

'Hand Built' by Robots

Get Control over your Wheel Quality

Initially automatic wheelbuilding was aimed at improving efficiency of wheelbuilding departments of large scale bicycle manufacturers. Product development at wheelbuilding supplier Holland Mechanics was driven by shortening the production time by seconds but also at improving quality. The implementation of sophisticated computer skills in combination with high tech mechanics made wheel building by Holland Mechanics technologically to one of the most advanced stages in the bicycle production process. The newest HM ProLine Carbon Edition makes the complete process of high-end wheelbuilding no longer the exclusive scope of the traditional mechanics who build wheels by hand. The Wheel specialist's know-how is still essential, but Holland Mechanics makes it possible to enter their personal knowledge as a recipe in the robots.

Step Sequence Programming, for the Truing Robot, is for example a very important tool. The specialists who can now enter their own wheel formulas in the robot and leave the repeating work to machines without losing control over the production process. When you run a manual wheelbuilding department with a few people it is already difficult to maintain the same top level of quality. Therefore we dare to state that the HM ProLine Carbon Edition 'beats the handwork'. Over the years Holland Mechanics has gathered so much data on wheelbuilding that the head office in the Dutch town of Purmerend became the know-how center on wheel building, often consulted by product managers.

Proud & Passion

The development of the wheelbuilding department to a "high mix – low volume" production process can be handled easily by the HM ProLine. As a result, the high

end market is shifting more and more to an in-house automated wheel production. Today the trend is to make wheelbuilding a proud 'core competence' with passion for spoked wheels. Producers have experienced that outsourcing requires perfect forecasting and an intensive and time consuming quality control. For wheels a visual inspection does not work, every spoke has to be checked. Without skilled labor and a supplier who can be miles away companies have a huge problem when the quality does not match. Instead of checking each wheel companies are now taking control on the whole process of making wheels.

In-house wheelbuilding allows you to reach your own

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high quality standards and special designs can be offered easily. The trend to invest in automated wheelbuilding also results from the need to produce closer to the market. Shipping wheel sets from overseas often results in a loss of quality and shipping a lot of air. With the rising value of the wheelsets, the import duties are becoming a serious problem making it worth to invest in local production capacity. The quality increase in combination with the cost savings make that even producers with a volume of a few thousand wheels annually already invest in the HM ProLine. This line has proved itself already at large companies like Giant, Trek, Formula, Accell, Rodi, BikeFun, Roland and Wilkinson. Last year also the range expanded with some top high end players like DT, Koga,

Smart/Mercedes-Benz, Citec, Santos, Simplon, Veltec and Rose. The latest addition to this list is a German high-end niche brand with less than 3,000 top-end wheels.

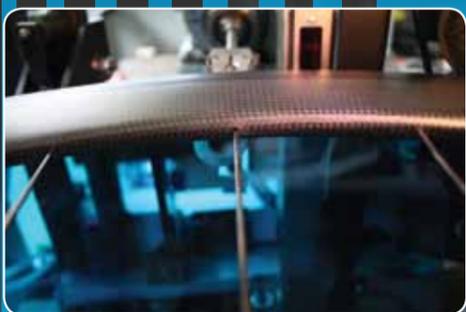
The HM ProLine Carbon Edition features a series of new technologies to meet the latest developments and requirements in the market for top class wheelbuilding with carbon rims up to 60 millimeter deep (higher sizes on request). The ProLine Carbon Edition is fully equipped to lace and true carbon wheelsets. The TCS Gripper prevents winding up of the spokes while truing with a deviation of 0,01mm is the most accurate ever achieved. The wheel identification takes place by no less than seven parameters and Holland Mechanics will grow this number even in the future. In the high-end market the Automatic Rimtaper in combination with barcode printing is an option which becomes very popular. This way companies can Track & Trace their wheels with unique serial numbers. All production data can be stored and above all, it provides the retailer the necessary information to order maintenance and replacement parts by one click with the bar code scanner. Also the HM Rimtape itself has benefits. The high-end cloth rimtape protects the tube perfectly giving less flats. Today HM has also introduced different new rimtape features like "dual layer" which makes it possible to inflate up to 12 bar and the new "tubeless tape" whereby you do not need a tube at all.

The final stage in the wheel assembly, the fitting of the tire, is perhaps the most underestimated process. The TMC is very flexible and can handle most existing rim/tire combinations including tubeless tires. Through the Solid State clamping system, the TMC is the only machine suitable to handle tire fitting without disrupting the accurate setting of the truing robot.

PROLINE CAR

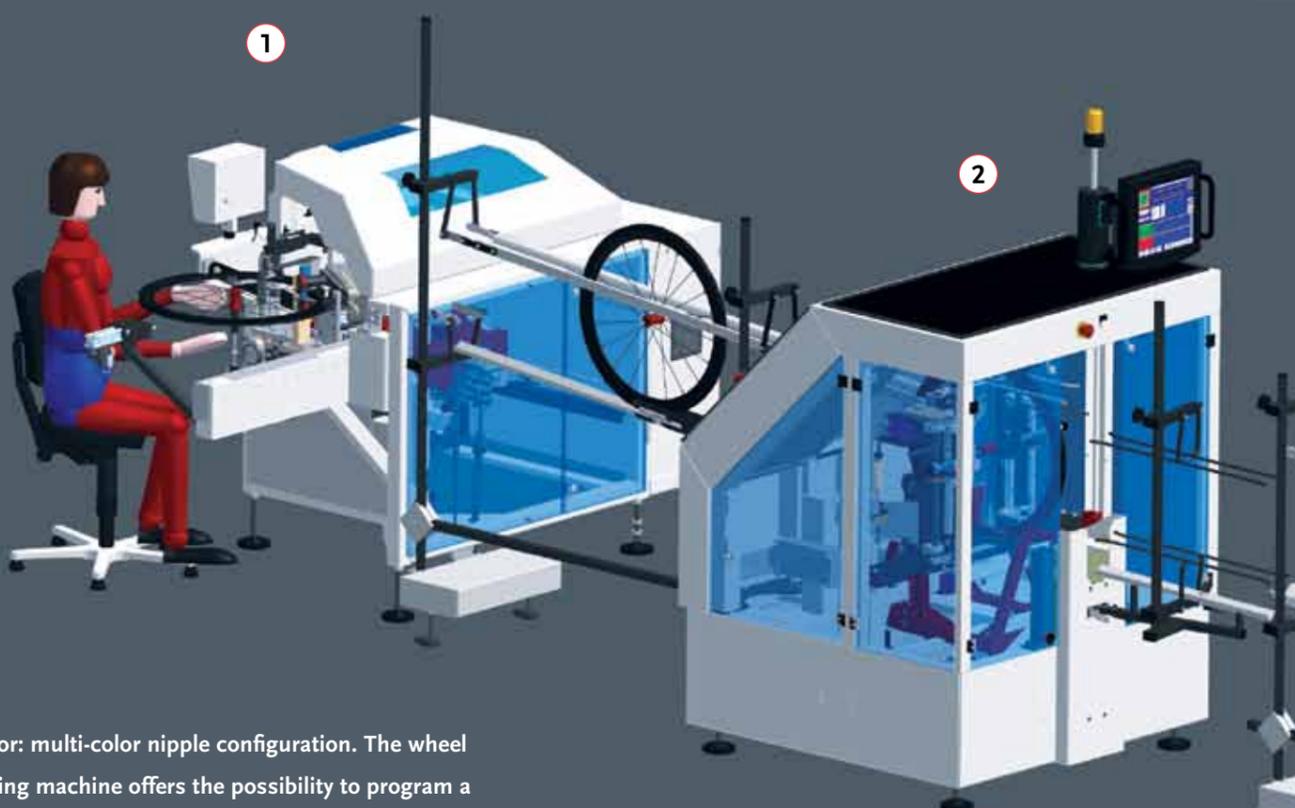
1 CN Carbon

- Tilt & Turn Lacing for angle drilled rims: the screwdriver can follow the exact angle under which the nipple holes in the rim are drilled. This to ensure the screwdriver does not slip out of the nipple head while tightening the wheel, the so called "Cam-out Effect".
- Carbon Lacing: a new sophisticated rim scanning system which enables to assemble 60 mm deep rims.
- The machine can universally be used for various nipple types:
 - Slotted – Double Square – Inverted – Hex.

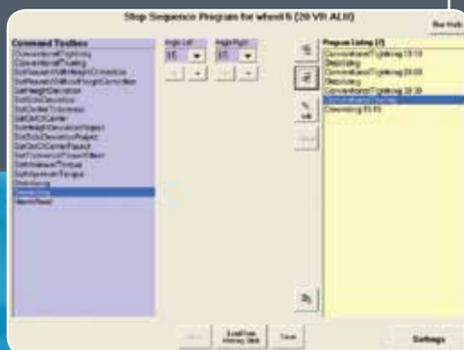


2 Robot OT

- Carbon Trueing: new technology for trueing up to 60 mm deep rims.
- Scratch Free Trueing for coloured nipples.
- TCS Grippers – TCS Spokes: best solution to prevent spoke wind-up.
- WID: Wheel Identification System whereby every wheel can be programmed according to its own unique trueing parameters.



- Auto Nipple Selector: multi-color nipple configuration. The wheel database in the lacing machine offers the possibility to program a nipple container per spoke group.
- High-end kit: Special kit for wheel specialists who mind more about the quality and appearance of the wheel, this kit prevents damage on rim and nipples.
- Automatic Friction Reduction treatment:
 - QLets: underhead friction reducing nipple washer
 - QLube: automatic dosing system which lubricates the nipple



- SSP – Wheel Recipes: Wheel Specialists have the possibility to program the machine exactly like a hand built wheel. The computer executes all repeatable actions so the final quality of the wheel is consistent and perfectly matching the recipe.
- ACCU: The Axle Control and Correction Unit measures the exact deviation in the hub and corrects the trueing program to meet "100% in center trued wheels".
- Integrated Stabilizing – Stress Relieving: through the SSP system it is possible to make the recipe for multiple stabilizing. You decide how many times you want to stabilize the wheel. In between you can program the machine to build up tension gradually or go to trueing mode.
- Actuators & Auto Pitch: perfect nipple contact by automatic aligning of the tooling to the spoke angle and pitch distance.

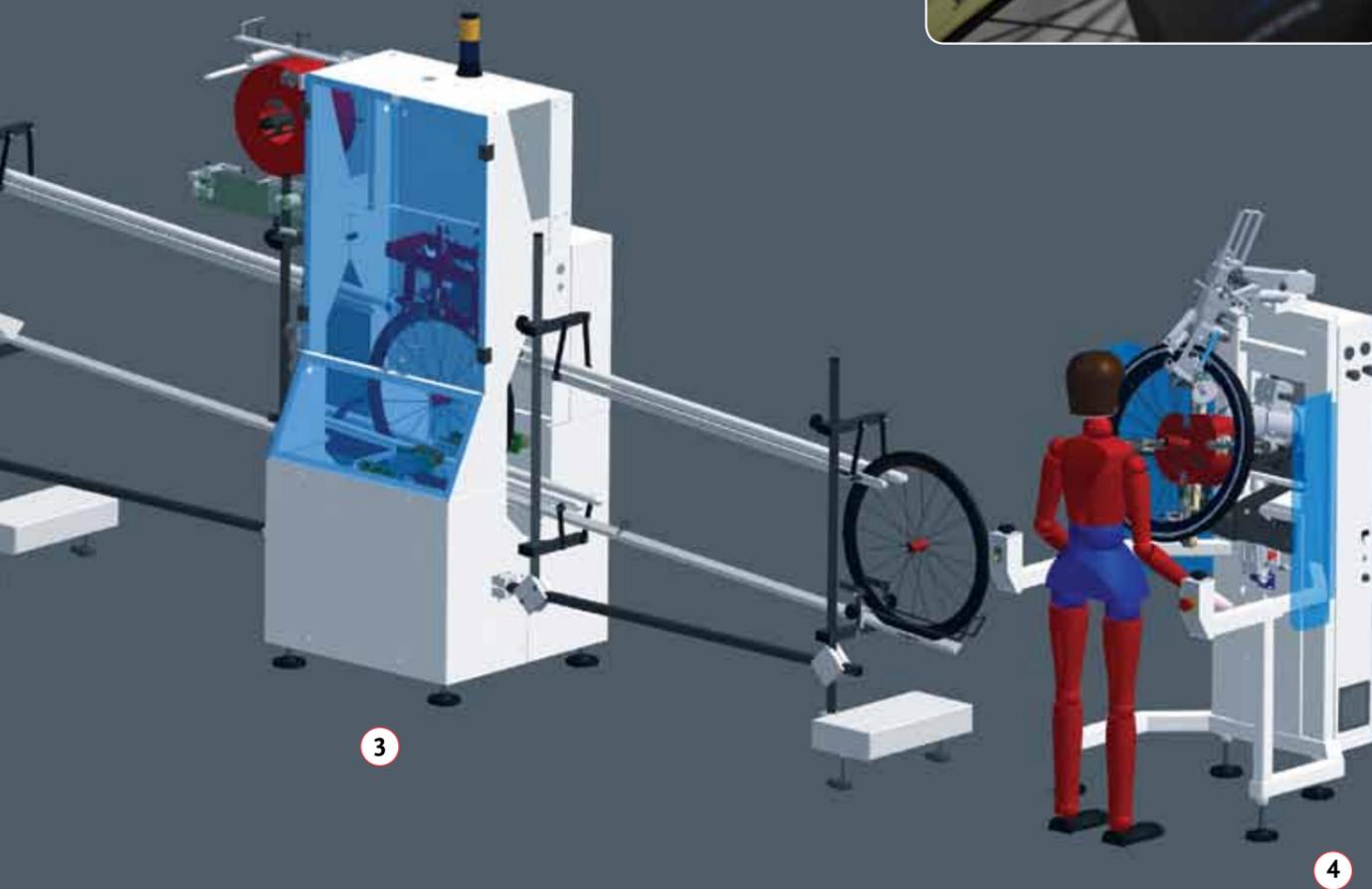


BON EDITION



3 Rimtaper HT with Printing Function

- Less Flats: Automatic Rimtaper Centering for perfect covering of spoke holes.
- No Friction Flats with High End Cloth Tape.
- Dual Layer for High Pressure: up to 12 BAR.
- Tubeless Tape: turn conventional rims into tubeless.
- Integrated Printing Head for inline printing: adding Logo, Barcode & Serial Number to your Rimtaper for Track & Trace purposes.



4 TMC: High-End Tyre fitting

- Solid State Tyre Fitting: guards truing tolerances of the Robot by 4 points clamping system.
- Integrated Tyre Centering.
- Easy Fitting: Tight Rim/Tyre combinations can easily be fitted without damaging the rim.
- Mixed Tyres: Standard – Tubeless – Folding.



Best of the Best Red Dot Design Award



One of our most prestigious R&D projects this year was the E-Bike Wheel development for SMART/Mercedes Benz. This wheel was one of the most complex wheel designs whereby our R&D had to solve the combination of Inverted Nipple Design, Large Diameter E-Bike Hub and GST Spoke Pattern. After some testing on the standard E-Bike line we knew which technology we had to develop. After a project of several months we succeeded to manufacture the SMART E-Wheel automatically by the new ProLine E-bike Edition. Holland Mechanics' statement is always that we develop machines "to make design possible" then it is nice to see that the E-Bike of SMART did win the Best of the Best Red Dot Design Award.

New markets for Automatic Hubfilling

One of the machines that has been a steady base for Holland Mechanics is the automatic hub filling machine type HFS. Introduced in 1998 with the HFS-A and in 2002 extended with the B-version for Nexus hubs and dynamo hubs, both machines form a reliable base at many companies that produce wheels.

Initially the Hub Filling System was mainly used in Europe & North America, the last years also customers in other countries have discovered the speed and ease of use. It is a trend that in the new growing economies bicycle manufacturers are facing labour shortage and with these shortage the labour costs automatically increase.

One of the easiest things to replace is the manual hub filing, due to this the Hub Filling Systems have reached large factories in new growing economies like Salcano in Turkey and Houston in Brazil.



Sneak Preview ProTruer II

What we are showing you here is a glimpse from our development department where our engineers are working hard to complete the ProTruer II. The first ProTruer was such a success that we decided that integration of all the tools with the machine had to be improved, so there are tailor made supports for the label printer, spoke tension meter and barcode scanner.

Next to this several of our customers requested a different way of stabilizing for straight-pull spokes, and that is to push with a roll on the rim instead of on the spokes. We have now added this option, and as we are at Holland Mechanics, we are never satisfied until the result is more than perfect. Our rim push units can be set to a fixed displacement next to an adjustable pressing force. Especially for very stiff Carbon rims the requirements were to set a fixed displacement for the rim, then you are certain of two things; you never over stretch the



rim with the risk of breaking it and you are certain that the rim has moved the pre-set millimetres ensuring the spoke de-winding has taken place.

In the ProTruer II we can combine our traditional way of stabilizing with the new rim roll pressing units. With this extra feature we also cover de-winding and stabilizing for two spoke types: J-bend and straight-pull. For the standard J-bend spokes the traditional way of stabilizing by pushing on the spokes is the better option as it makes the spoke neck stronger. For the more exclusive thinner spokes and the "high end" straight pull spokes it is more important that the spoke returns to its original position. When pushing the rim you release the tension on one side of the wheel and increase on the other side. When both sides of the wheel have been pushed all spokes have been released and stretched.