



# Renishaw's XK10 alignment laser helps Taibiao CNC embrace the era of digital manufacturing



## Background:

Taibiao CNC Machines Co., Ltd (Taibiao CNC), China, are Yunnan's largest manufacturer of casting sets and the first manufacturer to invest in Flexible Manufacturing System (FMS) production lines.



## Challenge:

Precision machine tools demand extremely high casting quality, achievable only through advanced manufacturing techniques.



## Solution:

Testing machine tool casting production and the geometric accuracy of large gantry machine tool castings with Renishaw's XK10 alignment laser system.



The XK10 system provides precise measurement solutions for long range machine tool castings.



Patented data stitch method has reduced the effects of air turbulence on straightness measurements.



Case study

Machine tool castings play a significant role in the manufacture of precision machine tools, support structures, and mechanical connectors. The quality of castings has a decisive influence on the structural support, machining accuracy, durability, reliability, flexibility, and customisation of precision machine tools.

Advanced casting manufacturing technology and control contribute to the stable operation of machine tools. By doing that, they enhance production efficiency and machining quality. Taibiao CNC are Yunnan's largest manufacturer of casting kits and provide high-quality products for global machine tool manufacturers.

### Beam casting straightness testing

Taibiao CNC uses the Renishaw XK10 alignment laser system to test large gantry machine tool castings. The test includes straightness, installation of guide rails to datum surfaces (horizontal and vertical), and parallelism and perpendicularity between two datum surfaces.

One vital application is testing the straightness of large beam castings. During the installation of the machine bed the beam casting can sag due to the increased weight. This can affect the overall straightness of the rail. Typically engineers leave space for adjustment known as 'crowning'. However, using the XK10 system the beam's mid-position can be precisely adjusted to meet the required tolerances.



**Chen Guofeng,**  
**Production Director**  
Taibiao CNC machines Co., Ltd. (Yunnan, China)

**“ We have been using the XK10 system for over two years and received positive feedback from our customers. This proves assurance in the outstanding measurement performance of the system. ”**

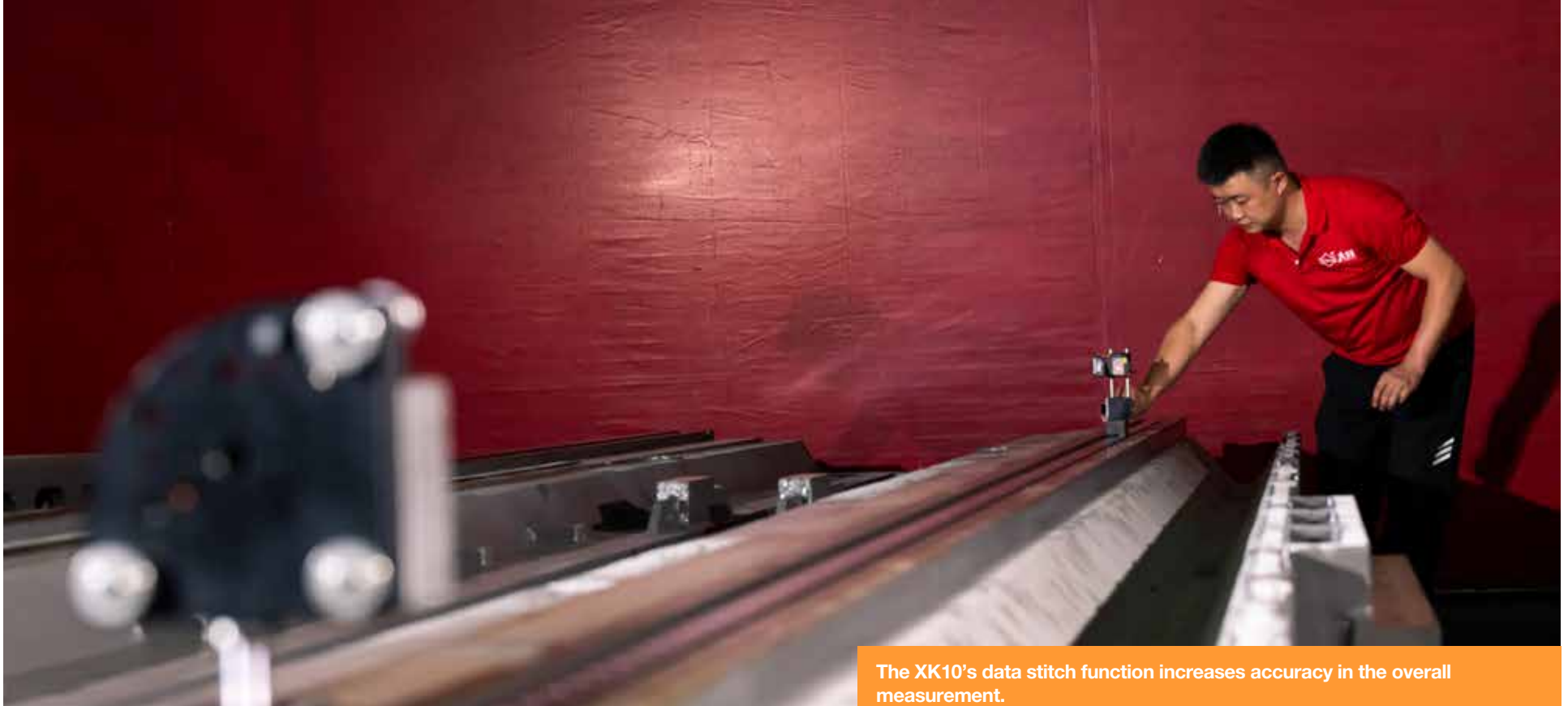


Renishaw's XK10 alignment laser system is ideal for long range testing.

### Long range testing

Taibiao CNC has launched a wide range of casting kits, including a large-scale moving column gantry kit with a range of up to 30 metres. Manufacturing such a long range machine is proof of the manufacturer's development capabilities. They are planning to launch a moving column gantry casting kit with a double gantry design. This would deliver double the machining efficiency and a longer machining range.

Long range measurement is a regular pain point for manufacturers. In the past, Taibiao CNC used a granite straight edge and dial gauge to test long range castings. Since their longest granite straight edge is only two metres, the test would need to be repeated in sections, leading to large testing errors. In contrast, the XK10 system uses laser measurement technology, providing advantages in long range tests. Unlike a dial gauge, its accuracy remains stable.



The XK10's data stitch function increases accuracy in the overall measurement.

Single beam laser interferometer systems can take long-distance measurements but air turbulence present in real environments can produce measurement noise. Ambient noise caused by air turbulence may interfere with the measurement results. This can cause inconsistency or non-repeatability between measurement results from various positions, which affects the accuracy of straightness measurements.

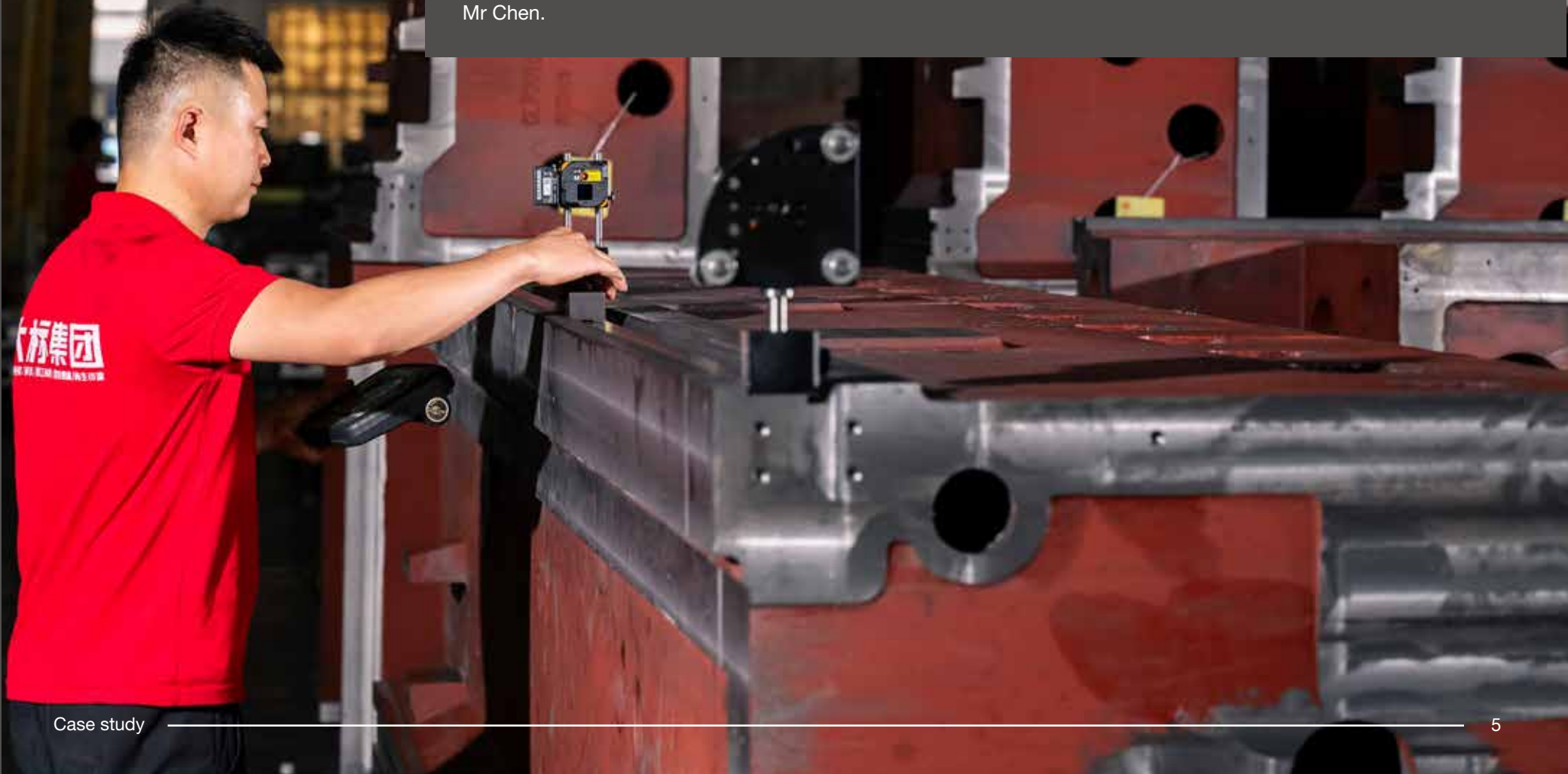
Laser straightness measurements rely on a static or stable laser light source as a reference. Changes in air temperature, humidity, and pressure cause drift in the laser beam. This becomes more significant as the distance between the laser source and the receiver increases. Although strict environmental control can effectively reduce air turbulence, this approach is costly and not always practical.

The XK10 system's data stitch function minimises this issue by providing a repeatable straightness measurement. The system reduces the noise over the entire measurement length, and provides repeatable straightness measurement data. This is effective for applications that require long-distance measurements or are carried out in environments with severe air turbulence.



## Solution

Taibiao CNC machines Co., Ltd. (Yunnan, China)



Taibiao CNC is very satisfied with the XK10 alignment laser system's highly repeatable test results. When using traditional tools such as autocollimators and levels the results are often varied due to operator error. However, the consistent measurement results from the XK10 system provide greater confidence in the reports supplied to their customers.

The XK10 alignment laser system has more than doubled Taibiao CNC's production testing efficiency. Previously, they used a grinder machine for measuring beam castings that required three operators. After introducing the XK10 system, one operator can easily complete the work. They can also adjust the 'crowning' straightness parameters according to the system-generated chart. This makes the measuring process efficient and reliable.

"The XK10 alignment laser system is simple, quick, and easy to operate and has a range of functions to meet our needs. In addition, the intuitive software interface is simple to operate and generates concise graphical reports," said Mr Chen.



## Machine tool maintenance

Taibiao CNC's busy casting production line operates three shifts a day, with an annual production capacity of approximately 110,000 tonnes. It is therefore crucial to maintain the precision of their machine tools. They have three Renishaw XL-80 laser interferometer systems, which are used for precision testing and maintenance of the machine tools used for machining castings.

Mr Wang Lin, Head of Quality Control at Taibiao, explained: "The XL-80 laser interferometer is quick and easy to operate. It is highly regarded in the machine tool market and has greatly enhanced customer confidence in our machines."





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Issued: 2026.01