

10,000 km course in search of machine tools - a report from the Taipei International Machine Tool Show in Taiwan

10000 km drogi w poszukiwaniu obrabiarek
– relacja z Międzynarodowych Targów Obrabiarek
na Tajwanie

NORBERT KĘPCZAK *

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26th Taipei International Machine Tool Show – TIMTOS 2017 was held from 7 to 12 of March 2017. The keynote of this year show was “Smart Manufacturing”. The schedule included press conferences. Visitors were encouraged to get acquainted with the offers from production companies and to speak to the leading persons in Taiwan machinery industry. KEYWORDS: TIMTOS 2017, machine tool fair, smart manufacturing

The adventure with this year's fair started at the Chopin airport in Warsaw, from where I set out on a journey to the Far East. After 24 hours of flight, changing to Dubai and over 10,000 km I landed at Taipei-Taoyuan Airport, 25 km west of the capital city of Taipei.

Taiwan is an independent, democratic state located in Southeast Asia, on the islands off the coast of the People's Republic of China. Officially, Taiwan is called the Republic of China, and is recognized internationally by a few countries. Nevertheless, most countries in the world maintain diplomatic relations with it through embassy offices. In Poland, this is the Taipei Economic and Cultural Office [1].

Currently, Taiwan has more than 23 million citizens (98% of Han's nationality), who inhabit 86 islands with a total area of 36,000 km² (for comparison, Poland's surface is 312 thousand km²). Mandarin is the official language. Taiwan is an industrialized country, the GDP of which per head in 2016 was 22.5 thousand USD (in Poland, it was 13 thousand USD) [2].

Taipei is a modern and prosperous city, one of Taiwan's two largest industrial centers. There are many thousands of companies and industrial plants in it. It is an international shopping center.

TIMTOS 2017

This year's 26th International Machine Tool Show (TIMTOS 2017) took place on March 7-12. The exhibition was presented in four exhibition halls scattered all over Taipei. Among the main organizers of the fair, there were the Taiwan External Trade Development Council (TAITRA) and the Taiwan Association of Machinery Industry (TAMI). More than 1,100 exhibitors, with over

5400 exhibitions, participated in the event. With such impressive numbers, TIMTOS 2017 has become the fifth largest machine tool fair in the world, second largest in Asia and the largest in Taiwan.

TAITRA is a non-profit organization founded in 1970, which first promoted trade and association in Taiwan. Mainly supported by the government, industry associations and several trade organizations, it helps Taiwanese companies and manufacturers to strengthen their international competitiveness and to deal with the challenges they face in foreign markets, and mediates contacts with foreign partners [3].

TAMI is an association with a very long tradition of operation in the machine industry. It was established in 1945 and is currently the second largest association in the world. It unites 2627 members and coordinates, facilitates the exchange of information and goods, and promotes the activities of Taiwan's machinery industry [4].

Opening ceremony

In this year's fair opening ceremony, representatives of the government with the vice president Dr. Chien-Jen Chen, diplomats and representatives of machine tool and business associations, participated.

Guests were welcomed by Lin-Wu Kuo, TAITRA Vice-Chairman. During his speech, he emphasized that Taiwan has a unique industrial cluster. Its highly efficient supply chain makes it the fifth-largest machine manufacturer in the world. Because in recent years the world economy has been facing a negative market situation. Due to the unstable international situation, the Taiwanese machine tool exports in 2016 decreased by 9% compared to the previous year. However, starting with the last quarter of 2016, thanks to the implementation of the Smart Manufacturing concept, aircraft designed for the United States have been designed, thus allowing for economic recovery and the emergence of new machine tool development prospects.

The culminating point of the opening ceremony was the speech of Taiwan's vice president, Dr. Chien-Jen Chen (fig. 1). He emphasized that government-industry cooperation is a very important link in the development of the Taiwanese economy. Government financing of trade organizations has an impact on the number of machines and equipment exported. According to estimates, about 95% of Taiwanese production is destined for export (mainly to China). For this reason, TIMTOS is the most

* Mgr inż. Norbert Kępczak (norbert.kepczak@p.lodz.pl) – Instytut Obrabiarek i Technologii Budowy Maszyn, Wydział Mechaniczny Politechniki Łódzkiej

important industrial event in Taiwan, as it provides an opportunity for interaction between exhibitors and potential buyers.



Fig. 1. Vice President of Taiwan Dr. Chien-Jen Chen at the TIMTOS 2017 Opening Ceremony

Taiwan Machine Tool Industry Awards

Taiwan Machine Tool Industry Awards are awarded for research and development in the field of machine tool design in terms of CNC machine tools, machining centers, CNC lathes, NC machine tools and CNC machine tools.

This year, Yeong Chin Machinery Industries Co., Ltd. (fig. 2) received the top prize for the NFP 500A-5AX-T Smart Multi-Tasking Mill/Turn Machining Center. This five-axis milling and turning center has been designed to meet the high accuracy requirements of the space industry. Thanks to increased stiffness and torque, the machine can handle heat-resistant materials such as titanium and Inconel, while extending the life of the tool. It is equipped with the latest iPros MX CNC controller. It has intelligent features that automatically optimize machining efficiency, maximize tool life and real-time monitoring of machine status.



Fig. 2. Representatives of Yeong Chin Machinery Industries Co., Ltd., which won the Main Award of the Taiwan Processing Industry

Complete list of this year's winners is in the table.

TABLE. Taiwan Machine Industry Award Winners

CNC machine tools		
Prize	Company	Product
Supreme Excellence Award	Yeong Chin Machinery Industries Co., Ltd.	NFP 500A-5AX-T Smart Multi-tasking Mill/Turn Machining Center
Machining centers		
Grand Champion Award	Tongtai Machine & Tool Co., Ltd.	HTH-800 Swiveling Head Type 5-Axis Horizontal Machine Center
Award of Eminence	Fair Friend Enterprise Co., Ltd.	U-800 Vertical 5-Axis Machining Center
Award of Eminence	Ching Hung Machinery & Electric Industrial Co., Ltd.	HM3252L 3-Axis Linear Motor High Speed Milling Center
Award of Eminence	Awea Mechantronic Co., Ltd.	FCV-800S Gantry Type 5-Axis Milling and Turning Machining Centers
CNC lathes		
Grand Champion Award	Far East Machinery Co., Ltd.	WVL-F24 Automatic Virtual Metrology System (AVM) for Alloy Wheel Automatic Line
Award of Eminence	L&L Machinery Industry Co., Ltd.	CLB-BC 5-Axis Milling Turning Center
Award of Eminence	Leadwell CNC Machines MFG., Corp.	TW-8M Flexible Intelligent Automation Production Line
Award of Eminence	Yida Precision Machinery Co., Ltd.	HML-600 Sub-Micron Lathe
Other NC machine tools		
Grand Champion Award	SOCO Machinery Co., Ltd.	SB-52x10A-2S-V-U+Robot All Electric Tube Bending Automation Cell
Award of Eminence	Ching Hung Machinery & Electric Industrial Co., Ltd.	AP3020L-Ultra-Precision 3-Axis Linear Motor EDM
Award of Eminence	Excetek Technologies Co., Ltd.	NP600L Intelligent High Precision Linear Motor Wire EDM Machine
Award of Eminence	Luren Precision Co., Ltd.	LGA-3020 Continuous Generating Gear Grinding Machine
Components for CNC machine tools		
Grand Champion Award	Keyarrow (Taiwan) Co., Ltd.	KAH-200 Hinged Belt Type Conveyor
Award of Eminence	HIWIN Technologies Corp.	RAS-320 Direct Drive CNC Tilting Rotary Table
Award of Eminence	Gifu Enterprise Co., Ltd.	BT5046SS3T Intellectualized Matrix Tool Storage System
Award of Eminence	Habor Precise Inc.	Cryogenic Cooling equipment with CO ₂ coolant

Far East Machinery Co., Ltd.

The Far East Machinery Company (FEMCO) was founded in 1949. From a modest bicycle shop it has evolved into a multidisciplinary international company. All machines are thoroughly tested to ensure they meet the strict quality control requirements prior to shipping to customers. The goal of FEMCO is to provide high quality products and services through an international network of distributors and regional offices.

During the TIMTOS 2017 FEMCO presented a robotic line for the treatment of aluminum alloy wheels (fig. 3). The line consists of three machining centers, a FANUC

robot and a measuring system with a vision system for recognizing the types of rims.

FEMCO offers the ability to process up to two types of rims. The machining process consists in feeding the aluminum alloy wheel to a measuring stand where the rim type is detected using the vision system. Then the machining program is started. The first machining center performs roughing of the outer and inner rims. The second center is designed for drilling holes for mounting bolts fixing the rim to the hub of the car, while the third machining center carries out finishing work.



Fig. 3. FEMCO machined line for machining aluminum rims

Asia Pacific Elite Corp.

Asia Pacific Elite Corp. (APEC) is a company under Tongtai Machine & Tool Co., Ltd. It specializes in manufacturing high quality machinery and equipment such as metalworking machines, five-axis machining centers and CNC milling machines. APEC uses the best components, high-precision production, stringent quality control, and customer-oriented technology. The company's machinery not only provides cutting solutions, but also contributes to increasing customer value. Thanks to experience in processing APEC has a good reputation in foreign markets.



Fig. 4. APEC 5-axis G2540-5L machining center

During the TIMTOS 2017, the APEC presented a new series of five-axis, high-speed machining centers (fig. 4). This family of machine tools is characterized by high spindle power (60 kW!), which can achieve a rotational

speed of 30,000 rpm. Maximum machining space is along the X axis - 3500 mm, along the Y axis - 4000 mm, and along the Z axis - 1200 mm. Five-axis machining allows the entire workpiece to be prepared in one attachment.

Dees Hydraulic Industrial Co., Ltd.

Since 1976, Dees Hydraulic Industrial is well known in the metallurgical industry for its machine tools. The flagship products of the company are presses for deep drawing and plasma cutting, tailor's presses and tools for hydraulic presses. The research conducted by Dees Hydraulic Industrial significantly contributes to the company's ever-increasing success. The development of machinery, such as the deep-drawing hydraulic press, covers a wide range of product research activities, component coordination, performance enhancement, and cost reduction through redesigning the production process. Dees Hydraulic Industrial takes into account customer suggestions that are necessary for the development of its products. More than 95% of the components are self-produced, allowing total control over delivery times to customers. Additionally, in the event of a failure it is possible to diagnose and repair quickly without having to download the manufacturer's service for a particular component.

Shieh Yih Machinery Industry Co., Ltd.

Shieh Yih Machinery Industry (SEYI) has been operating in the mechanical press industry since 1962. It is a large company with 5400 employees in Taiwan and China. The range of presses produced is very wide. SEYI offers a press with servo-drive to control traffic during work. More than fifty years of experience in the production of presses enables the selection of a specific solution for specific customer requirements. More than 40% of the company's production is located in the Chinese market, and around 40 agencies offer SEYI products worldwide. In response to the growth of the global automotive market and the emergence of smart manufacturing challenges, SEYI is focusing on sustainable development using metal stamping technology to reduce energy consumption, which is part of the Smart Manufacturing concept. After successful 400-tonne servo motors for rectilinear presses and 800-tonne toothed-tooth servos, in cooperation with OEM Daimler Group, the 800-tonback press series will be completed soon for Tesla Motors USA. Fig. 5 shows the SEYI factory.



Fig. 5. Press factory of SEYI

Luren Precision Co., Ltd.

In 1994, Luren Precision Co., Ltd. began manufacturing cutting tools at the Hsin-Chu Science-Based Industrial Park in Taiwan. Key specialists who have recruited from the Institute of Industrial Technology Research (ITRI) have had extensive experience in advanced technology and precision machinery for the manufacture of tools and parts. Over time, Luren has distinguished three main divisions that focus on the manufacture of cutting tools, pumps and machine tools. As part of the technology development team, ITRI research units and ITRI specialists work on manufacturing solutions and special, high-precision components.

Among the machine tools presented by Luren is a CNC grinding machine for grinding helical worm gear units with the LWT-2080 (fig. 6). This is a user-friendly and cost-competitive multifunctional machine that incorporates advanced solutions such as direct-drive and linear drive. Custom Smart Dialogue software allows you to flexibly generate infinite number of features, manage sanding cycles, and store process data without the need for an external PC. PC connection and digital control make data input and operation easy.

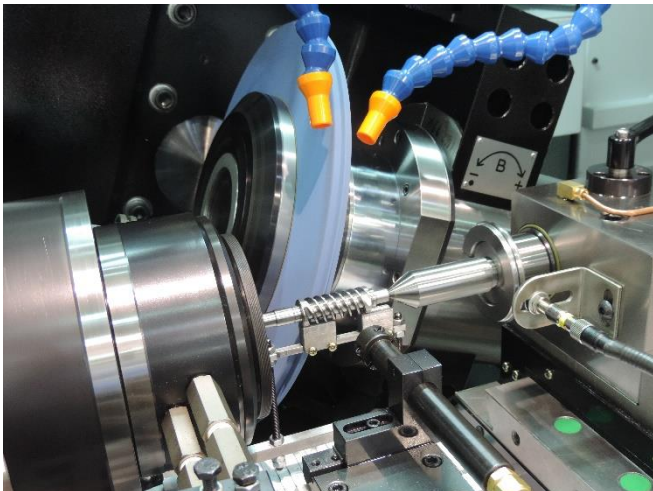


Fig. 6. Machining space for LWT-2080 screw grinders from Luren

Ching Hung Machinery & Electric Industrial Co., Ltd.

Ching Hung Machinery & Electric Industrial (CHMER EDM), established in 1975, is governed by the principle of "honesty, growth, customer satisfaction, employee safety". Emphasis is placed on the development of EDM technology and quality in the global markets. The software department has developed special EDM software to optimize the cutting performance between the power supply and the controller, as well as programs for specific applications.

CHMER is the leader in the Taiwanese market for EDM manufacturers. At TIMTOS 2017, the company presented electro-drills and electro-erosion wire cutters. In these devices, linear drives are used to drive the electrode or wire, resulting in improved motion accuracy and acceleration. CHMER's newest hit is the RV853L wire cutter (fig. 7). It incorporates innovative solutions to improve machining efficiency. The RV853L uses the structure of moving columns. The machine is equipped with a new E8 controller which in real-time carries out machine diagnostics, notifies the need for maintenance

and manages the life of consumables and other automation devices.



Fig. 7. CHMER RV853L electro-discharge machine tool

Yeong Chin Machinery Industries Co., Ltd.

The YCM was founded in 1954. It currently employs 750 people. The company produces various types of machine tools: three-axis vertical milling centers, five-axis milling centers, horizontal milling and milling centers, horizontal milling centers, vertical two-column milling centers and CNC lathes.

YCM uses its own control systems for machine tools - developed in cooperation with FANUC - equipped with Automatic or manual tool measurement, quick positioning, and intelligent tool data management.

At this year's TIMTOS 2017, the YCM presented a robotic machining line for small cast iron bodies (fig. 8). The line consists of two three axis machining centers, a FANUC robot, a measuring station, a semi-finished goods warehouse and a finished goods warehouse. The first machining center TV850B performs rough machining of the workpiece, which is then conveyed by the robot to the measuring station. After checking the required parameters, the item goes to the trash labeled "NONE" (if any of the dimensions is not in accordance with the requirements) or to the semi-finished stock (if all dimensions are compatible). From the semi-finished goods warehouse, the detail goes to the second machining center NXV106A for finishing work, where after the positive test the body goes to the finished goods warehouse.



Fig. 8. Robotized YCM machining line

HIWIN Technologies Corp.

On TIMTOS 2017 was presented the offer of companies supplying measuring and technological equipment and components for the production of machine tools - among others, well known in Europe by HIWIN. She presented, among others, A helical-bevel gearbox, which, thanks to the built-in sensor in the gear cap, could accurately control its position. In addition, HIWIN has shown a number of industrial robots designed for machine tools and accessories. The stand attracted attention thanks to two Articulated Robot RA605 robots, which prepared coffee for the visitors (fig. 9).



Fig. 9. HIWIN coffee maker preparing coffee for visitors

SOCO Machinery Co., Ltd.

SOCO company was established in 1979 and belongs to the leading manufacturers of profile bending machines. At factories in Taiwan and China employs nearly 500 employees. SOCO products are offered by 40 certified sales agencies around the world. Eastern Europe is an important market for them, therefore the representation in Russia is very active. Sales in this part of Europe amounted to 15% of SOCO's total sales last year. The company's products are also presented at trade fairs in Europe. One of the SOCO pipe benders received the STOM medal in Kielce in 2009.

The SOCO pipe bender SB-52X10A-V-U (fig. 10 [5]) has been equipped with double sided bending technology for maximum flexibility and minimum machining interference. The "U" pipe bender is especially suitable for machining complex parts and shapes such as car head restraints, fuel lines, heating and cooling systems. These benders are equipped with 5-10 CNC electric axes and 2-3 bending units. In addition, the unique direct gear transmission from SOCO is used in them.



Fig. 10. SB-52X10A-V-U CNC bending machine [5]

Advantech-LNC Technology Co., Ltd.

Advantech-LNC was founded in October 2000. Today, it is China's leading brand of CNC controllers. Advantech-LNC employs more than 300 employees in its factories. The company offers a wide range of numerical controllers that can be used in a variety of CNC machines such as lathes, milling machines, grinders or injection molding machines. Among the world's manufacturers of controllers, Advantech-LNC is characterized by mature technology, excellent production capabilities and uncompromising quality control. This makes Advantech-LNC one of the world's leading suppliers of CNC controllers.

Conclusions

This year's TIMTOS International Machine Tool Show was a great opportunity to get acquainted with the latest trends in construction and machine tool technology as well as to better understand the cultural, taste and architectural values of the Far East. The hosts are already inviting to the next edition of the fair, scheduled for March 5-10, 2019.

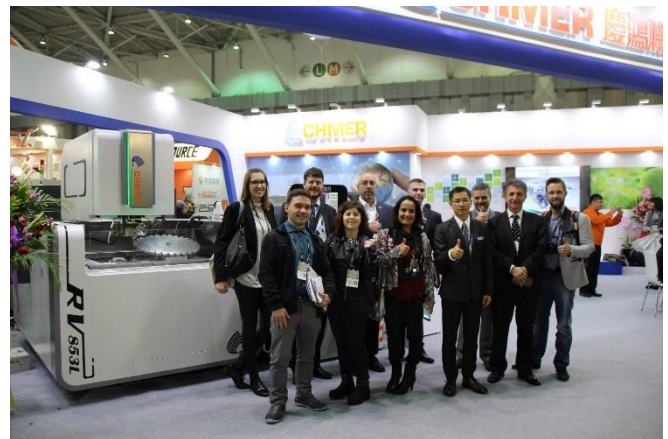


Fig. 11. Group of journalists on TIMTOS 2017. From the left: Julia Dusold (Germany – Fertigung), Adalberto Rezende de Luz Filho (Brazil – Maquinas e Metais), Matt Danford (USA – Modern Machine Shop), Hatice Deniz (Turkey – TT Magazin), David Wiggins (UK – Machinery Market), Martha Carvajal (Colombia – Reportero Industrial), Mike DiFranco (USA – Aerospace Manufacturing and Design), Brad Wang (General Director of CHMER), Stefano Colletta (Italy – Macchine Utensili), Yalcin Gur (Turkey – MM Makina), Norbert Kępczak (Poland – Mechanik)

The author would like to thank the entire group of reporters participating in TIMTOS 2017 for the exchange of experience related to the previous and current trade fairs and the substantive discussion about the presented products.

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REFERENCES

1. Biuro Gospodarcze i Kulturalne Tajpej – www.roc-taiwan.org/PL.
2. Siemiński P. „Przemysł obrabiarkowy na Tajwanie oraz przegląd wybranych producentów – cz. I”. *Mechanik* 10 (2014): pages 768–789.
3. http://www.timtos.com.tw/en_US/news/info.html?id=6F6A423AEB0B224B.
4. Pawłowski W. „Obrabiarki z Tajwanu – potencjał, trendy, strategia”. *Mechanik*. Nr 1 (2013).
5. http://www.soco.com.tw/product_detail_en.php?d_id=1048&reset_var=Y.