

Global quality and service system of metal working industry

■ **Newsroom**

IMTEX 2013 Preview

■ **Global Outlook**

India

■ **R&D Zone**

Thermal Growth Measurement and Compensation for Integrated Spindles - Part II

■ **EVENT**

-Microcut in AMB 2012
-Microcut Innovation Day 2012

■ **Taiwan Panorama**

The Beauty of Formosa



LT-HT-SPT series
CNC Slant-bed Lathe



DUAL series
Dual spindle
CNC Lathe



MCG-5X
5-axes Gantry
type VMC



MU-5X
5-axes VMC



V-Series
V-20/5



MM-Series
Linear
guideway
VMC



MCV-Series
Box way VMC



VM/VMC Series
Medium/Large
Box way VMC



TC Series
Travel Column VMC



TT-40
Bridge type Twin-table VMC



HBM-4T/5T/5TE
Travel-column
Horizontal Borer



HBM-4
Table-moving
Horizontal Borer



BNC-5000/6500
4-Guideway Heavy
Duty Lathe



BNC-3000/3500/4000
Large bore CNC
Flat-bed Lathe



BNC series
Teach-in Flat bed Lathe



ISO 14001:2004
EMS 546518



ISO 9001:2008
FM 538421

New Collection of Master Huang



Rainbow



Tears of Angels

<http://www.hyp.com.tw>

The **CHALLENGER** Vol. 4 Iss. 16 2012

Publisher: Paul Chang

E-mail:

info@mail.buffalo.com.tw

Editor: Sabina Chen

t02@mail.buffalo.com.tw

Editorial board: Paul Chang

Sabina Chen

Iris Chen

Doreen Wang

Layout and Typesetting :

Treasure Map Advertising Corp.

E-mail: apchen.ap@msa.hinet.net

Subscription:

Buffalo Machinery Co., Ltd.

56, Lane 318, Der Sheng Road, Ta Ya District,
Taichung City, Taiwan

TEL: 886-4-25 60 37 59

FAX: 886-4-25 60 37 69

www.buffalo.com.tw

Copyright © 2012 Buffalo Machinery Co., Ltd.

All right reserved. No portion of this publication covered by the copyright herein may be reproduced in any form- graphic, electronic, mechanical, photocopying without the written permission of the publisher.

Opinion expressed by contributors and advertisers are not necessarily those of the publisher or editor and take no responsibility for any false claims or erroneous information.

Contents



From the Publisher 2

Newsroom 3

- IMTEX 2013 Review

Global Outlook 5

- India

Distributor 9

- SJS Limited

Product 11

- HBM Series

R&D Zone 13

- Thermal Growth Measurement and Compensation for Integrated Spindle - Part II

Application 19

- Facing Head

Key Component 21

- Ball Cutter Mastering

Event 23

- Microcut in AMB 2012

- Microcut Innovation Day 2012

Taiwan Panorama 27

- The Beauty of Formosa

Contents



Spin The World

POSA Machinery Company Always on your side

Precision Spindle Builder

POSA MACHINERY CO., LTD.

No. 379, Yi Sin Street, Eastern, Taichung City, 40153 Taiwan

TEL: 886-4-22135988 / FAX: 886-4-22135996

E-mail: posa.posa@msa.hinet.net

www.posa-spindle.com



Welcome user's contribution

of company profile, Challenger products experience sharing and pictures of people and products. Please send your story and pictures (Images in high-resolution higher than 300 dpi) to your Challenger Factory Outlet or e-mail to t02@mail.buffalo.com.tw

From the Publisher



In spite of the recent EURO zone debit crisis, the crowd visitors of AMB Messe, Stuttgart Germany, during the show period were gratifying with number of the visitors this year. Buffalo Machinery was delighted to participate in this event with very successful presentation of the latest Gantry type 5 axis simultaneously Milling Center and many high speed machines. The day before AMB opening, Buffalo held a positive 2012 innovation seminar for the regional distributors. A great successful result has performed and the exhibition AMB 2012 has been a valuable event.

Providing the complete product line of the products for general construction to high end, high speed machine tools has been Buffalo's commitment to sustainability. Recent HR redefining and reinforcing training programs as well as strengthening the standard operation procedure (SOP) for production, sales and management are the primary innovation of Buffalo Machinery. Buffalo Machinery proudly functions on the belief that "quality and service build our business". Buffalo Machinery produces a wide range of strong, robust, precise and reliable machine tools together with exceptional customer service. Innovative products and sustainable management are the daily goal, and business development philosophy.

"Users of metal-cutting technologies are being confronted with the demand for ever shorter processing times – with simultaneous lower production costs and consistent or even higher quality", quoted from Marc Busch who led the '2012 Tool Study – Trends in Tool Technology.' Buffalo's Innovation ensures that we follow the trends and meet the demands of the market for the High Speed Machining (HSM) by providing the Smart Machine Technology which applies faster machining speed, lower force, less tool breakage, no thermal growth and better surface finish, with these efficient and better

performances to produce extremely competitive products and a lower production cost. Our aspiration for the acquisition of the high-end market by assuring the Smart Machine Technology meets the requirement of HSM. The Smart Machine Technology can support a better job, ensure better tolerance, work faster and is an up-dated mechatronics technique.

Buffalo Machinery coordinates both the electrical and mechanical performance with automatic control to enhance the output value of the machinery industry. We work together with the global distributors to define direction of the development of new technologies. As well as an additional line of column type Horizontal Borer which is equipped with either hydrostatic system or strong linear guide ways, providing a wide range of application. Floor type Borer is on the schedule to service the market in middle of 2014. Buffalo Machinery will then offer a complete line of Horizontal borer.

 Dr. Paul Chang
Oct. 2012

Reference: Innovation and Precision are key to success, AMB press, July 2012



IMTEX 2013 Preview

The 16th Indian Metal-cutting Machine Tool Exhibition – IMTEX 2013 will be held from 24 to 30 January 2013 at Bangalore, India. As one of the largest exhibitions of metal-cutting machine tools and manufacturing solutions in South and South-East Asia, IMTEX will showcase a wide range of innovations and technological refinements in the complete product segment of metal-cutting machinery.



IMTEX attracts a large domestic and international participation over the past few decades, it therefore becomes an ultimate platform for the manufacturing sector to forge strategic alliances, develop vendor bases, exchange technology know-how and enter into new partnerships. IMTEX is also known as a leading trade fair for showing the up-to-date innovations in front of the best international specialists.

As a biannual event, the previous IMTEX exhibition was held in 2011. In a space of over 45,000 square metres of gross area, it featured participation of 813 companies from

23 countries including China, Czee Republic, Germany-Italy, Singapore, Spain, Taiwan, United States, Australia, Canada, France, Korea, Holland, Turkey, Belgium, Russia, Japan, Thailand and the UK...etc. It attracted around 92,500 business visitors from all across the Indian manufacturing industry, led to a virtual sold-out of all machines displayed at the exhibition and generated business enquiries to the tune of Rs. 70,000 million.

According to the executive director of India Machine Tool Manufacturer's Association Mr. V. Anbu, 2013 is expected to be strong economic phase for the Indian economy and its industry. India is forecasted to achieve 8 - 9% GDP growth by means of a higher industrial growth, especially by the manufacturing sector. This provides good opportunities for enabling industries including machine tools and manufacturing solutions. It is expected that IMTEX 2013 will be held at the cusp of the economic boom of India.

Concurrent with IMTEX 2013, Tooltech 2013 – 15th International Exhibition of Cutting Tools, Tooling Systems, Machine Tool Accessories, Metrology & CAD/CAM will be held at the same exhibition center, introducing the newest trends in cutting tools and tooling systems from all across globe.

SUMMARY SHEET

Show	IMTEX 2013 (16th Indian Metal-cutting Machine Tool Exhibition with International Participation) Concurrent show Tooltech 2013 (15th International Exhibition of Cutting Tools, Tooling Systems, Dies, Moulds, Forming Tools, Machine Accessories, Metrology & CAD/CAM)	
Organizer	Indian Machine Tool Manufacturer's Association (IMTMA)	
Dates	24-30 January 2013	
Venue	Bangalore International Exhibition Centre (BIEC) 10th Mile Tumkur Road, 562 123 Bangalore, India	
Official Website	www.imtex.in	
Visitors Profile	Professionals related to the field of Machine building, construction of equipment, Tool & mould-making, fixture design, Steel & light-metal construction, Road vehicle construction & suppliers, Automotive industry & suppliers, Shipbuilding industry, Aerospace industry, Electrical & electronic industry, Precision machines & optics, Manufacture of iron, sheet metal and metal ware	
Product Scope	IMTEX 2013	Tooltech 2013
	• Turning Machines • Drilling Machines, Boring Machines	• Tools for Metalworking Machine Tools Including Press Tools and Dies Attachments,

SUMMARY SHEET

<ul style="list-style-type: none"> • Turning Machines • Drilling Machines, Boring Machines • Milling Machines • Gear Cutting & Finishing Machines • Screwing & Threading Machines • Planning, Shaping, Slotting & Broaching Machines • Sawing and Cutting-off Machines • Grinding Machines, Tool Grinding Machines • Special Purpose Grinding Machine • Honing, Lapping, Polishing & Deburring Machines • Special Production Machines & Unit Heads • Electro Erosion Machines • Machines for Unconventional & Other Operations • CNC Multi Function Machines • Machining Centres • Hardening and Heating Machines • Assembling Systems & Industrial Robots • Flexible Manufacturing Systems • Organizations 	<ul style="list-style-type: none"> • Tools for Metalworking Machine Tools Including Press Tools and Dies Attachments, Accessories and Fixtures for Machine Tools • Measuring Machines and Instruments • Sensors and Diagnostics • Portable Electric or Pneumatic Tools • CAD/CAM – Hardware and Software • Testing and Balancing Machines • Hydraulic and Pneumatic Systems and Equipment for Machine Tools • Lubricating Oils and Cutting Fluids for Machine Tools
--	---

Data Resource: www.imtex.in



Global Outlook

India



Know India

Temples, festivals, food, fascinating cities, beautiful beaches and tiger-spotting in the national park... few countries encompass as richly varied culture and scenery as India. As one of the oldest civilizations in the world, it is not only famed for its abounding variety and rich cultural heritage, but also its rapid economic growth since market-based economic reforms in 1991. India is now the seventh-largest country in the world and the second-most populous country with over 1.2 billion people. In addition, its economy is the world's eleventh-largest by nominal GDP (Gross Domestic Product) and the third largest by PPP (purchasing power parity).

Particulars	Description
Country Name	Republic of India; Bharat Ganrajya.
Government Type	Sovereign Socialist Democratic Republic with a Parliamentary system of Government.
Capital	New Delhi.
Administrative Divisions	28 States and 7 Union Territories.
Independence	15th August 1947 (From the British Colonial Rule).
Constitution	The Constitution of India came into force on 26th January 1950.
National Days	26th January (Republic Day).
	15th August (Independence Day).
	2nd October (Gandhi Jayanti; Mahatma Gandhi's Birthday).
Population	India's population, as on 1 March 2001 stood at 1,028 million (532.1 million males and 496.4 million females).
Ethnic Groups	All the five major racial types - Australoid, Mongoloid, Europoid, Caucasian, and Negroid find representation among the people of India.
Religions	According to the 2001 census, out of the total population of 1,028 million in the Country, Hindus constituted the majority with 80.5%, Muslims came second at 13.4%, followed by Christians, Sikhs, Buddhists, Jains, and others.
Languages	There are 22 different languages that have been recognized by the Constitution of India, of which Hindi is an Official Language. Article 343(3) empowered Parliament to provide by law for continued use of English for official purposes.
Literacy	According to the provisional results of the 2001 census, the literacy rate in the Country stands at 64.84 per cent, 75.26% for males and 53.67% for females.
Location	The Indian peninsula is separated from mainland Asia by the Himalayas. The Country is surrounded by the Bay of Bengal in the east, the Arabian Sea in the west, and the Indian Ocean to the south.
Area	3.3 Million sq. km.

Particulars	Description
Climate	The climate of India can broadly be classified as a tropical monsoon one. But, in spite of much of the northern part of India lying beyond the tropical zone, the entire country has a tropical climate marked by relatively high temperatures and dry winters.
Terrain	The mainland comprises of four regions, namely the great mountain zone, plains of the Ganga and the Indus, the desert region, and the southern peninsula.
Natural Resources	Coal, iron ore, manganese ore, mica, bauxite, petroleum, titanium ore, chromite, natural gas, magnesite, limestone, arable land, dolomite, barytes, kaolin, gypsum, apatite, phosphorite, steatite, fluorite, etc.
Natural Hazards	Monsoon floods, flash floods, earthquakes, droughts, and landslides.

Data Resource: National Portal of India <http://www.india.gov.in>



India Spices

Photo by Judepics on Wikipedia



Vegetarian Curry

Photo by Gracinha Marco Abundo on Wikipedia

Society and Religion

India spans more than 4,500 years that it has hugely diverse range of cultures, languages and belief system; therefore, it is impossible to identify just one representative "Indian" society. Traditionally the form of social organization in India is the caste system, by which people identify and group themselves. The caste system of India is based on the twin concepts of dharma and karma: the duties one must fulfill in this life and one's actions will have on any future lives. The concept has a great impact on the life-cycle rituals of birth, marriage and death. For example, midwives have been from the low castes, as blood and after-birth are seen as "polluting".

In India, marriage is one of the most important events in one's life. The vast majority of marriages are still arranged by the parents, in consideration of the caste and the negotiation of a dowry. In regard to the religion, India's multiplicity of peoples and forms of social organization are best

seen through the reflection of its numerous religions. There are many religions coexist in the country including Islam, Christianity, Hinduism, Sikhism, Buddhism and Jainism. Although there has been conflict at times, the interaction between different religious groups has been positive in general.

Land, Climate and Rivers

Extending through thirty degrees of latitude, India is a vast and varied land, no matter the snow-clad Himalayan peaks, deserts and rocky plateaus, lush jungles or mangrove swamps, all you can see within its territory. The Indian climate is strongly influenced by the Himalayas and the Thar Desert: the Himalayas prevent cold Central Asian katabatic winds from blowing in, keeping the bulk of the Indian subcontinent warm; the Thar Desert plays a crucial role in attracting the moisture-laden south-west summer monsoon winds, providing the majority of India's rainfall.

Rivers play an important role in the lives of the Indian people. The river systems densely cover the country and provide irrigation and potable water, cheap transportation, electricity and the livelihoods for a large amount of residents all over the country. The rivers are also considered holy by all Hindus, especially the Ganges, which is the most sacred river to Hindus and to be worshiped as the goddess Ganga in Hinduism. Apart from religious reasons, the Ganges is also a lifeline to millions of Indians who live along its banks and depend on it for their daily needs.

Features

Food & Drink. The cuisines of India are as diverse as the country's culture. Given the range of diversity in soil type, climate and occupations, these cuisines vary from each other significantly. India food is influenced heavily by religious and cultural choices, Hindu and Jain beliefs particularly affect it that vegetarianism is a common dietary trend in Indian society. Despite the regional variation, there are significant similarities of Indian cuisine. For example, the use of spices is essential in most of the cuisine. You can always find colorful and various spices displaying in their markets. Tea is also a staple beverage throughout the country. Darjeeling and Assam, for instance, are the finest world-known tea growing here.

Festivals. Festivals are a part of daily life in India, where huge number of festivals are celebrated throughout a year. Most of the festivals are stemmed from Hinduism. One of the nationwide pan-Hindu festivals is called Navaratri or Durga Puja, which means "nine nights". It usually occurs between September and October, after the monsoon, to worship the goddess Shakti and symbolize the triumph of good over evil.

Machine Tool Market in India

The area of India is 3.3 million sq. km; the population of it is 1.2 billion, which is next only to China of 1.3 billion. According to IMF (International Monetary Fund), GDP (Gross Domestic Product) of India for 2010 was US\$ 1.5 trillion; export value and import value for 2010 to 2011 was US\$245 billion and US\$350 billion respectively.

India's economy was developed rapidly since 2003, during 2001 to 2011, the annual growth rate was 5.9% in average. All of the economy growth rates from 2006 to 2008 were



Navaratri Photo by Sattiskumar Kesavalu on Wikipedia

higher than 9%, although slid to 6.5% in 2008-2009 as the result of financial crisis, it has recovered to 8.6% in 2010-2011. The estimate growth rate for 2011-2012 provided by the India government is 8-9% as shown in the diagram below.

Economy of India

Year	Actual GDPUSD billion	Economy Growth Rate %
1981-82	195.9	--
1991-92	287.2	--
2001-02	487.8	5.1
2002-03	510.3	3.8
2003-04	591.0	8.5
2004-05	688.8	7.4
2005-06	808.7	9.4
2006-07	908.5	9.6
2007-08	1,152.8	9.0
2008-09	1,251.4	6.5
2009-2010	1,254.0	7.4
2010-2011	1,598.0	8.6

Note: India financial year runs from 1st April to 31st March.
Date Resource: Handbook of Statistics on the Indian Economy (2012/06); IMF



Taj Mahal Photo by Nikkul on Wikipedia

According to the report from IMTMA (India Machine Tool Manufacturers' Association), India stands 12th in production and 7th in the consumption of machine tools in the world as per the latest survey. Market requirement is mainly from automobile and its components, power equipments, infrastructure, transportation, commercial durable goods, general industrial machinery, national defense, aerospace, nuclear energy...etc.

According to IMTMA, output value of India machine tool in 2011-2012 is 28 billion Rs and CAGR (Compound Annual Growth Rate) of the output value from 2000 to 2012 is 15.3%. From 2000 to 2012, the total import value is 59 billion while the interior market demand is 86 billion, which means 70% of the India machine tool market depends on imports.

Scale Analysis of Interior Market Demand on India Machine Tool Industry

Unit: Rs million

Year	Output Value	Import Value	Export Value	Market Demand (A+B-C)	Export Ratio(%) (C/A×100)	Import Dependence (%) (B/D×100)	Self-sufficiency (%)
2000-2001	5866.5	3405.2	336.7	8935.0	5.7	38.1	61.9
2001-2002	5203.9	3108.4	485.1	7827.2	9.3	39.7	60.3
2002-2003	5486.5	4507.2	394.2	9599.5	7.2	47.0	53.0
2003-2004	7967.9	9654.6	548.5	17074.1	6.9	56.5	43.5
2004-2005	10885.8	18208.2	526.1	28567.9	4.8	63.7	36.3
2005-2006	13531.0	28985.9	502.7	42014.2	3.7	69.0	31.0
2006-2007	17305.7	46557.5	735.0	63128.1	4.3	73.8	26.2
2007-2008	19019.4	64146.2	1466.7	81699.0	7.8	78.5	21.5
2008-2009	14244.3	62706.7	894.2	76056.8	6.3	82.4	17.6
2009-2010	16561.9	48422.4	810.0	64174.3	4.9	75.5	24.5
2010-2011	24158.3	67033.3	904.8	90286.8	3.8	74.2	25.8
2011-2012	28167.0	59216.0	1468.5	85914.5	5.2	68.9	31.1
2000~2012 CAGR	15.3%	29.6%	14.3%	22.8%	--	--	--

Note: India financial year runs from 1st April to 31st March. Data Resource: IMTMA : Industrial Technology Research Institute IEK (2012/05)



Garba Dance During Navaratri Festivities
Photo by Hardik Jadeja on Wikipedia

In India, raw material resource for machinery equipment is quite rich, apart from producing iron mineral, it is also a major producer of steel material in the world. Among middle-stream industries such as secondary process of iron and steel materials, many countries go to India for purchase and subcontract because of its ability of casting and forging and low cost of labors; other middle-stream industries such as special machineries for huge casting

and military industry also reach certain standard. As to down-stream industries, precision machining is not common since India is not an industrial-oriented country, therefore it is not easy to find a qualified supplier for precision components and for its peripheral industries. For that reason, it is more feasible to import components to assemble while investing machinery equipment in India.

Major Rivers of India

http://en.wikipedia.org/wiki/Major_rivers_of_India

Ganges <http://en.wikipedia.org/wiki/Ganga>

India Cuisine

http://en.wikipedia.org/wiki/Indian_cuisine#Eating_habits

Navratri <http://en.wikipedia.org/wiki/Navratri>

ITIS <http://www.itis.org.tw>

National Portal of India <http://www.india.gov.in>

India <http://www.insightguides.com>

Distributor



SJS Limited

HBM 4T is machining a key component of plus-piston.

Founded in June 1992, SJS Limited is located in Jingzhou, a well-known historical and cultural city near the Yangtze River in the central part of China, is a joint venture of Chinese JHPA and American SERVA group. SJS Limited has developed products for the oil and gas industry including oilfield high pressure triplex and quintuplex pumps, cementing and fracturing equipments, down hole oil tools, clutches and brakes. SJS Limited delivers the quality products and service for the oilfield industry globally.

SJS Limited has adopted the concept of advanced management techniques including the ISQ Quality Management System, Lean Production Management System with HSE commitment. By using of 2BizBox Enterprise Resource Planning platform, SJS is able to create close communication between company departments and to ensure the operational efficiency.

The extensive training programs for the SJS employees are important to the company ongoing innovation and improvement. SJS has established as the world leader in the automatic control systems of the oilfield cementing and fracturing equipments. Furthermore, SJS is recognized as the professional pump manufacturer for selling plunger pumps and centrifugal pumps world widely.



Paul Chang visited SJS Limited.

Distributor

On the management side, SJS is constantly performing the lean production to improve management capacity. Within the company, SJS has set up a Lean Production Committee to pursue perfection. The front-line employees of production propose the lean production improvement plans; under the premise of quality assurance and safety consideration, SJS applies the wisdom of the employees to the production. The production efficiency has been improved and the production cost has been reduced. Through all these processing, the employees working with enthusiasm and the ability of employees have been recognized and coordinating with the lean training program, the quality of employees are improving.

In addition to enhance the capability of R&D, SJS dedicates to upgrade the productivity by purchasing the HBM-4T, Horizontal Boiling Machine from Buffalo Machinery Co. Ltd. for the purpose of machining key components of plus-piston pumps. When the production is carried out with Buffalo's HBM-4T, the preparation time has been reduced 20% and the machining time is shorter, as well as achievement of the high accuracy. The workpiece sample



The HBM-4T operation panel is easy to operate and the powerful interface is handy in programming.

for the position accuracy testing on the HBM-4T is under 0.012mm which confirms that the actual accuracy is better than design accuracy. According to the feedback from SJS, the aesthetic design of HBM-4T, the layout of all the wires, hydraulic lines and towlines are reasonable and convenient to use. The HBM-4T operation panel is easy to operate and the powerful interface is handy in programming. The extended sleeve design is ideal for the SJS processing box-type parts, which is conducive to the boring axis to maintain the accuracy. The most remarkable is the secured structural design of "X" axis framework which providing the lasting and effective guarantee of accuracy.

SJS attaches great importance to health, safety and environment, launched the ISO1400 and OHSAS1800 systems when first established. SJS commits to the policy of "total commitment to customer satisfaction", endeavors to research, development and production of the oil drill equipments. In cooperation with Buffalo more closely in the future, SJS anticipates providing better and quality service to the customers, staff, suppliers as well as the communities.

The workpiece sample for the position accuracy testing on the HBM-4T is under 0.012mm which confirms that the actual accuracy is better than design accuracy.



Product

HBM Series

Started from 1997, Buffalo Machinery has been continuously producing metal-cutting machines for more than 14 years and has developed a complete product line which meets various requirements from different industries.

Based on believes of excellent and innovation, the HBM series is developed. This horizontal milling and boring machine is ready here to meet various potential needs and to provide a wider selection of working capability. Equipped with large loading capacity working tables, the HBM series is particular suitable for utilization in the energy industry, mining industry, oil and gas industry and die and mold industry. Among the series, model HBM-4 is table type, model HBM-4T, 5T and 5TE are column moving type (T-type), and all of them are successfully serviced in fields.



SVS

Table Type Horizontal Borer HBM-4

Rotary Table

- Large bearing surface for heavy loading capacity.
- 3-piece Hirth couplings transmission and clamping for precise positioning.
- Hydraulic clamping system enables heavy cutting.
- Easy chip removal by low position integrated chip auger.

Spindle & Gear Box

- 110mm quill diameter with travel 440mm for deep hold boring and milling.
- Spindle and quill is driven by the servo unit and lubricated by sintered bronze for durability and longevity.
- Two-speed gear box offers powerful torque output. 2 speed shifts automatically.



Bed

- All major structural components are made of Meehanite licensed casting iron.
- Harden & ground box way offers heavy loading capacity and high reliability.
- 2 additional support ways designed for the large longitudinal travel.
- Absolute linear measuring system on request.

Thermal Growth Measurement and Compensation for Integrated Spindles - Part II

Authors Chang Paul · Tang Chia-Hui

Product

Column Moving Type Horizontal Borer

HBM-4/5T/5TE



Spindle

- 130mm quill diameter with travel 700mm for deep hole machining.
- Grade GGG iron casting.
- Two-speed planet geared box, which can shift automatically.
- Cylindrical roller bearing.
- Spindle surface hardness of HRC52-55.
- Equipped with automatic OTT Jakob tool chuck collets.

Y-axis

- Column and slide are joined in a one unit fabricated from a robust cast.
- Hydraulic counter weight
- N.C. electromagnetic brake system adopted.

X-axis and Z-axis

- All major structural components are made of Meehanite licensed casting iron.
- Two (2) roller type linear guideways with six pieces blocks on 4T. Three (3) roller type linear guideways on 5T/5TL. Four (4) roller linear guideways on 5TE.
- Linear measuring system.

Rotary Table

- Robust cross-ribbed casting.
- Centrally integrated rotary encoder.
- 0.001 degree variable positioning.
- Dual worm-gear driven system ensures backlash free.
- Coated and hand-scrap treated bearing surface.
- Reinforced with integrated hydraulic clamping force and four points lock pins.



SVS (Spindle Vibration Supervision) is one of the SMART machining technologies which have been applied to whole series of Microcut borer for providing better finish quality, longer life time and vibration data recording.

III. Model Development (Dual Displacement Meters)

3.1 Mechanical Design

This new model consists of dual displacement meters placed in front of the spindle [17-18]. One single meter is used as a reference and the other one is placed 3-5mm away from the reference meter, depending on the space and its rigidity of the spindle end cover. Both meters should be fitted very closely towards spindle end and all geometrical distance between two meters should be as close as possible. The geometrical tolerance should be reduced to minimum. The differential amplifier is then applied. Fig. 14 shows the meters placed on the bottom spindle cover.

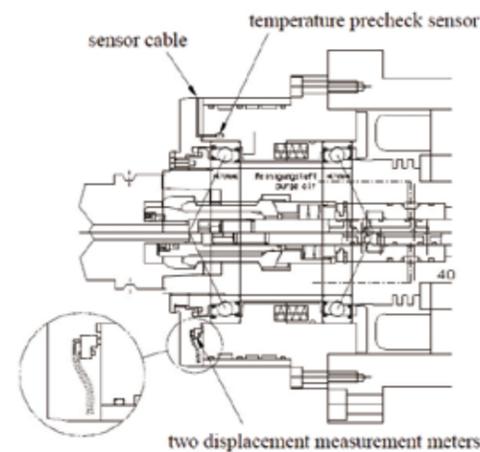


Fig. 14 Spindle with dual displacement meter

3.2 Logic concept & Amplifier

To get a perfect performance of cutting result, the compensation logic has been set to allow the spindle axis compensation of every +/-1 μm when the output voltage changes per +/-0.02v. The flow chart is shown in Fig. 15.

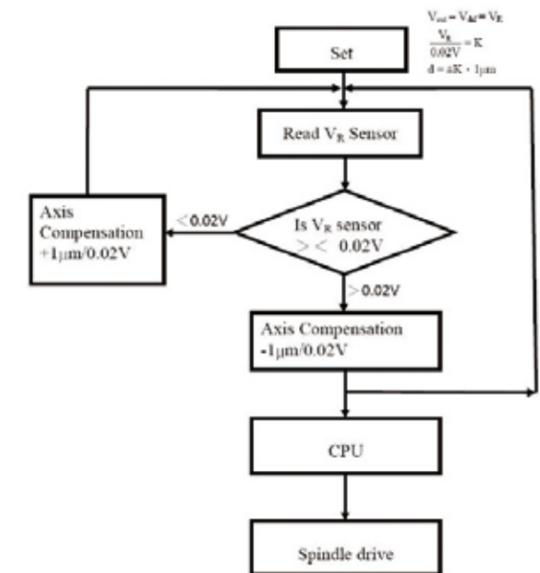


Fig. 15 Flow chart of dual measurement meter

3.3 Simulation of Dual Measurement Meters

The circuit diagram of the dual differential amplifier is shown as Fig. 16 [22]. The voltages V1 and V2 are the output voltages of the measurement devices. The voltage gain can be adjusted by changing the resistance values of R1, R2, R3 and R4. In this study, the resistance R3 is set equal to be R4.

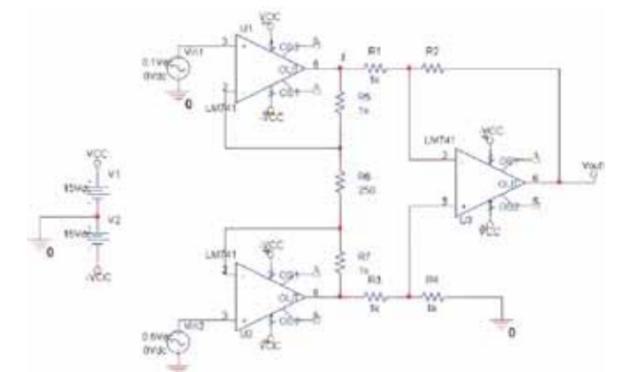


Fig. 16 Differential amplifier diagram

where:

V_{in1} is the input voltage reading from the reference meter.

V_{in2} is the input voltage reading from the displacement meter

R_6 is a ratio resistor, rated 4 times or 2 times

R_1, R_3 are input circuit insulation resistors

R_2 is the time control resistor.

And the equation is given as following:

$$\phi = \frac{V_{in2} - V_{in1}}{R_1} = \frac{V_{in1}}{R \cdot \sin \omega t} \quad (7)$$

where:

ωt is the phase angle at time t ,

V_{in1} and V_{in2} are the input voltages.

To investigate the frequency response of the amplifier circuit, the gain and phase Bode plot of the amplifier are presented by utilizing the simulation software. In the simulation, the input voltages V_1 and V_2 are set identical and the data in Bode plot are normalized. The respective parameters of the devices are $R_1=1k$, $R_2=500\Omega$, $R_3=1k$ and $R_4=1k$.

Fig. 17 shows the Bode plot of the voltage gain of the amplifier circuit. It demonstrates that the 3 dB bandwidth of the circuit is about 10 kHz which is perfectly suitable for the displacement measurement meter.

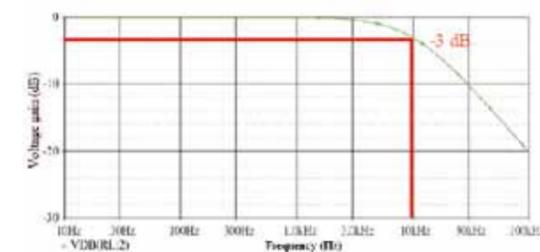


Fig. 17 Bode plot of dual measurement meter voltage gain

In Fig. 18, one can see that the output voltage is nearly in phase with the input voltage with the frequency lower than 300Hz. Therefore, from the simulation results, the design of the amplifier circuit obviously meets the requirement of the displacement meter. Due to the same type of single pole low pass filter used, the simulation results are nearly the same as the single displacement meter. Although the frequency response of the dual displacement meter is similar to the single type meter, the accuracy of the displacement measurement can be further doubled.

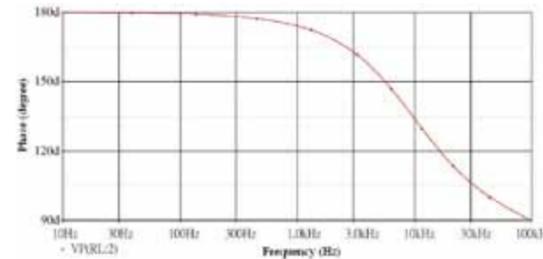


Fig. 18 Bode plot of dual displacement meter phase

3.4 Control System

The control system is used to measure the output voltage, it can be designed to be a reference level which links to the scale design of the CPU control system. A M-Code reference has been designed to measure output voltage in sequence. It includes definition of sequence times, analog signal for CPU and measurement reset process. The system will monitor the output value when the spindle growth is within tolerance or output voltage is larger than constant value K . Then, the voltage is converted to be a compensation value as set in Fig.15 flow chart. The M-code sample is shown in Fig. 19.

where:

- (14-1) Define the checking sequence, sample is set 100 times each pulse width.
- (14-2) Stop compensation when PLC is not started or CPU is receiving input.
- (14-3) Analog signal processor in CPU.
- (14-4) Output voltage summary.
- (14-5) Reset after CPU receive every input.
- (14-6) Voltage value counting (RMS).
- (14-7) Voltage convert to be distance.
- (14-8) Reset

```
#define KL_number_of_measuring K=100 (14-1)
L.MI_spindle_growth_phase
IFT
L.MI_marker_one
K.MI_spindle_growth_phase
ELSE
L.MI_marker_one
S.MI_spindle_growth_phase
ENDIF

LN MI_spindle_growth_phase
ON M0_machine_parameter_atc_read (14-2)
EMT

PS KL_Analog_input_3
CM 9000
PL WG_SP_growth (14-3)
M_display_module_error(KG_error_module_9000)

L WL_SP_growth
= WL_min_value (14-4)
= WL_max_value

INC BL_average

L BL_average
= KL_number_of_measuring

EMT

L K=0
= BL_average

L WG_SP_growth
= K=800

O[ L WG_SP_growth
= K=800 (14-5)
]
CMT -Growth_comp_reset
EMT

L WL_min_value
/ KL_number_of_measuring (14-6)
WG_SP_RMS_growth

L WG_SP_RMS_growth
X K+1000 (14-7)
/ K*1000
= FN_WSB1_log_error_compensation_Z (14-8)

LBL_Growth_comp_reset

L K=0
= WL_min_value

L.MI_marker_one
= FN_error_spindle_growth_fault

EM
```

Fig. 19 M-code sample

3.5 Pre-check Device

The displacement meter could be moved after long time usage and some occasional accidents such as crash from improper operation. Thus, the position detection of the displacement meter when starting the machine and after initial installation is necessary. Considering the temperature sensitivity of the displacement meter, this study fitted a temperature sensor in the opposite side (180 degrees) of the displacement meter. To avoid the temperature effect on accuracy, the temperature sensor is used for compensating the temperature of displacement meter.

Fig. 20 shows the flowchart of designing displacement meter. The flowchart ensures the sensor can be reset and compensate precisely within acceptable tolerance or even over the tolerance after operation.

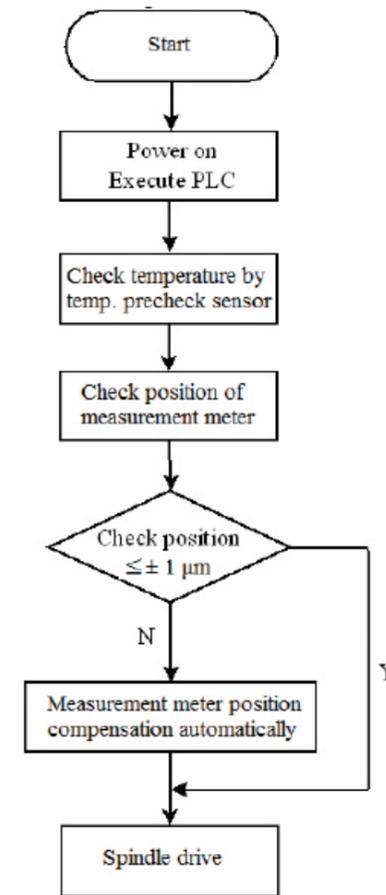


Fig. 20 Pre-check flowchart

IV. Experiment and Performance

4.1 Amplifier Experiment

To assure the quick and accurate measurement of voltage gain and phase, a high frequency response checking equipment (Model TF-2000) made by Voltech Instrument is used in this study. To ensure the accuracy and reliability of the amplifier design in this study, the voltage gain and phase testing will be testified in this section.

4.1.1 Experimental results and discussions of the single displacement meter

The gain and phase bold plots of the amplifier circuit of the single displacement meter are shown in Fig. 21-1 and Fig. 21-2. The experimental results show that the design fit the bandwidth requirement. The increase of the voltage

gain at about 100 kHz may result from the effect of the stray capacitance and inductance in the circuit or the nonlinearity of the operation amplifier. However, this effect can be neglected because the circuit design is not used in the high frequency region. Also, comparing the simulation results with PSpice, Fig. 11 and Fig. 12, the characteristic curves are nearly the same. It is obvious that the amplifier circuit is perfectly suitable.

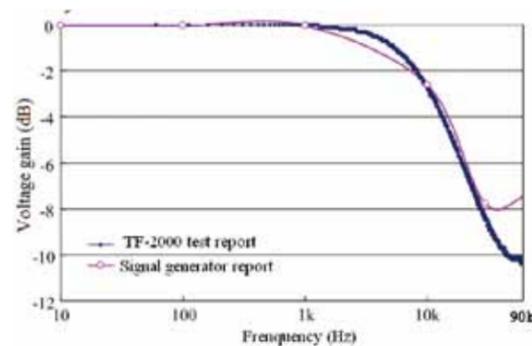


Fig. 21-1 Bold plot of single displacement meter voltage gain

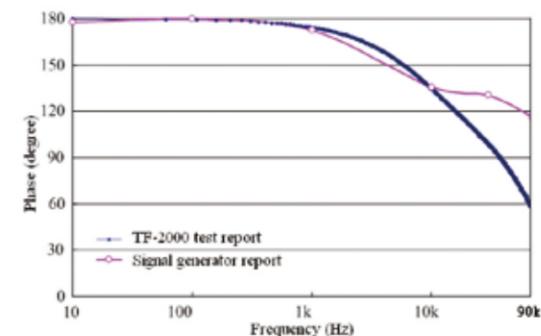


Fig. 21-2 Bold plot of single displacement meter phase

4.1.2 Experimental results and discussions of the dual displacement meter

The test procedures of the dual displacement meters are similar to the single displacement meter, except that there are two input voltages in the dual displacement meter amplifier. The two input terminals are connected to one signal source for experimental test. From the simulation results in section 3.3, one can see that the frequency response of the dual measurement meter is nearly the same as the single measurement meter. Therefore, the experimental results of the dual displacement meter should be similar. Fig. 22 and Fig. 23 show the measured gain and

phase bold plots of the dual displacement meter. It is seen that the measured 3 dB frequency is about 10 kHz which meets the design requirement. The experimental results are nearly identical with the simulation results with PSpice, as shown in Fig. 17 and Fig. 18.

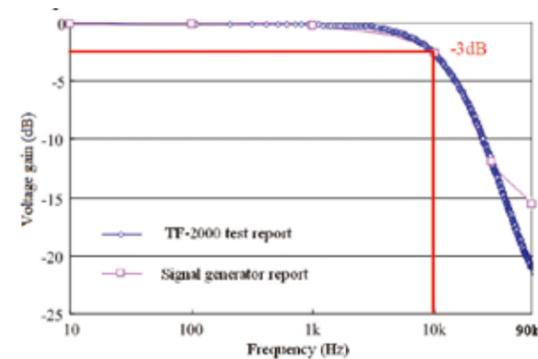


Fig. 22 Dual measurement meter voltage gain Bold plot

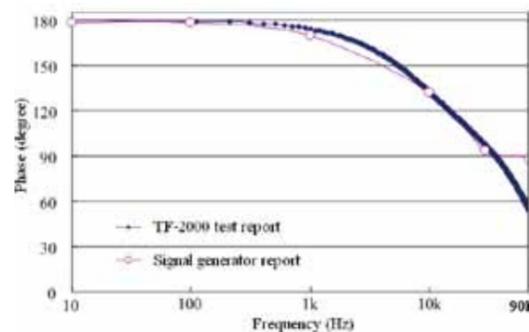


Fig. 23 Bold plot of dual measurement meter phase

4.2 Laser Check

The test is performed on a high speed vertical machining center, which is equipped with a 24000rpm high speed spindle. A laser checking unit is placed on the surface of the working table, as shown in Fig. 24.



Fig. 24 Laser checking unit

A comparison of the spindle equipped with only single displacement meter and dual displacement meters is shown in Fig. 25. An additional laser report is also provided to prove the test results. This figure shows that there exists some discrepancies between the measure 1 (single displacement meter), and the laser curve. The measure 2 (dual displacement meter) in this new model nearly matches the laser curve, which confirm an extremely perfect compensation.

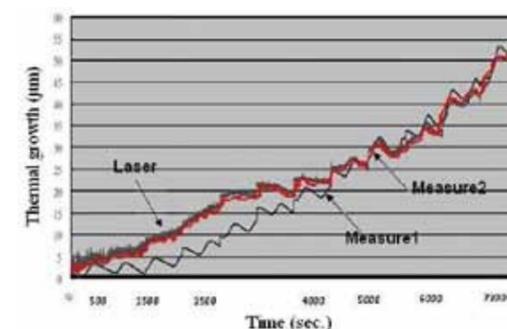


Fig. 25 Comparison curve of laser and two models

4.3 Cutting Report

Fig. 26 shows a the main checking dimensions of working piece, the material is plastic mould tool steel, code DIN M-461 (GMP21M), and it is the most popular high grade mould steel, the hardness of raw material is HRC 38-42 degree.[26] A three dimensions simultaneously program with highest spindle speed is applied. The tools used are shown in table 1, representing different working time of roughing, 2nd rough cut, pre-finish cut and fine cut. Each sample had been done on the same machining tooling and program. The cutting performance presents a significant improvement of tolerance and its working time

when the dual measurement meters are applied. Table II shown cutting report of all models. Take checking point "A", "B" & "E" as example, tolerance in between the spindle equipped with PT-100 thermo coupler and dual displacement meter shows a 6 times improvement. And it shows better performance when comparing with a single meter, too.

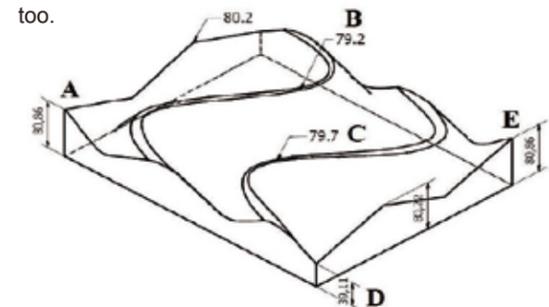


Fig. 26 Working piece and its main checking points

A DEA brand high precision three dimensional coordinate system is applied to check all samples, as shown in Fig. 27.



Equip. made by DEA spa, Torino, Italy
Model SCIROCCO-201009

V. Conclusion

The proposed new model discovers that the tolerance is better than the single displacement meter design. The work piece cutting time is much shorter than the spindle equipped with PT-100 and a much better geometrical report is shown.

It's a great quality improvement of the accuracy performance. This will greatly help to improve machining quality level and meet the requirement of HSM technology. Moreover, machine daily warm-up time is no longer needed, it saves a lot of energy waste and increase significantly the productivity of machine.

Acknowledgement The project is supported by the foundation for the Author of Excellent Doctoral Dissertation of Green Energy Technology Association of R.O.C. (Project No. 201018).

Application

Facing Head

Table I. Tools List

Program	Tool diameter (mm)	Total No. of edges in the tools	Working time PT-100 (min.)	Working time Single meter (min.)	Working time Dual meter (min.)	Spindle speed (rpm)
Roughing	12	3	98'15"	98'15"	98'13"	2000
2 nd Roughing	10	2	113'0"	113'0"	112'	4000
Pre-finish	10	2	65'14"	56'25"	50'50"	5500
Finishing	10	2	65'15"	610'30"	560'10"	6000

Remark: All tools are Sandvik brand tools. Tool no.: R300-32T16-12M / R300-20A25C-10L / R216.44-10030-AK22N / R216.44-10030-AK22N

Table II. Geometrical Test Report

	Check points & requirement	Spindle without compensation (Tolerance)	Spindle with PT-100 (Tolerance)	Spindle with Single Measurement meter (Tolerance)	Spindle with Dual Measurement meter (Tolerance)
A	80.86	80.24 (-0.62)	80.80 (-0.06)	80.85 (-0.01)	80.85 (-0.01)
B	79.20	78.60 (-0.60)	79.14 (-0.06)	79.20 (-0)	79.20 (-0)
C	79.70	79.05 (-0.65)	79.65 (-0.05)	79.69 (-0.01)	79.70 (-0)
D	39.11	38.50 (-0.65)	39.06 (-0.05)	39.11 (-0)	39.11 (-0)
E	80.86	80.20 (-0.66)	80.80 (-0.06)	80.84 (-0.02)	80.86 (-0)

References

- [1] A. Donmez, (2005) Smart Machining Systems, Manufacturing Engineering Laboratory, National Institute of Standards and Technology, www.mel.nist.gov/proj/sms.htm.
- [2] Lin Wang, Jianfu FC, Yuqiang QL (2010) Speed optimization control method of smooth motion for high-speed CNC machine tools. Int J Adv Manuf Technol 49-325. Doi 10.1007/s00170-009-2383-2.
- [3] S. Zhang, JF Li, X Deng, YS Li (2009), Investigation on diffusion wear during high-speed machining Ti-6Al-4V alloy with straight tungsten carbide tools, Int J Adv Manuf Technol 44:17-25, doi 10.1007/s00170-008-1803-z.
- [4] O. Maeda, Y. Cao and Y. Altintas (2004), "Expert Spindle Design System," International Journal of Machine Tools & Manufacture, pp.537-548.
- [5] Pai-Chung Tseng (1997), A Real-Time Thermal Inaccuracy Compensation Method on a Machining Centre, Int J Adv Manuf Technol 13:182-190
- [6] Qianjian Guo, Jianguo Yang, Hao Wu (2010), Application of ACO-BPN to thermal error modeling of NC machine tool, Int J Adv Manuf Technol 50:667-675, doi 10.1007/s00170-010-2520-y.
- [7] JS Chen, YW Hwang (2006), Centrifugal force induced dynamics of a motorized high-speed spindle, Int J Adv Manuf Technol 30:10-19, doi 10.1007/s00170-0005-0032-y.
- [8] Jenq-Shyong Chen and Kwan-Wen Chen (2005), Bearing load analysis and control of a motorized high speed spindle, International Journal of Machine tools & Manufacture 45,
- [9] J.S. Chen and G. Chiou (1995) Quick testing and modeling of thermally induced errors of CNC machine tools, Int. J. Mach. Tools Manufact, vol.35, no.7, pp.1063-1074.
- [10] Bernd Bossmanns and Jay F. Tu (1999), A thermal model for high speed motorized spindles, International Journal of Machine Tools & Manufacture, vol. 39, pp.1345-1366.
- [11] James Wong (1986), Temperature Measurements Gain from Advances in High-precision Op Amps, Electronic Design.
- [12] Wikimedia Foundation, "Thermocouple", <http://en.wikipedia.org>, 2008.
- [13] A Simm, T Theodoulidis, N Poulakis, GY Tian (2010), investigation of the magnetic field response from eddy current inspection of defects, Int J Adv Manuf Technol, doi 10.1007/s00170-010-2915-5.
- [14] NDT Resource Center (2008), Depth of Renetration & Current Density, <http://www.ndt-ed.org>.
- [15] ACE CORP (2006), PU-03A*291-102 Sensor, Kanagawa Japan.
- [16] B. E. Paton (1998), "Sensors, transducers, & LabVIEW", National Instruments, Virtual Instrumentation, Canada.
- [17] C. Kitchin and L. Counts (2006), A Designer's Guide to Instrumentation Amplifiers, Third Edition, Analog Device INC., North Wood MA.
- [18] C.L. Phillips and R.D. Harbor (2000), Feedback Control System, Forth Edition, Prentice Hall International, Inc, New Jersey.
- [19] Ramon Pallas-Areny and Joan G. Webster (1991), Sensors and Signal Conditioning, John Wiley, New York.
- [20] N. Mohan, T.M. Undeland and W.P. Robbins (2003), Power Electronics, Third Edition, New Jersey.
- [21] G.M. Jenkins and D.G. Watts (1968), Spectral Analysis and It's Applications, Holden-Day, San Francisco, CA.
- [22] Ramon Pallas-Areny and Joan G. Webster (1991), Sensors and Signal Conditioning, John Wiley, New York.
- [23] G.M. Jenkins and D.G. Watts (1968), Spectral Analysis and It's Applications, Holden-Day, San Francisco, CA.
- [24] T.L. Floyd (2005), Electronics Devices, Conventional Current Version, Seventh Edition, Pearson Education, Upper Saddle River, New Jersey.
- [25] J. Jensen, W. A. Tuttle, R.B. Stewart and H. Brechna (1980), Brookhaven National Laboratory Selected Cryogenic Data Notebook, Volumell, Brookhaven National Laboratory, Associated Universities, Inc.
- [26] Chrome Molybdenum Steel of Taiwan Hsin Ying Chromium Molybdenum Steel, <http://www.steel-heat-treatment.com>.
- [27] Measurement error and bias (2009), www.bmj.com/epidem
- [28] Electrical Conductivity, Wikipedia (2008), <http://en.wikipedia.org>.

Facing heads are primarily used for internal and external facing, grooving and contour turning in large batch production on special machines like automatic rotary cyclers and transfer lines. These economic high performance cutting operations are specifically suitable for machining tasks which require utmost precision, no matter it is for machining cast iron and steel or non-ferrous metals such as aluminum. The components or workpiece produced by using facing heads are varied including power generation condenser shell, oil tool industry tubing hanger, oil tool industry bulkhead, oil tool industry valve block, power generation steam chest...etc.

To be specifically, facing heads perform "turning operations on the fixed piece": facing, boring, taper boring and threading. Pipe deburring machines, for example, are used for the purpose of deburring of the pipe before galvanizing and threading operation. Three different tools are used to debar the pipe from the outer, inner and front face. The facing head rotates, while the pipe remains stationary.



This is basic facing head applying on a bore. It displays how programmable heads alter the effective cutting edge diameter to create a chamfer "turn" an outside diameter and generate a radius. The tube in the diagram is part of a large L-shaped welded assembly that couldn't be turned on a lathe.

D'ANDREA

Located in Italy, known as one of the world leader in the manufacture of high precision machine tool accessories, D'ANDREA is the partner of Buffalo Machinery who provides U-Tronic facing heads for installing on the borer HBM series.

U-TRONIC - "Super-Sized" Performance

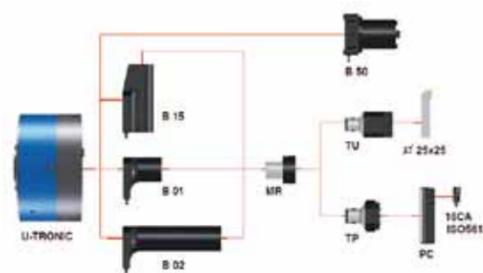
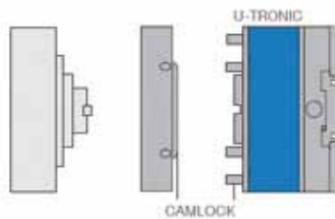
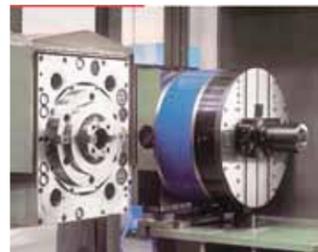
U-TRONIC are medium and large sized NC heads that are connected to the U axis of the CNC in the tooling machine for outer facing, inner facing, back-facing, cylindrical and conical boring and treading, concave and convex radius machining through the interpolation with the other axes of the tooling machine. They can be applied manually or automatically and with pallet systems on boring machines, machining centers and special machines. They are constructed in 6 models from \varnothing 360 to \varnothing 1000 mm. All these include an internal passage for coolant.

U-TRONIC heads are prearranged with holes that allow coolants to pass through. It is also possible to enter air from the holes provided on the fixed body, in order to pressurize the motor and limit switch area, to automatically lubricate the internal kinematic motion and lubricate the slide guiding rails and lead screw with sprayed oil.

U-TRONIC heads are prearranged with holes that allow coolants to pass through. It is also possible to enter air from the holes provided on the fixed body, in order to pressurize the motor and limit switch area, to automatically lubricate the internal kinematic motion and lubricate the slide guiding rails and lead screw with sprayed oil.

U-TRONIC is applied manually or automatically using a flange for fastening the machine and a plate for rotation of the rotating body. It is applied manually using a flange for fastening with a cam lock quick coupling, or automatically with a palletized system and special connectors. U-TRONIC can also be fitted with a B50 automatic tool holder changer mounted on the slide to achieve fully automation.

Application



Reference:

Modern Machine Shop <http://www.mmsonline.com/>
 D'ANDREA <http://www.dandrea.com/>



D'ANDREA Facing Head "U-TRONIC" Installed on HBM-5T



Super Sized Performance



Key Component

Ball Cutter Mastering

In standard ball cutters, factors such as setting errors, effects of speed and temperature or tool wear occurring during the machine process can always impact the accuracies in shape. Now there is a new software option for compensating ball cutter errors. Introduced by Blum-Novotest, the software is developed for its LaserControl NT series. With 3D RadiusControl, ball cutter errors in shape can be compensated before and during the process steps in a very precise manner. Furthermore, operators can profit from a considerable improvement in workpiece quality and a remarkable reduction in tool costs.

"For a long time people thought the earth was round until it occurred to someone to actually check the measurements. It's very similar when it comes to ball cutters. If standard spherical cutters are actually tested for their roundness, not all of them will meet the requirements that are today demanded especially in tool and mould making and the aerospace industry. As machine control, however, operate on the assumption of an optimal circularity, and the contact point of the cutting edges usually lie orthogonally to the workpiece surface, such an error in shape will have a direct effect on the machining result. Therefore many operators employ expensive tools with test certificates in order to eliminate this source of error." Said by Bruno Riedter, the head of software development at Blum-Novotest.

Today many machine controls provide the possibility of lodging a compensation value table which defines angle-dependent delta values in order to determine divergences of the tool from its ideal circular shape. In this case the system uses the actual value of the radius which is defined by the current contact point between tool and workpiece. To be able to exactly determine the contact point, the NC programme is being generated with surface-normal blocks from the CAM system. In the surface-normal blocks the theoretical centre of the ball cutter, as well as the tool orientation, is configured in relation to the surface.

The missing link for the utilization of the described control method is an applicable measurement of the ball cutter at different angles. Neither gauging the workpiece on the measuring machine, nor the classical external tool presetting, is a viable solution. After all, any setting errors, effects of speed and temperature or tool wear that occurs during the machining process, cannot be compensated with these methods.



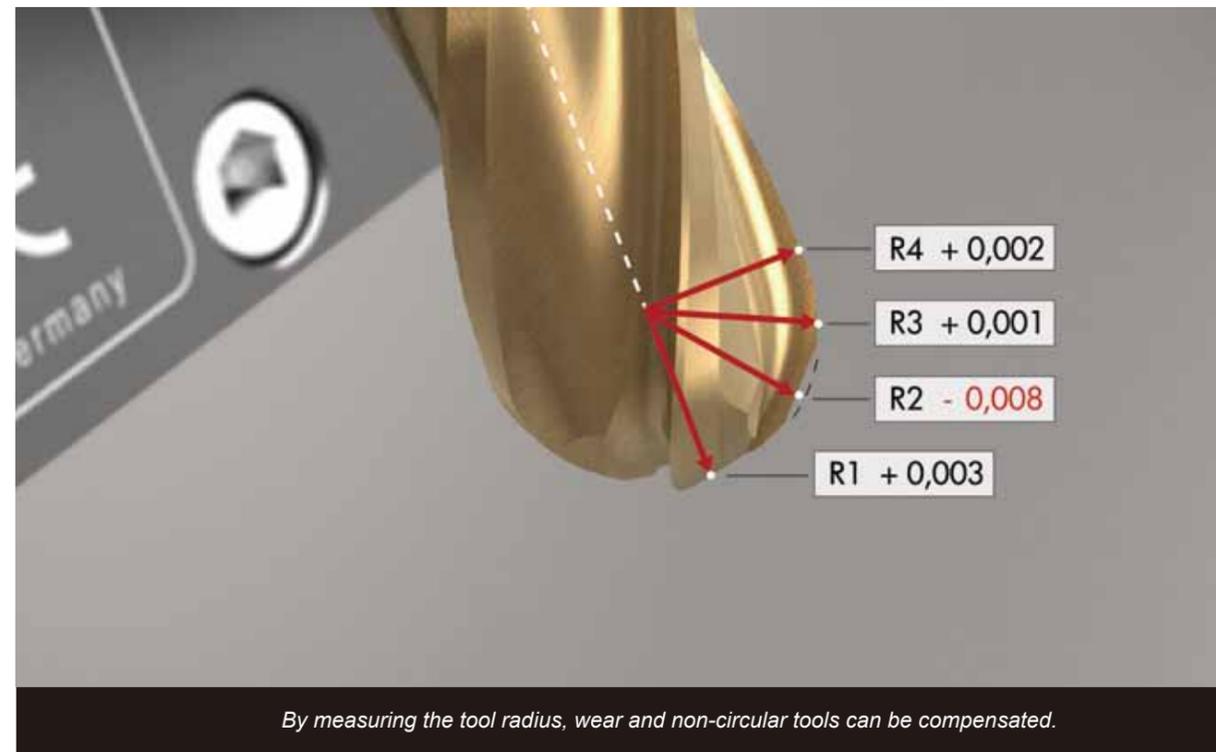
Blum's LaserControl NT enables the complete measurement of a ball cutter at up to 50 different angles.

Key Component

With 3D RadiusControl, Blum-Novotest provides measuring software for the LaserControl NT measuring system, which can identify up to 50 radii of an operating ball cutter under working speed. Via cue parameters the tool data for length and radius – e.g. the length up to the cone point or the circle centre – can be inscribed into the tool table.

In standard ball cutters, typical inaccuracies in shape lie within the range between 0.005 mm and 0.010 mm. The Blum system reduces these errors to a residual inaccuracy of less than 0.001 mm. The precise residual error can be identified by conducting a control measurement of a calibration tool with an ideal sphere.

The possibility of measuring these tools at up to 50 radius points provides numerous advantages. If the operator can master the measurement of the tool, this will save them from expensive and time-consuming reworking. This will make manufacturing more efficient and improve its quality. Moreover, it reduces tool costs, as tools can be used up to their wear limit without compromising workpiece precision. Thus, a preventive replacement with “fear allowance” becomes redundant. Furthermore, the new software reworked tools can also be applied in the high precision field. Any contingently suboptimal cutting geometry can be detected and compensated with the laser system.



EVENT

Microcut in AMB 2012



Located on Stuttgart - the city prominent for its high-tech industry and is headquartered for many international companies such as Mercedes-Benz and Porsche, AMB was successfully closed on 22nd September. According to Ulrich Kromer, Managing Director of Messe Stuttgart, this was the best AMB ever. This year, AMB broke lots of records of its own. Around 90,000 visitors (2010: 86,200) and 1,356 exhibitors (2010: 1,346) came to Stuttgart for this big event, 12 per cent of the visitors (2010: 11 percent) were from abroad and stayed an average of 1.3 days (2012:1.2) at the exhibition. All nine exhibition halls, a total of 105,200 square meters (gross), were booked up solid. More trade visitors, more overseas exhibitors and visitors and more days to stay, AMB consolidated its place among the world's top 5 events.

Despite a slight downward trend in the economy, there was

still high demand for new machine tools that the order situation in the industry was quite good. Positive atmosphere was noticeable at AMB because there were further investment needs and the backlog of orders in the industry was still high for the next few months.

In AMB 2012, a large number of new products and further developments were presented including some genuine world innovation. In addition, environment topics were strongly represented at AMB 2102 such as energy efficiency and sustainability. Visitors can easily saw machines with greater productivity, energy and resource efficiency and solutions for processing new materials such as composites or titanium, complete processing, quality assurance and improved customer friendliness. The expertise of visitors was rated as very high that 80 per cent of them were solely responsible or partially responsible for purchasing and procurement decisions in their companies, or that they acted as an advisor regarding these decisions.



EVENT

Buffalo Machinery has been devoting to promote its brand "MICROCUT – The Challenger" in Europe for a very long time. To improve the brand identification, Buffalo announced the new combined trademark **MICROCUT** in AMB which gave its distributors and customers a new advanced image. Furthermore, distribution companies VOLZ Maschinenhandel GmbH & Co. KG, POS GmbH and Rolf Heller GmbH were co-exhibited. It was really joyful to see so many visitors went to the booth that the number far exceeded expectations and the stand was full of visitors all the time.

The models presented including MCG-5X, MU-5X, V-30 and BNC-22120, all of them were highly asked. 5 axes machining technology was obviously the hottest product which gained most inquiries. This situation could be seen in the booth of Microcut as well as other stands. On the other hand, teach-in lathe was always important to Germany machine users that many visitors were asking a demonstration on machine. [Reference: http://www.messe-stuttgart.de/](http://www.messe-stuttgart.de/)



Microcut Innovation Day 2012

Named as Microcut Innovation Day 2012 – BE A CHALLENGER, Buffalo Machinery held its bi-annual seminar in Stuttgart, Germany on 17th September, one day before the AMB exhibition. The one day event was very success that 28 guests from 15 different distributors participated in the seminar. Coming from 9 different countries including Portugal, Russia, Lithuania, Germany, England, Denmark, Spain, France and Czech, the distributors acquired varied information such as Buffalo Machinery's developing trends and the latest technologies, and gave their valuable feedbacks of the seminar.

Buffalo Machinery specially selected 8 subjects for the seminar, introducing its technology innovations of products, software applications on R&D, production environment and marketing concepts. By virtue of the presentations, distributors and customers can find how MICRO-CUT-The Challenger keeps making progress. Strict control in production environment and procedure provides steady quality; advanced aid software helps to develop new technology and high-end products; designs are optimized by finite element analysis system. These are efforts that Buffalo Machinery has been made for providing advanced products with well-designs, good-rigidity, stable-performance and competitive prices. By means of presenting the subjects, the distributors can realize not only the advantages of MICORCUT-The Challenger, but also how it continually devotes to create good turnovers for each other.

Starting from a topic related to marketing, "The Key to Success" introduced overall turnovers related to machinery industry in the world, then brought out the marketing strategies and plans of Buffalo Machinery. Followed by two technical subjects, the first one is "Straightness Control Technology". This presentation introduced how the RAM compensation technology is applied to the borer by introducing the vacuum coating application. The second one was "An Updated Developing Technology". Elected as one of the most interesting topics in this seminar, this presentation displayed how Buffalo Machinery applies the Ansys finite element analysis system to its high speed machining center for design evaluation and improvement. This finite element analysis system can simulate and optimize machine designs without building and destroying multiple prototypes while testing and hence speeding up

development procedure and saving cost. In addition, Buffalo Machinery was honored to have Dr. Uwe Rondé presenting "New Concept of Work Piece Positioning Systems", Dr. Rondé introduced the new turning tilting table of Kessler which will be widely utilized on Buffalo's 5-axis machines.

Seminar in the afternoon began with an illustration of productivity: "A Reliable Production – Your Best Partner", which contained introduction of factory environment and standard operation procedures that established Buffalo's quality and reliability. Next, "Smart Way to Cut Better & Faster" was about the SMART Technology from Buffalo called MRRO – Metal Removal Rate Optimization. Unsurprisingly, it is also one of the most interesting topics amid all. Then, "Vision Analyst Technology" explained how to apply scrapping technique and inspection on bearing surfaces, in order to reduce friction force. Finally, "Prepare for Tomorrow", the most popular presentation of the seminar, which focused mainly on new models under developing. Attendees can explore the undergoing trends and features of Buffalo's developing 5-axes machining centers and RAM type and Floor type borers.



EVENT

According to feedback questionnaires, attendees are satisfied with the subjects and contents of all presentations in substance that most of the topics are interesting and beneficial to them, therefore they would like to have this sort of seminar regularly. Apart from general information and up-to-date technology, high demands and interests in product introduction, no matter current or future products, are noticeable reflected. Furthermore, positive feedbacks are received regarding to facilities, speaker performance and schedule arrangement. It was a great experience and achievement for Buffalo Machinery to hold the seminar, with all the feedbacks received, it is expectable to organize a better one in the near future.



Taiwan Panorama The Beauty of Formosa



390 km (242 miles) in length and is about 140 km (87 miles) wide at its broadest point. Located off the southeast coast of the Asian Continent, Taiwan is separated from China by the Taiwan Strait, 160 km (99 miles) wide at its narrowest point. Shaped like a leaf with narrow ends, Taiwan points north to Japan and south to Philippines. With all these geography features, Taiwan forms a vital line of communication in the Asia-Pacific region.

Forested Mountains

Taiwan has been abundantly endowed with mountains that 2/3 of the total area is covered by forested mountains; among which 258 of its peaks are more than 3,000 meters high, making Taiwan geographically unique. The most prominent topographical feature is the Central Mountain Range, which stretches along the entire country from north to south. On the west side, lies the Yushan (also known as Yu Mountain or Jade Mountain) Range with its main peak reaching 3,952 meters, which is not only the highest summit in Taiwan but in Northeast Asia. Moreover, Yushan is nominated as one of the 261 qualified national and multinational nominees for New7Wonders of Nature in 2009 because of its high elevation, and accommodation of variety of floras and plenty wildlife.

General Information

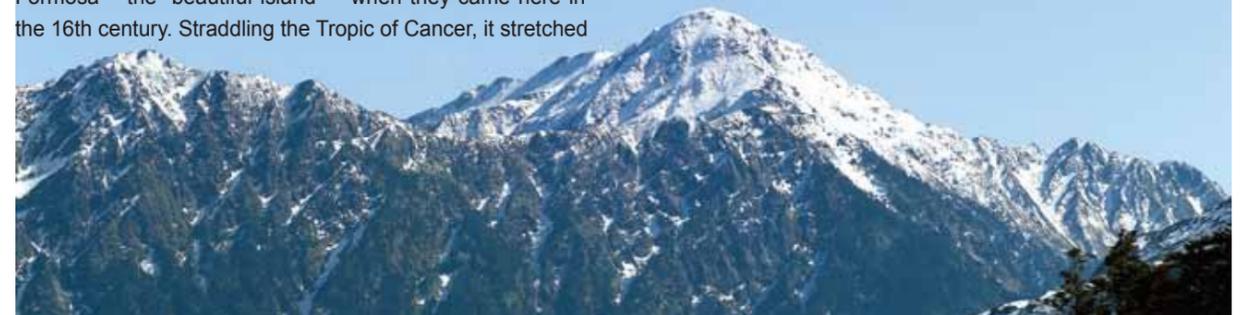
Location: Asia
Area: 36,000 square kilometers
Population: 23 million
Capital: Taipei city
Language: Mandarin / Taiwanese / Hakka / Indigenous languages
Religion: Buddhism / Taoism / Christianity / Islam
Climate: Tropical / Subtropical

Geography

Taiwan is a fertile island that the Portuguese named Ilha Formosa – the “beautiful island” – when they came here in the 16th century. Straddling the Tropic of Cancer, it stretched



Provided by Diego <http://www.flickr.com/photos/piu33/4553949543/in/set-72157623935091978>



Taiwan Panorama



Marble Gorge

Taroko gorge is one of the most spectacular natural wonders of the world and Taiwan's foremost scenic attraction. Taiwan was formed by the collision of plates four million years ago; after millions of years of wind erosion, the marble rocks were exposed and cut by the Liwu river, creating impressive grand canyons of 3,742 meters height. With marble cliffs, through which flows the torrential Liwu River, Taroko Gorge winds sinuously for 19 km (12 miles). The area is renowned for its lofty mountains, deep canyons cutting off from the main gorge, head-spinning precipice, elegant waterfalls and raw, wild rapids. Such special geography has also bred special flora and fauna in this area.



Provided by Taiwan Tourism Bureau

Reference:
 Tourism Bureau, Republic of China (Taiwan)
<http://eng.taiwan.net.tw/>
 Insight Guides <http://www.insightguides.com>

Unspoiled Coast

On the Pacific side of the Central Mountain Range lies Taiwan's rugged and craggy east coast, which stretches for 170 kilometers and remains for the most part immaculate. The land here consists of volcanic rock and classic rock from deep beneath the sea, as well as the shale which has been pushed upward by tectonic action. Weathering, erosion and accumulation have produced a wide range of landform here such as coastal terraces, sand and pebble beaches, shoreline reefs, inshore islands, trenches, caves...etc. To many people, this area is like a refuge where the flavor of human feelings retains its natural tastes.



Provided by Taiwan Tourism Bureau

Exhibition Calendar

2012 Q4	Period	Title of Exhibition / Country	Distribution Company
October	2~4	TOOLEX 2012 AT SOSNOWIEC / Poland	TBI
	2-7	MAKTEK EURASIA 2012 / Turkey	Celik Makina Ticaret A.S.
	2-6	BIMU Show / Milano, Italy	Tecnor Machine SPA
	15~18	Stankostroenie 2012 / Russia	BPK
	17~20	TIB, Bukarest / Romania	NCT
November	22~25	Mashex 2012 / Russia	BPK
	6~10	EMAF 2012 / Portugal	Mater
	7~11	TMTS 2012 / Taiwan	Buffalo Machinery
2013	Period	Title of Exhibition / Country	Distribution Company
March	5~10	TIMTOS 2013 / Taiwan	Buffalo Machinery
April	TBD	MEC SPE / Italy	TECNOR MACCHINE SPA
May	21~23	Balttecnica 2013 / Lithuania	FORMOSA CNC
	27~31	Metalloobrabotka 2013 / Russia	BPK
October	TBD	Stankostroenie 2013 / Russia	BPK



OUR PROFESSIONAL INCLUDED
 CNC Tilting Rotary Table
 CNC Rotary Table
 Index Table
 Coupling Gear



HC-1800H-B
 Non-lifting CNC Horizontal Hydraulic Coupling Gear Index Table

ERT
 CNC Tilting Rotary Table



NCT+APC
 CNC Rotary Table + APC



No.418, Shueiyuan Rd., Fongyuan City, Taichung County 420, TAIWAN
<http://www.exactmachinery.com> E-mail: info@exactmachinery.com
 TEL: 886-4-25158290 FAX: 886-4-25158291