- In step 2 the Robot Quattro – 4 hands tightening robot – gives the wheel an equal tension spread. This is done by 4 hands whereby two are placed at the top and two at the bottom. Working this way the wheels are perfectly prepared with good spoke tension before it will be finally trued. With an easy automatic change over a maximum flexibility is guaranteed.
- The final step 3 is the Trueing Robot which trues and finishes the wheel.

In the situation below the Robot Quattro creates a continuous flow with an optimal balance between the three wheel assembly stages.

The advantage is that this modular production line saves floor space, gives extreme flexibility, high wheelquality and creates more output with less machines and operators.



4 Tape & Tyre

The Quattro Line can be extended with the Tape & Tyre Solution. This makes the line complete for full wheel assembly (inclusive tyre fitting). The Holland Mechanics Tape & Tyre solution is adding value to your wheel process. First of all by optimizing your stock because of the “one size fits all” principle. One stock position or to say 1 reel of 2000 meter tape in stock that fits all rims with a Quality Cotton Tape. Less flats with precise rimpaper fitting. The Automatic Rimpaper is one of Holland Mechanics most successful innovation of the last years.

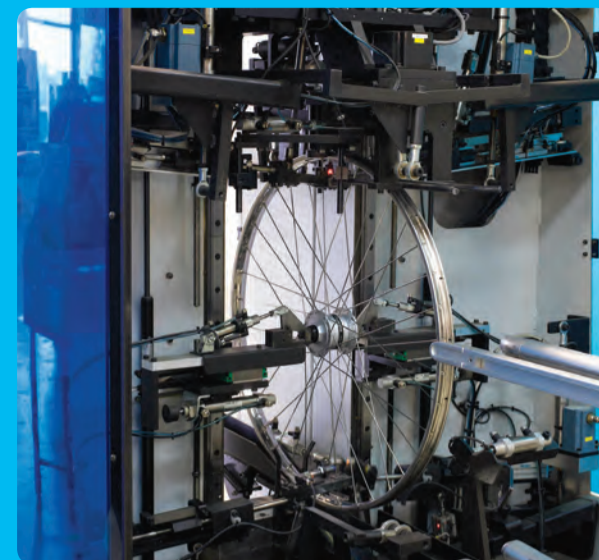
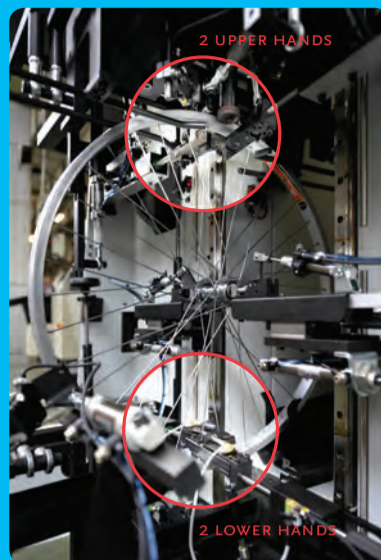
The final station of “wall to wall wheelbuilding” is Tyre Fitting. With the so-called “Guarded Tyre Mounting”, or to say the 4-point rim clamping technology whereby the hub is always floating you do not need to re-true or check the wheel after fitting the tyre. In the HM process the Trueing Robot is responsible for the trueing tolerances, the HM Guarded Tyre Mounting guarantees that your wheel stays in-true.



40% HIGHER OUTPUT AFTER INVESTING IN ROBOT QUATTRO

Baltik Vairas CEO Dirk Zwick states:

“Best Wheelbuilding Innovation of last 10 Years”



Baltik Vairas in Siauliai, Lithuania stated that the efficiency of the wheelbuilding line increased after investing in a Holland Mechanics Robot QUATTRO. After a challenging year Baltik Vairas will put focus again on operational improvements. The company recognized clear efficiency results in the wheel shop after implementing the newly developed Holland Mechanics Robot Quattro into the wheel manufacturing

lines a few years ago. This statement is based on measuring output results of the wheel line with and without QUATTRO'S. Next to this the Robot Quattro also has the advantage that it is saving floor space in combination with higher output with less machines and operators. "This is the best wheelbuilding innovation of the last 10 years", according to Dirk Jens Zwick, General Manager of Baltik Vairas. "We created up to 40% higher output

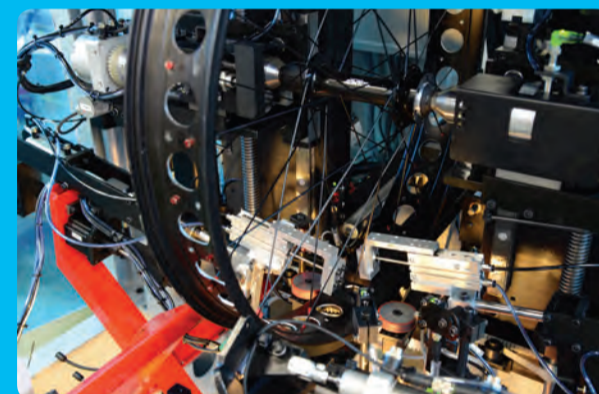
within the wheelbuilding process and this has a significant impact on the overall efficiency of building wheels". Next to this the wheel quality increased because of accurate tensioning. The torque is equally distributed by the Quad Tightening Technology, totally four hands are tightening the nipple at the top and bottom of the wheel. Baltik Vairas will further invest in their manufacturing competences through innovative technologies.

Quattro Ready

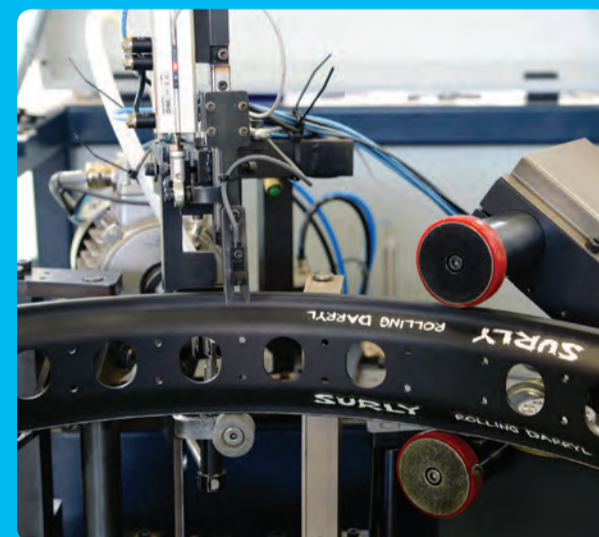


We can imagine that not every customer will invest in a complete Quattro Line right from the start. It has always been possible to extend and integrate Holland Mechanics wheel building machines in existing Holland Mechanics lines. For full integration of the Quattro Robot it is important that machines can actually communicate with each other to share wheel and process data. From this season onwards we will mark the Lacing Machines and Truing Robots as QUATTRO READY as indication that in the future a Quattro Robot can be fully integrated in the line to increase the output.

Fat Bike Trend



Holland Mechanics supports new wheel innovations. For a couple of years Fat Bikes are gaining popularity, especially in the United States. Originally this design was meant for snow cycling, but the rugged look of a bicycle with a roomm Fat Tyre is getting more popular in other segments too. This year Holland Mechanics has upgraded their latest CN In-Line Lacing Machine and their Robot OT for the manufacturing of the popular Snow Tyre wheels. As the trend of large tyres in combination with extra wide rims is popular in the States, the first "FAT-RIM" HM machines will be delivered next month to the USA. The wheelbuilding automation of Fat Rims can help to bring the Fat Bikes to the masses.



Holland Mechanics Rim Manufacturing Solutions



Most people know Holland Mechanics from its state-of-the-art wheelbuilding machines. What not many people know is that Holland Mechanics also offer a large range of rim manufacturing machines. From entry level standard to state-of-the-art fully automated rim manufacturing machines. Companies like Rodi, Exal, Schürmann, Büchel, Remerx and Alex are all using the Holland Mechanics Rim Manufacturing equipment.

This year Holland Mechanics has introduced their newest development in this segment, an automatic Saw-Pin machine whereby the two operations of Rim Sawing and Pin Insertion are combined in one machine. With automatic loading and unloading this is the final step to make a fully automated the rim manufacturing process possible.