cadmicro

INDEX - Werke

Founding: 1914

Employees: >2000

Headquarters: Esslingen

Key Competence: Manufacture of CNC turning machines

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The Company

Today, INDEX-Werke, comprising INDEX and TRAUB brands, stands as a global leader in CNC lathe manufacturing. Operating across five production facilities, seven international sales and service branches, and a vast dealer network, this Esslingen-based conglomerate maintains a presence in 80 locations worldwide. Founded in 1914, the company now boasts over 2,000 employees. Its commitment to quality, reliability, and technical excellence shines through its highly innovative product portfolio and comprehensive customer-centric services, ensuring optimal solutions for every client.

Everything From One Source

INDEX-Werke, with its brands INDEX and TRAUB, is a leading manufacturer of CNC turning machines worldwide. With five production sites, seven international sales and service companies, and a broad dealer network, the group operates in 80 locations globally.

The INDEX Group specializes in providing tailored manufacturing solutions for customers, leveraging its extensive portfolio for both series and custom production. Application engineers utilize this diverse range to develop optimal manufacturing strategies, particularly for complex

and high-precision components.

Engineering and research and development are central to INDEX, employing over 10 percent of the workforce. This emphasis underscores the company's commitment to delivering cutting-edge solutions, from individual machines to interconnected manufacturing systems.

The Challenge

INDEX provides a bar feeder designed for its multi-spindle turning machines, responsible for supplying raw materials to the machining area. To ensure continuous feeding of bars, a slider is utilized for each metal bar. Traditionally, this slider comprises a slider trolley and a clamping piece. There exists potential for cost savings in terms of material, assembly, and storage costs. To simplify comprehension, we'll examine the slider trolley and clamping piece individually, both of which can be optimized through 3D printing.

INDEX aims to save time and costs by primarily utilizing metal 3D printing, driven by factors including reduced assembly effort, minimized rejects, decreased manufacturing effort, and optimized spare parts storage space.

The subsequent pages will elaborate on how additive manufacturing achieves these goals, beginning with an overview of the two applications and their respective requirements.

The Applications

Two interconnected applications are necessary for the bar feeder to efficiently supply material into the processing chamber of the multi-spindle machine. The initial application involves the slider trolley, functioning as the "arm" of the clamp.

Function

The transfer of axial movement force from the clamping piece to the semi-finished bar is achieved through a spring-loaded ram.

Requirements

The slider trolley requires exceptional stability and precision to accommodate the spring plunger effectively. Additionally, it should be feasible to attach the slider trolley securely to the clamping piece.

Previous Method

Currently, the slider trolley comprises a base plate and a turned component, with the rotating element welded onto the base plate.

of Units & Cost to Date
Annually, 520 units of the slider trolley are needed, with conventional production costs totaling €127 per slider trolley, amounting to a yearly total of €66,040.

Challenges
The manufacturing process for the slider trolley is intricate, primarily due to the essential welding procedure, resulting in heightened time and expenses. Furthermore, quality issues arise with the component, largely attributed to the weld seam. These issues can lead to failures, consequently causing delays.

The Applications

The second application is referred to as the clamping piece. Working in tandem with the slider trolley, it facilitates the transportation of bar stock into the processing area.

Function
Resting on a V-belt, it transports the bar stock to the machining area with assistance from the slider trolley.

Requirements
The component needs to fit snugly within a C-rail and should have minimal wear when moved back and forth.

Additionally, threads must be created for belt mounting and attaching the clamping piece.

Previous Method
Currently, the clamping piece comprises two stainless steel plates and an aluminum base body. The stainless steel plates are affixed to both sides of the aluminum base body using pins and screws, as precise alignment with the base body is necessary for the rails. This leads to a labor-intensive assembly process. Subsequently, threads are cut into the malleable aluminum.

of Units & Cost to Date
Annually, 520 units of the clamping piece are needed, with conventional production costs totaling €205 per clamping piece, resulting in an annual total of €106,600.

Challenges
Multiple suppliers must be enlisted for the various components of the clamping piece, leading to a complex, multi-stage supply chain and significant costs and effort for assembly. For the assembly of the clamping piece alone, four steps are required after material acquisition. Moreover, adapting to changes in the product bar feeder entails additional effort. The lead time for re-procurement is 42 days.

The Solution

The company's experts opted for metal 3D printing to produce the two components. After creating the CAD model and completing data and print preparation, the design department initiated the manufacturing process directly on the company's metal 3D printer, bypassing the traditional work preparation chain.

Printing 42 slider trolleys on a build plate takes 50.5 hours, while four clamping pieces, fitting on one build plate, require 22.5 hours. Intelligent design and optimal positioning in the installation space minimize support structures and post-processing, allowing for rapid assembly of the components in multi-spindle systems.

By pre-printing necessary threads in the clamping piece and printing it as a single piece, assembly steps are reduced from five to one. These components, crafted from robust materials, exhibit high mechanical and thermal resilience, ensuring efficient material feeding in spindle systems.

62% Cost Reduction

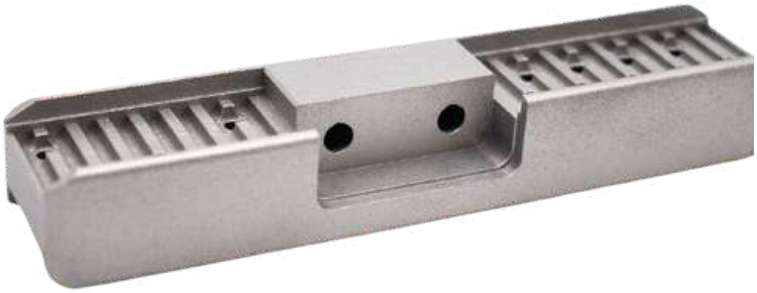
66% Less Storage Needed

80% Reduction of Assembly Effort

10% Scrap Reduction

Conventional Manufacturing

Additive Manufacturing



Additive Manufacturing