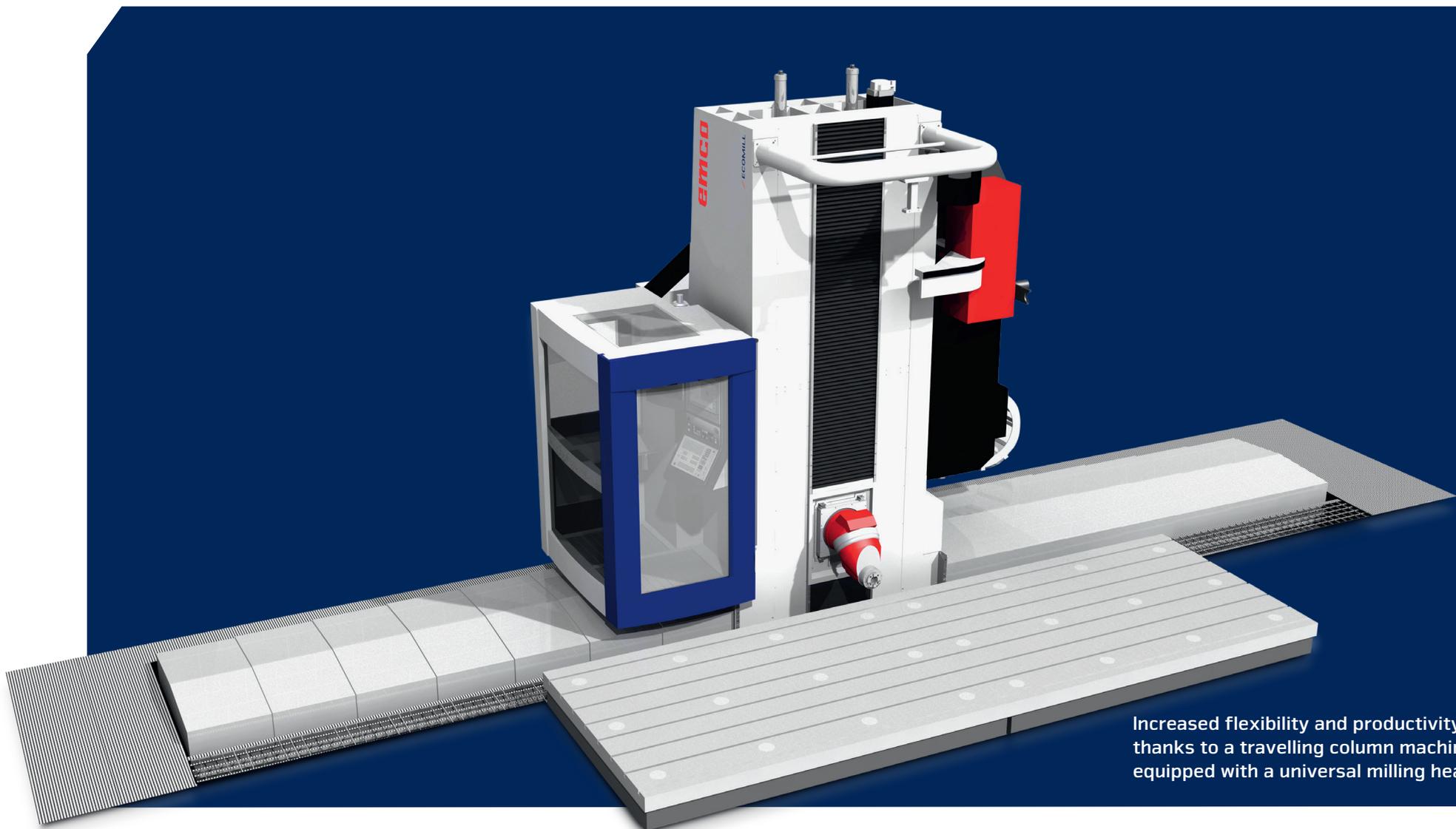


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/ IDEAL LEAD TIME WITH SINGLE-LINE PRODUCTION



Increased flexibility and productivity thanks to a travelling column machine equipped with a universal milling head

Requirements profile and realisation

- / High productivity through single-line production
- / Flexible machining of workpieces in different sizes
- / Digital integration into KOMATSU's production management
- / After sales service including replacement head rental

An Ecomill travelling column milling machine by Emco Mecof has been used in Komatsu Germany's production since March 2021. Acquired as a replacement for two older machining centres, the Ecomill has since been saving valuable space and working hours and increased the Hanover-based construction machinery manufacturer's productivity to a significant extent. The building construction and civil engineering sectors have been booming for many years now. Modern construction vehicles perfectly customised to meet a wide variety of requirements are crucial to the industry. The Japanese Komatsu Group - one of the world's leading manufacturers of construction machinery - has been established on this market for decades.

The same applies to Komatsu Germany GmbH, a Hanover-based company which had been known under the name of "Hanomag AG" until 2002. Focusing on the development and manufacturing of wheel bearings and mobile excavators for the whole of Europe, the German subsidiary has been growing for years. According to managing director Ingo Buscher, the Corona-related crisis had certainly made its presence felt, albeit to a moderate extent. 'This year has been marked by a substantial growth of roughly 70 percent, which more than compensates for the previously experienced decline,' as Buscher continues.

Several aspects have had an influence on this positive development. One of the key factors: Komatsu Germany produces premium vehicles which meet the highest standards. 'The market is aware of that,' Buscher states. Another crucial factor: The Hanover-based company is no longer focusing on classic earth-moving machinery only, but has rather been expanding its lines of business to include further industrial applications, such as waste management, steel production, port handling etc. Ingo Buscher explains, 'It's not as if we were reinventing the wheel for each of our customers. Our ex-works solutions are always based on a tried and tested basic machine. Here in Hanover, we cooperate with our customers to develop options for them that will maximise the productivity for applications that can sometimes be quite exotic. Thanks to highly digitised processes, we mostly use standard production procedures. Our customers appreciate this partner-like development process, as ideally customised special solutions usually lead to follow-up business.'



But the Hanover-based company's capabilities go far beyond that. 'Our customers cannot wait indefinitely for their wheel bearings and mobile excavators to be delivered. They need them as soon as possible. Our internal processes allow us to manufacture and deliver a customised construction machine within four weeks after receiving the order,' the managing director confirms.

According to him, there are two crucial factors which have paved the way for that ability, the first one being his highly qualified employees who - for the most part - receive in-house training either in the form of dual training as skilled workers or by completing dual study courses in the field of engineering or similar degree programmes. The second factor is the synergy of company-wide digitisation and modern technologies and machines which are characterised by maximum reliability, flexibility and quality.

The Ecomill has replaced two machining centres

In March 2021, Komatsu Germany integrated an Ecomill travelling column milling machine by Emco Mecof into its mechanical production. Designed for pendulum machining of components with weights of up to 20 tons, the machine has replaced two older machining centres. While the new machine does save a lot of space, there are two factors that

are even more important to Ingo Buscher: the newly gained flexibility and productivity. 'We really wanted to implement single-line production, which means that, once they have been welded, several of our construction vehicles' main components, such as shovels, excavator arms or front and rear frames, will be conveyed into one central machining centre. This centre must be able to mill different assembly bolt fits into all of these components, regardless of their sizes and of whether they are intended for a wheel bearing or for a mobile excavator. Emco Mecof's Ecomill makes it possible for us to master this challenge.' However, coming up with the current solution has not been easy at all. Repeated adjustments of the standard machine concept had been required. One of the many challenges involved the full digital integration into the production management. What is more, there was only one clearly defined area available for the setup of the machining centre, which implied the exact calculation and implementation of the installation site's statistics.

The milling time has been reduced from 45 to 17 minutes

Compared to the modifications referred to above, only a few changes had to be made to the highlight of the Ecomill, a flexible and infinitely variable universal milling head with



This group picture shows the persons involved in the Ecomill Germany project (from left to right): production manager Sascha Thiese, production engineer Nicole Kohne, managing director Ingo Buscher, production engineer Nico Paasche (all of whom belong to Komatsu Germany), Uwe Urban, Emco sales manager for large-scale machinery, and Matthias Henning, overall production manager at Komatsu Germany.

A- and B-axes able to perform highly precise horizontal and vertical tasks and, according to Uwe Urban, Emco sales manager for large-scale machinery, the machine's centrepiece. 'The mechanical design of our compact milling head makes it possible to use relatively short tools, which in turn results in ideal power transmission and high stability.' What is more, the universal milling head comes with pneumatic oil lubrication, a water cooling system and automatic positioning to the nearest thousandth of a degree. 'These innovations allow us to achieve increased precision and productivity with regard to the workpieces,' explains Urban.

This is confirmed by Matthias Henning, production manager of Komatsu Germany, who proves the productivity gain on the basis of H8 fits with a diameter of more than 100 mm which have to be milled into different types of shovels on a regular basis. 'It took the old machine a total of 45 minutes to complete the milling process. The Ecomill, however, can do that in only 17 minutes.' Apart from that, the travelling column machine reduces the downtime. While a component is being machined on one side of the machine, the machine operator prepares the next component on the other side. All the operator needs to do then is select the matching programme on the CNC and press the start button. After that, he will keep an eye on the machining process while at the same time setting up a new component. Today, it takes only one employee to carry out all of these work steps. 'In the past, we would need three skilled workers on two machines to complete these tasks,' tells Matthias Henning. Today, he is glad that he has two more employees at his disposal who can work in other departments of the company to reliably and flexibly respond to Komatsu Germany's increasing number of customer enquiries.



The Emco travelling column machine is used to machine H8 fits for different main components of Komatsu construction vehicles - shovels and arms as well as front and rear frames.

Many providers, but only one perfect solution

According to managing director Buscher, several international machine tool manufacturers participated in the bidding for the horizontal travelling column machine. At the end of the design customisation phase, however, Emco was the only participant that could convince Komatsu. 'We have got to know Uwe Urban and all Emco employees as very competent and helpful persons. They are always available for open conversations,' Buscher explains and adds, 'Thanks to that and to Emco's solution-oriented approach, we have successfully mastered the challenges posed by this project.'

It was also possible to install the machine in the desired place. Since all accesses to the halls were too small for the moving column to pass, the 30-ton colossus was finally brought in through the hall roof. With regard to that, Uwe Urban, Emco sales manager for large-scale machinery, explains, 'This is a problem we encounter from time to time, but we are more than happy to support our customers with know-how and competent partners to master such challenges as well.' It has now been established that, in practice, the Ecomill does live up to the reliability, quality, flexibility and productivity promised by Emco, the importance of which is stressed by Ingo Buscher. 'If this machine fails, our entire production will come to a standstill. So this is something that must never happen.' To be able to reliably exclude such an event in the run-up to the machine's commissioning, Emco had carried out several in-house simulations and practical test runs, which convinced both the German subsidiary in Hanover and the headquarters in Tokyo, Japan.

Back in 2017, the two companies had already been cooperating smoothly

The good cooperation did not come as a surprise, neither to production manager Henning nor to managing director Buscher. After all, it was in 2017 when the two companies successfully completed their first joint project. Back then, Komatsu Germany purchased an MMV 3200 travelling column centre which is used to machine thousands of components for gears and axes every year. Japan is the Group's only other production location when it comes to these centrepieces of the construction vehicles, and since good long-term business relationships are important to both Komatsu and Emco, further joint projects are already being planned. Once more, the projects aim at saving space with modern machining solutions. Furthermore, existing, qualified employees are to be reassigned to other tasks in order to be able to handle most of the extra orders in a reliable and flexible way.



Komatsu Germany GmbH - Construction Division, still known as "Hanomag" by many a Hanover citizen, has been one of Hanover's major employers since 1835. In 1989, Komatsu, the world's second largest construction machinery manufacturer, took over shares from Hanomag AG. Since 2002, Komatsu Germany GmbH is a wholly-owned subsidiary of the internationally successful company. On a surface of 200,000 m², the Hanover-based company develops, produces and sells wheel bearings from 55 to 531 PS and mobile excavators with weights between 14 and 22 tons.

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TECHNICAL DATA

Linear axes

Longitudinal axis travel	4000 - 10000 mm
Cross axis travel	1300 mm
Vertical axis travel	2000 / 2500 mm
Feedrate	30 m/min

Numerical control

Heidenhain	TNC 640 HSCI
Siemens	840D SL

Spindle motor

Standard	60 kW 600 Nm
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Tool/workpiece cooling system

Low pressure	28 l/min, 6 bar
High pressure (through the spindle)	20 l/min, 20/40/60 bar

Options

Universal milling head with automatic millesimal positioning	6000 + 8000 rpm
Milling head with offset spindle	3000 rpm
High speed spindle in special support for universal milling head	18000 rpm
Automatic tool magazine	40 / 60 / 80 pockets

Universal milling head with automatic millesimal positioning

Power S1/S6	38 / 48 kW
Torque S1/S6	600 / 750 Nm
Rotation speed	15 + 8000 rpm
Tool taper standard	ISO 50 DIN 69871
Option	BIG PLUS
Option	HSK 100-A DIN 69893

High-speed spindle 40,5 / 53 kW

Power S1 / S6	40,5 / 53 kW
Torque S1 / S6	35,4 / 46 Nm
Rotation speed	18000 rpm
Tool taper	HSK 63-A



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TECHNISCHE DATEN

Lineare Achsen

ECOMILL

Längsachse Verfahrweg	4000 - 10000 mm
Querachse Verfahrweg	1300 mm
Vertikalachse Verfahrweg	2000 / 2500 mm
Vorschubgeschwindigkeit	30 m/min

CNC-Steuerung

Heidenhain	TNC 640 HSCI
Siemens	840D SL

Motorspindel

Standard	60 kW 600 Nm
Option	

Werkstück-/Werkzeugkühlsystem

Niederdruck	28 l/min, 6 bar
Hochdruck (durch die Spindel)	20 l/min, 20/40/60 bar

Optionen

Universalfräskopf	6000 + 8000 U/min
Fräskopf mit ausserachsiger Spindel	3000 U/min
Universalkopf mit Torque Motoren und Elektros­pindel	-
Elektros­pindel mit Sondersupport für Universalfräskopf	18000 U/min
Automatisches Werkzeugmagazin	40 / 60 / 80 Plätze
Automatisches Kopfmagazin	-

Universalfräskopf mit stufenloser Positionierung auf ein Tausendstel Grad

ECOMILL

Leistung S1 / S6	38 / 48 kW
Drehmoment S1 / S6	600 / 750 Nm
Spindeldrehzahlen	15 + 8000 U/min
Standard Werkzeugaufnahme	ISO 50 DIN 69871
Option	BIG PLUS
Option	HSK 100-A DIN 69893

Elektros­pindel 50 / 63 kW

Leistung S1 / S6	-
Drehmoment S1 / S6	-
Spindeldrehzahlen	-
Werkzeugaufnahme	-

Elektros­pindel 42 / 55 kW

Leistung S1 / S6	-
Drehmoment S1 / S6	-
Spindeldrehzahlen	-
Werkzeugaufnahme	-

Elektros­pindel 40,5 / 53 kW

Leistung S1 / S6	40,5 / 53 kW
Drehmoment S1 / S6	35,4 / 46 Nm
Spindeldrehzahlen	18000 U/min
Werkzeugaufnahme	HSK 63-A