TZN6 Series Rolling Machines

Introducing the vertical rolling machine (TZN6 series) which can manufacture splines, worms or screws without creating any chips on a shaft by plastic processing.

Processing accuracy has been stabilized by adopting a double holding system to the body of ball screw.

Also, the automating the OPD (Over Pin Diameter) adjusting work, which had to be done manually in the past, has shortened the working hours required for adjusting the position of forming racks (tools). Furthermore, the overall size of the machine has been made more compact, making it possible to change the forming racks (tools) while standing on the floor near to the machine. This greatly improves the overall workability when changing the forming racks (tools).

Features

1) Simplification of change-over work
2) Automated OPD adjusting work
3) Stabilized rolling processing with high accuracy
4) Shortened processing time through high-speed rolling
5) Space saving

Structure

1) Simplification of change-over work

The position where the actual rolling work takes place has been moved to the lower area, making it possible for workers to change forming racks (tools) while standing on the floor. In addition, the distance between the workers and the forming racks (tools) has been reduced to simplify the process even further.

Fig. 1 Change over work

2) Automated OPD adjusting work

With the existing machine, OPD adjusting work was done by inserting and removing forming racks (tools), manually turning the adjusting screw, and by moving the adjusting pin up & down. However, with the TZN6, the release of the forming racks (tools) clamp is done automatically & mechanically at the OPD adjusting position.

The up & down movement of the pin is driven by a motor and the distance of the movement can be set by workers via a teaching pendant.

The OPD position can be selected by the work selection on the operation panel.

Fig. 4 Automated OPD adjustments

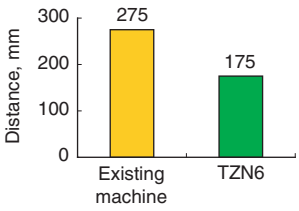

Fig. 2 Distance required to change tools (front forming rack)

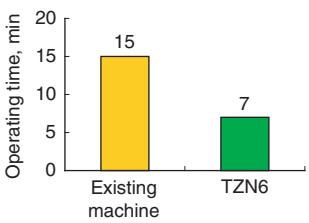

Fig. 3 Tool change time

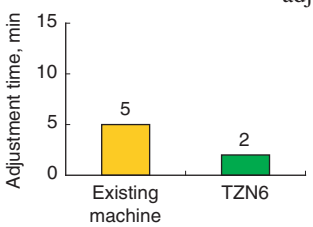

Fig. 5 Time to adjust OPD

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3) Stabilized rolling processing with high accuracy

The double holding system has been adopted to support the rolling driving ball screw. This has stabilized the deviation accuracy of the base tangent length.

· Accuracy of processed parts (for reference)

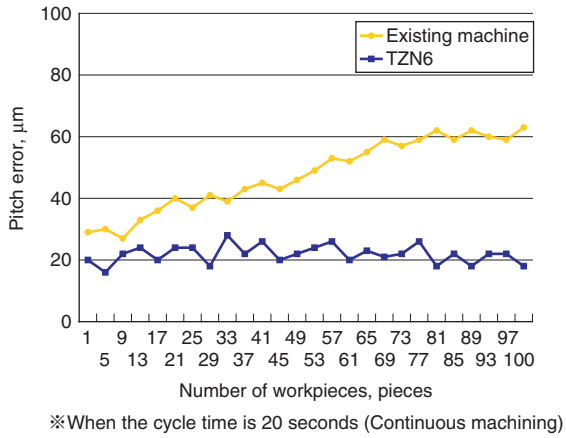


Fig. 6 Change in tolerance of pitch error

4) Shortened processing time through high-speed rolling

The double holding system has been adopted for the driving ball screw and the rolling speed has been increased by raising the permissible rotation speed.

For workpiece that consists of a small rolling load, it has become possible to perform rolling at 20 m/min., which results in a shorter overall processing time.

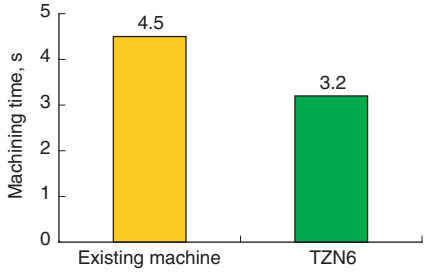


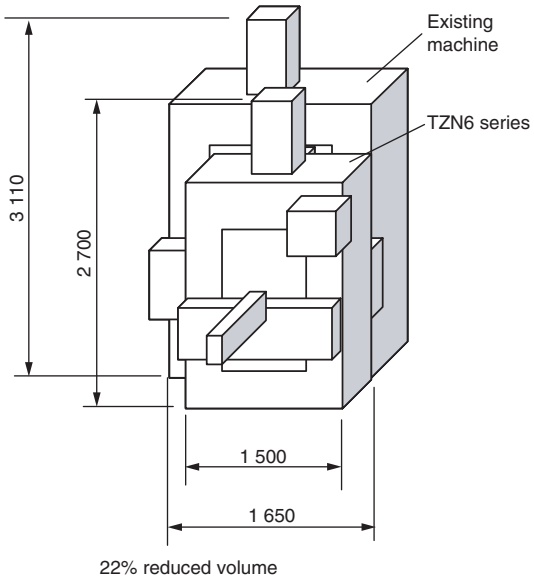
Fig. 7 High speed realized

5) Space saving

The front & rear area of the tie bar mounting and the mounting area of the ball screw nut have been separated in order to save space.

Table 1 Comparison with existing machine

Items	TZN6 series	Existing machine
Forming racks (tools) post setting space, mm	250	140, 200
Forming racks (tools) post setting row, rows	1, 2, 3, 4	1, 2, 3, 4
Maximum forming racks (tools) length, mm	630	630, 730
Maximum stroke, mm	700	800
Rolling center height from floor, mm	1 030 + 40	1 090 + 40
Overall height, mm	2 700 + 40	3 110 + 40
Total width, mm	1 500 × 3 000	1 650 × 3 000
Distance required to change forming racks (tools), mm	175 (Front forming racks) 425 (Back forming racks)	275 (Front forming racks) 475 (Back forming racks)
Rolling speed, m/min	Maximum 20	12



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