



# GROW TOGETHER

In a unique exchange program Toyota & MGT engineers are working together and help MGT build world class grinding machines





# Chairman's Message

Two consecutive years of draught in 2014 & 2015 have been tough on the Indian economy & its citizens. The difficult conditions challenged us to not only remain in Equilibrium, but keep finding ways to innovate & keep the national GDP at 7.4%; best performing in the world!! The pursuit of the ZERO, the centre between positive & negative, helped MGTians keep their mind in a state of Equilibrium & focus on innovations to provide value to the Customers.

"Growing Together" our cover story is one such Innovation with our key customer Toyota Kirloskar Auto Parts (TKAP). You will read how the world's no.1 auto major TOYOTA works with their key suppliers in an unique ICT (Inter Company Transfer) program, where one engineer from each company works inside the other company for 6 months. Objective is to acquire deep knowledge of each other's key processes related to manufacturing & use of the products. MGT's grinding machines are used by TKAP to produce transmission parts for the gear boxes, exported to Toyota plants worldwide. What the 2 engineers & companies gained is evaluated through a well-structured process as detailed on pages 10-11.

Another highlight of 2015 was the near culmination of the Next Generation Precision Grinding (NGPG) machine project started in 2011 with IITM & sponsored by PSA's (Principal Scientific Advisor) office, Govt. of India. It's hugely satisfying to realise that, starting at ZERO, a complete eco-system has been established with the students & faculty at IITM. A dedicated Project Review Monitoring Committee (PRMC) was established to monitor project progress quarterly along with experts from IMTMA, AMTTF & Dr. K. Subramanian, president STIMS Inc. USA as advisor. With several research papers & PhD's as an additional outcome, industry now need not depend on imported high-precision grinding machines.

Following pages reveals several other innovations: MGT's constant pursuit is to make your business grow successfully & remain in Equilibrium with the environment & the society, despite the turmoil, all around in the world. Happy reading.

**N. K. Dhand**

Chairman

[nkdhand@micromaticgrinding.com](mailto:nkdhand@micromaticgrinding.com)



# MD's Message

Micromatic Machines 2M, as our company was known in 1979, was the first time we participated in the 4th IMTEX Machine Tool Exhibition held at the Godrej, Vikhroli complex in Bombay. In a rare first historical achievement, Micromatic won both the 1st Prizes introduced by IMTMA, the organisers, for the first time that year.

**-CMTI 1st Prize for the Best Design**

**-FIE Award 1st Prize for the Best Product**

The Precision Universal Hydraulic Grinding Machine Model GCU 100, that won these awards is still India's most preferred Hydraulic Grinder (now Model ECO 200U) after nearly 40 years. Today MGT has nearly 4000 machines working in India & over 250 machines exported to various countries around the world with more than 100 in Europe alone.

MGT has been participating in the IMTEX exhibitions ever since 1979. The year 2015 started with MGT displaying 3 new products at the IMTEX exhibition. In another historical "Customer's" recognition, MGT received orders for all these 3 New Machines shown at the IMTEX 2015! Thank You Dear Customers for your confidence & trust in MGT.

At this exhibition, MGT also unveiled its new core philosophy of "In the Pursuit of ZERO", aiming to achieve, "Zero Defects, Zero Downtime & Zero Emissions". It's not only for the final products we deliver, but in all our internal processes. You will be hearing more about it in coming days.

I will appreciate your feedback to me always.



**Kapil Dhand**

Managing Director

[kdhand@micromaticgrinding.com](mailto:kdhand@micromaticgrinding.com)

# Contents



IMTEX 2015  
MGT Introducing Philosophy of  
"In the Pursuit of Zero" **04**

## NEW PRODUCTS

Twin Wheel Head Grinder: Productive  
Solution to grind LHS & RHS in single setup **06**

## TECHNOLOGY

CBN Technology CBN OD Cylindrical Grinder for high volume Production **12**

Case Study : Grind-Track™ used to optimize process and reduce cost by 22% **13**

## PRODUCTIVE SOLUTIONS

OEE Improvement through  
Setup time reduction **14**

Simple Automation for enhanced  
productivity and safe working **15**

**16** CUSTOMER CARE  
Value Added Services -VAS for your success

**17** CUSTOMER RECOGNITION  
Tata Motors Jamshedpur

**20** Award for Superior Performance & Quality  
Musashi Auto Parts India



**08**

## Ecosystem for Innovation

Next Generation Precision Grinder  
NGPC: Industry and academia  
join hands to achieve new milestone  
in Precision Grinding

**10**

## Cover Story



Working with  
Customer  
"GROW TOGETHER"  
initiative between  
TKAP & MGT

Global  
Foot  
Prints  
**17**



Values & Culture: Small steps  
to create Impact in the lives  
of people

**18**

# IMTEX 2015

## MGT-IN THE PURSUIT OF ZERO

AIMING TO ACHIEVE :

- ❖ Zero Defects
- ❖ Zero Downtime
- ❖ Zero Emissions



## GRINDING MACHINE

CBN OD



Dr. Y. Inaba, President Fanuc Japan along Ms. Sonal Kulkarni, President Fanuc India presenting Lord Ganesh momento to Mr. Kapil Dhand MD for prosperity of MGT at the stall.

The year 2015 started with a bang in January at the mega event IMTEX 2015, held every 2 years in Bangaluru. At this exhibition MGT showcased three New products:

1. Centreless Grinder CLG 5020, a smaller wheel (500 mm OD X 200 mm width wheel)
2. CBN Cylindrical OD Grinder for large volume production
3. SimpleGrind SG 40 CNC the popular economical model in Angular version.

MGT got overwhelming response for these New machines in the form of Orders being placed at IMTEX for all of them!

### MODEL : CBN 3263 C80

- CBN wheel speed upto 120 mps
- Compact Size - Moving Wheelhead Concept
- Easy Setup - Friction Drive

| Description                           | U/M   | Value         |
|---------------------------------------|-------|---------------|
| Swing over table                      | mm    | 320           |
| Grinding Length                       | mm    | 630           |
| Grinding Diameter                     | mm    | 100           |
| "Grinding wheel (OD X ID X W) [MAX.]" | mm    | CBN 450X40X35 |
| Wheel peripheral speed                | m/sec | 80 (120)      |
| Spindle power                         | kW    | 15            |
| ( ) Optional Feature                  |       |               |

# SIMPLE GRIND



## MODEL : SIMPLE GRIND

- Economical
- Productive
- Easy to Use

| Description                        | U/M | Value        |
|------------------------------------|-----|--------------|
| Swing Diameter                     | mm  | 260          |
| Admit between Centers              | mm  | 400/630/1000 |
| Max. Grinding Wheel $\Phi$ x Width | mm  | 500 x 65     |
| Grinding Wheel Spindle Power       | kW  | 3.7 (5.5)    |
| Wheel Surface Speed                | m/s | 45           |
| ( ) Optional Feature               |     |              |

# CNC CENTRELESS GRINDING MACHINE



## MODEL : CLG-5020

- Lowest Cost Per Piece (CPC)
- Compact
- Rigid

| Description                     | U/M   | CLG-5020         |
|---------------------------------|-------|------------------|
| Component Diameter              | mm    | $\Phi$ 2 ~ 60    |
| Grinding Wheel $\Phi$ x Width   | mm    | $\Phi$ 510 x 200 |
| Regulating Wheel $\Phi$ x Width | mm    | $\Phi$ 305 x 200 |
| Grinding wheel spindle power    | kW    | 11 (15)          |
| Wheel Surface Speed             | m / s | 45               |
| ( ) Optional Feature            |       |                  |

# Innovative Solution

## TWIN WHEEL HEAD GRINDER

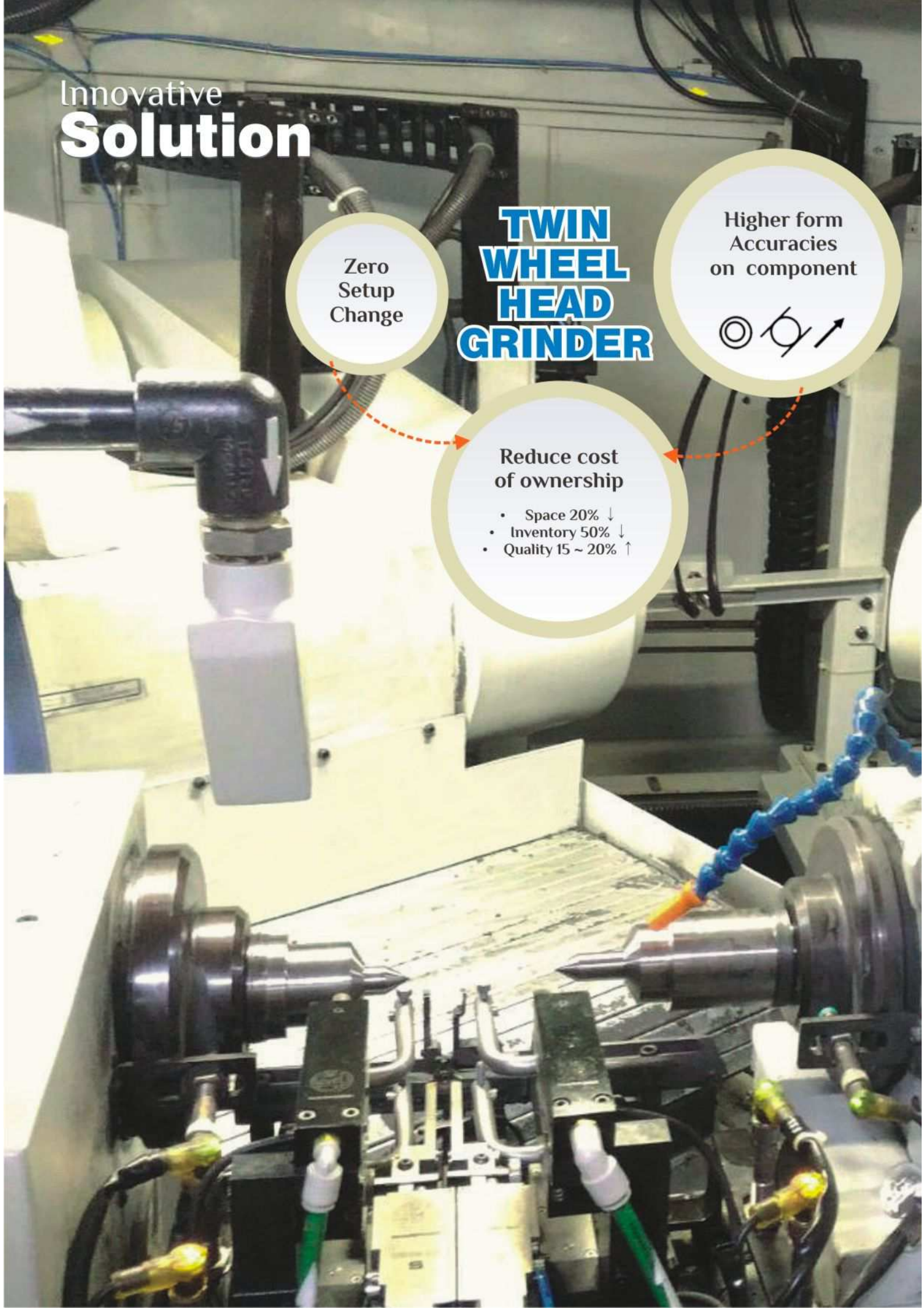
Zero  
Setup  
Change

Higher form  
Accuracies  
on component



Reduce cost  
of ownership

- Space 20% ↓
- Inventory 50% ↓
- Quality 15 ~ 20% ↑

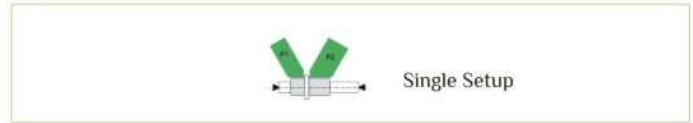


# SINGLE WHEEL HEAD GRINDER



# TWIN WHEEL HEAD GRINDER

## Number of Setup's



## Number of machines required



## Automation cost



## Space



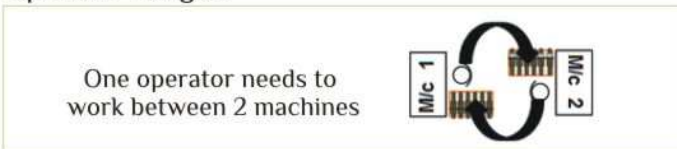
## Form Error (Run out, Concentricity)



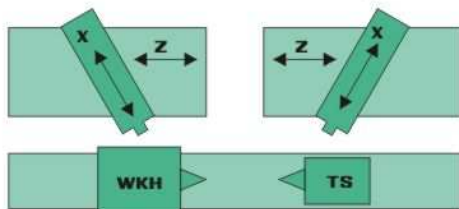
## Inventory of components



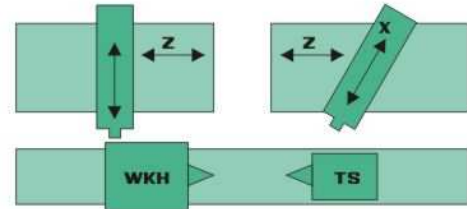
## Operator fatigue



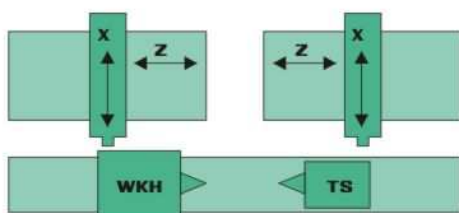
## Flexible Machine Configuration



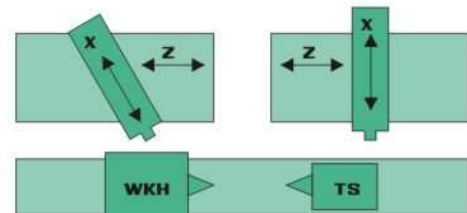
Both Wheel heads with 30° approach



Right Wheel head with 0° approach and Left Wheel Head with 30° approach



Both Wheel heads with 0° approach



Right Wheel head with 30° approach and Left Wheel Head with 0° approach

\* Based on component type, simultaneous grinding is also possible

# Development of Next Generation Precision Grinding Machine (NGPG)

## OBJECTIVE

Development of an indigenous cylindrical grinding machine equivalent to the best in class grinding machine in the world.

Frame-work for the design, building & testing of a similar Next Generation high Precision Grinding machine (NGPG).

## THE TEAM

NGPG was developed with the collaborative efforts of IIT Madras, MGT, PSA office-Govt. of India, IMTMA and AMTTF. Progress was reviewed quarterly & monitored by the PRMC (Project Review Monitoring Committee)

## PERFORMANCE TARGETED

for the Next Generation Precision Grinder (NGPG)

| Specification as per ISO 2433:1999 (E)   | Reference machine | SH-63 Machine | Project Target |
|--|-------------------|---------------|----------------|
| Circularity ( $\mu\text{m}$ )  | 0.7               | 1             | 0.5            |
| Consistency of diameter ( $\mu\text{m}/\text{mm}$ )  | 1/300             | 4/300         | 1/300          |
| Process scatter after (30 minutes) warm-up (dimensional stability without gauge) $\mu\text{m}$ | 5                 | 10            | <5             |
| Process scatter for 8 hour duration (1 typical production shift)                               | 25                | 35            | <25            |

### Grinding wheel Surface Speed (Maximum Speed for characterizing the performance of grinding machine)

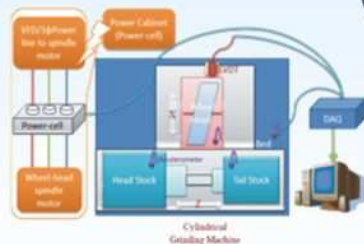
| Conventional wheel (660mm X 60mm) | 60 | 60 | 60 |
|-----------------------------------|----|----|----|
|-----------------------------------|----|----|----|

## NGPG MACHINE DEVELOPMENT TIMELINE



- Project sanction by OPSA
- IITM and MGTL partnering together
- Identification of indigenously developed machine.
- Setting of target for NGPG

2012

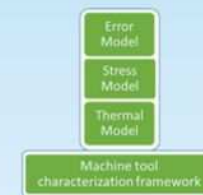


2013

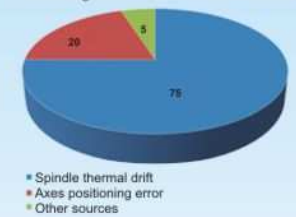
- Development of Diagnostic tool for process characterization
- Development of Machine tool testing protocol with AMTTF
- Benchmarking with world class machine

2014

- Development of machine characterization framework
- Identification of precision influencing elements of machine



Percentage contribution of error sources



NGPG - PRMC  
Committee Members  
Prof. N K Mehta (IIT - Roorkee Chairman)  
Mr. Neeraj Sinha  
(Member secretary-PSA office GOI)  
Prof. P V M Rao ( IIT - Delhi )  
Dr. R. Balasubramaniam (BARC-Mumbai)  
Mr. P J Mohanram (IMTMA - Bangalore)  
Mr. B R Mohanraj (CMTI - Bangalore)  
Mr. T. Parabrahman (ex MD, KTTM)





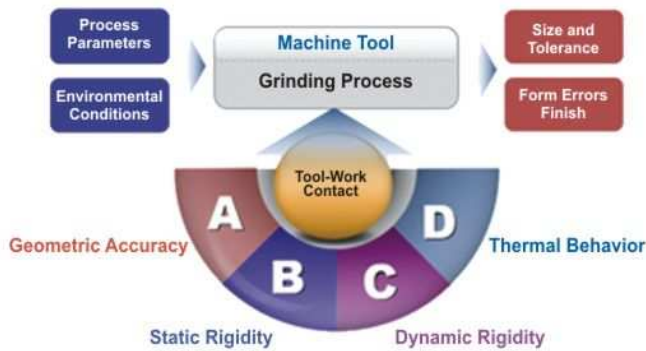
## THE APPROACH

To make a characterization framework for evaluating the performance of a High Precision Grinding Machine.

To conduct the testing and compare both the MGT machine and the World class cylindrical grinding machine for the Geometrical, Static, Dynamic & the Thermal characteristics.

- To set goals for the NGPG machine
- To develop design, manufacturing & testing Guidelines for the NGPG.
- To build the NGPG, verify the set targets & deliver it to IIT-M (for further research work).

## PERFORMANCE EVALUATION OF MACHINE TOOL



## AMTTF

Advance machine tool testing facility



Office of principal scientific advisor to the government of India



Machine tool industry partner



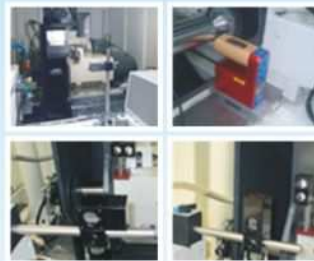
## PRMC

Project Review & monitoring committee



Indian Institute of Technology Madras

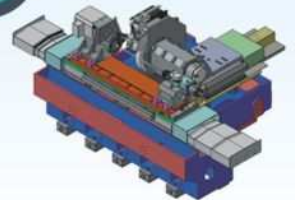
- Suggestions to upgrade the machine to NGPG
- Enhancement of Design, Manufacturing and Assembly process at MGTL



2015

2016

- Design validation with exp. results.
- Building of NGPG machine.
- Testing & Realization of NGPG Machine.



Members of the PRMC & IITM, MGT staff reviewing the progress of NGPG machine building at MGT, Bengaluru plant.

# Working with Customer

Exchange program towards “Grow together” Between MGT & TKAP



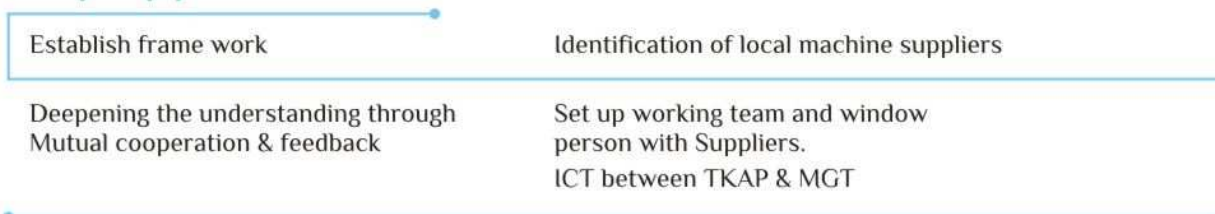
SANDEEP K.A.

Toyota, world's No. 1 Car Manufacturer, is also well-known for its Toyota Production System (TPS), which has made them beat their American & European rivals for the Top Slot.

One of the key focus of TPS is building Quality & Reliability into their Supply Chain. MGT has been supplying their Cylindrical grinders to Toyota Kirloskar Auto Parts Ltd. (TKAP) ever since their start in 2003. MGT machines finished grinding of all the shafts and gear OD etc for the Gearboxes, which are used by Toyota not only in their vehicles in India but, worldwide.

To build this relationship further TKAP & MGT entered into a six months ENGINEERS EXCHANGE PROGRAM- ICT under the banner "GROW TOGETHER".

## Step approach



## Ultimate goal

- Build machines as per global standards
- System approach towards Toyota Way
- Lead time reduction
- High reliability and maintainability of machines
- Low maintenance & running cost
- Quick response to abnormality
- Achieve win win solution

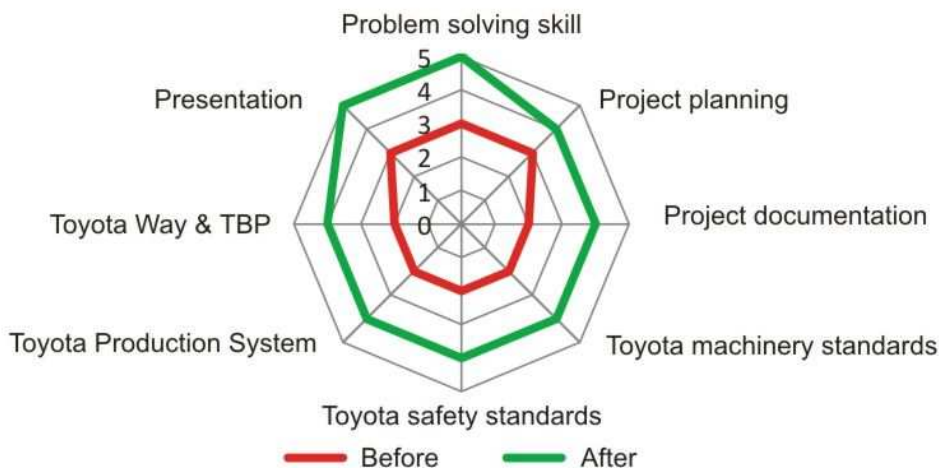
## TKAP Expert's Voice

Sandeep carried out focussed activity to achieve good & reliable machines. In the process he has learnt good practices of Toyota. This mutual learning will surely help him to contribute to the organisation and achieve the motto of, "GROW TOGETHER".

## My Reflection

Special thanks to MGT & TKAP for giving me a wonderful opportunity to enhance my skills which inturn levelled up my efficiency by understanding Toyota Machine Standards & Toyota way.

## Skill Matrix in Each Area



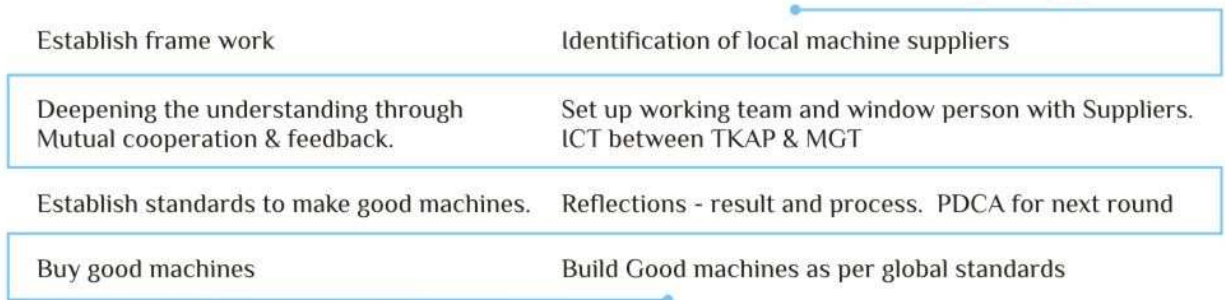
During this period MGT's Mr. Sandeep K,A, worked as a part of TKAP's Maintenance team, whereas Mr. Kotresh M.N. of TKAP worked mainly with sub-assembly, assembly and application teams at MGT's facilities. This working had given both of them, a deeper insight about customer and supplier processes. This exchange program will help upgrade MGT's products not only to international standards but also inline with Toyota's production and process needs.

We congratulate Mr. Kotresh for his commitment for learning at MGT, We also congratulate Mr. Sandeep K. A. for his devotion and hard work which has made him improve his skills very significantly, as shown in experts comments below.



KOTRESH M.N.

### Step approach



### MGT Expert's Voice

Actively involved in learning machine assy, process, sub assembly manufacturing process, machine trials, grinding process, troubleshooting in system approach way. Overall a very good exchange program.

### My Reflection

Special thanks to TKAP & MGT for giving me a wonderful opportunity to enhance my skills which inturn levelled up my efficiency by understanding grinding system.

### Ultimate goal

- Gain exposure and understand machine manufacturing industrial standards
- Understand the Quick repair steps in MGT grinding machine
- Improve the PM activities based on Maker view of thinking
- Trouble shooting skills improvement

### Skill Matrix in Each Area



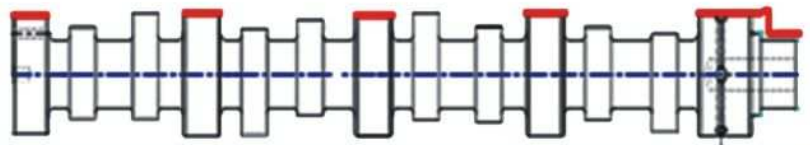
# Can CBN Grinder be Economical?

## YES ONLY FROM MGT

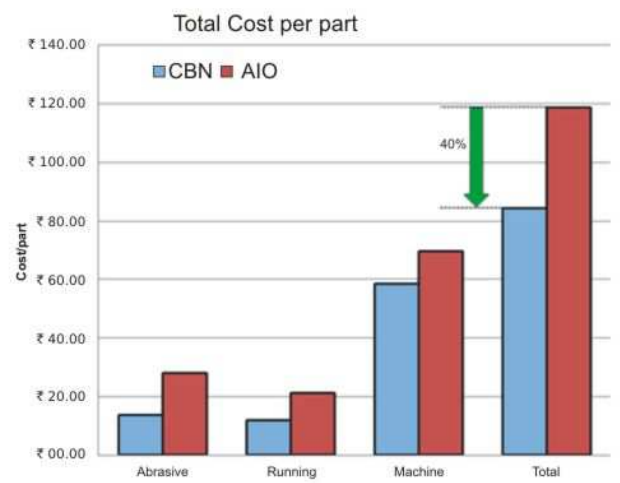
### Unique Feature of MGT CBN Grinder

- Compact machine size with X/Z configuration of slides
- Cutting speeds upto 80mps
- Higher material removal achieved due to rigid and stiff machine structure
- Specialize nozzle for coolant delivery in cutting zone
- Can grind left and right face in single setup
- LH & RH servo drive workhead suitable for friction drive (available as an option)

### Case Study - Cam Shaft Journal and face grinding



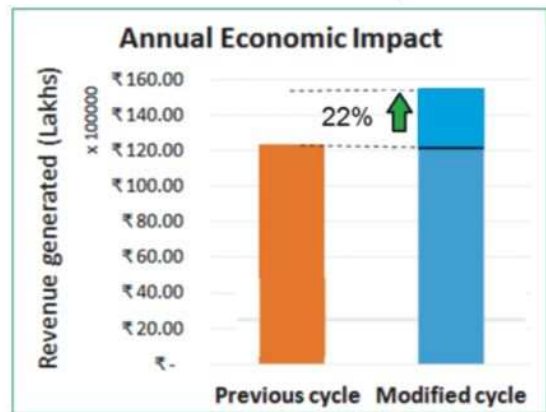
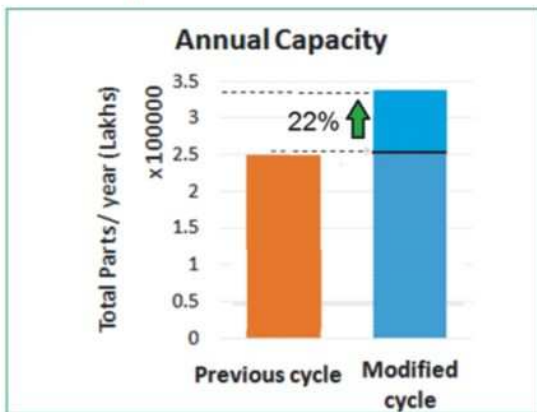
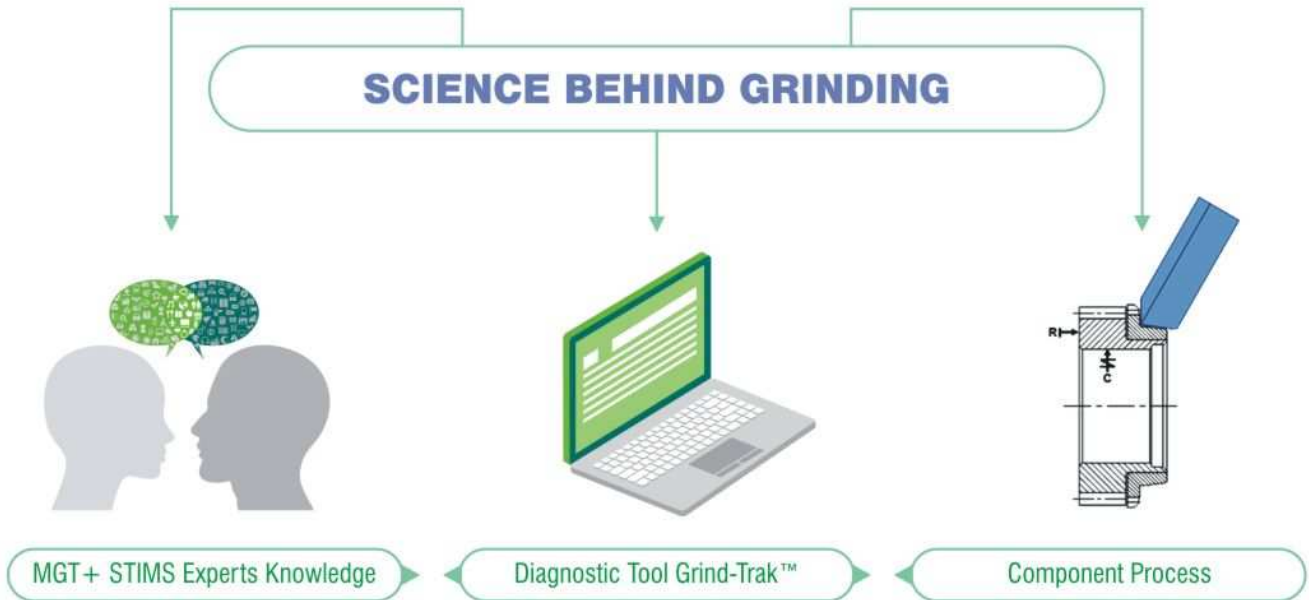
|                  | Alox Wheel Machine      | CBN Wheel Machine       |
|------------------|-------------------------|-------------------------|
| Type of machine  | Angular                 | Straight                |
| Operation        | 6 Journals and One face | 6 Journals and One face |
| Total Cycle time | 385 secs                | 215 secs                |
| Dressing         | Every component         | After 45 components     |



|  | CBN grinder (Straight)                               |   | Conventional grinder (Straight)                              |
|--|--|---|--|
| Number of component in single dressing | Upto 45 components for OD & 2000 components for Face | ↑ | Every component  |
| Total Cycle time                       | Lower by 44%   | ↓ | -  |
| Cutting feed rates                     | Upto 3.5 mm/min                                      | ↑ | -  |
| Form holding                           | Better by 25 %                                       | ↓ | -  |
| Productivity*                          | Better by 50%  | ↑ | -  |
| Cost / pc \$\$\$\$\$                   | Lower by 40%   | ↓ | -  |
| Surface finish quality                 | Consistent & within 0.3 Ra                           | ↑ | Increase component to component in range of 0.35 Ra ~ 0.6 Ra |
| Grinding of Thrust face                | Possible   | ✓ | Possible with AWH Machine                                    |

- \* For CBN machine available uptime is higher
- Setup changeover time for CBN wheel is 50% less than Alox wheel
- 1 CBN wheel produces same number of components as by 5 nos Alox wheels
- Effective setup changeover time for CBN Wheel = 1/10 time of Alox wheel changeover
- Similarly setup change time for disc dresser for CBN wheel = 1/40 time of diamond for Alox wheel
- 1 Disc Dresser life is 85 times that of a diamond dresser

# In-process Dignostics to reduce cycle time



MGT + STIMS-USA launched its GPS (Grinding Process Solution) service to cater to customer's needs of optimizing grinding operations, using indigenously developed Grind-Trak™ Diagnostic tool. In a typical example during production run at customer's facilities, MGT GPS team achieved 22% reduction in grinding time for an automotive part.

This expert service provides significant long term economic impact for customers which might be recurring or one time. This service can be effectively used for diagnosis and solution of grinding process problems or benchmarking of grinding process between various machines.

# Want to reduce setup time on a **CNC Grinding Machine?**

## Use Servo Tailstock



Servo Driven MT 5 tailstock is especially developed and offered on MGT to make Stallion Series External Cylindrical Grinding Machines

- Avoid Accident due to wrong Loading
- No Proximity Sensor

**SAFE TO  
USE IN  
AUTOMATION**

- Zero Adjustment required
- Can be used with Gantry or Robot effectively

- Can adjust similar family of components up to 150 mm length variation
- Minimum Length variation of 0.2 mm adjusted accurately

**BENEFITS OF SERVO TAILSTOCK**

**ACCURATE**

**FAST**

- Quick and easy for setup changeover through programming
- Zero Downtime – due to failure / damaged proximity



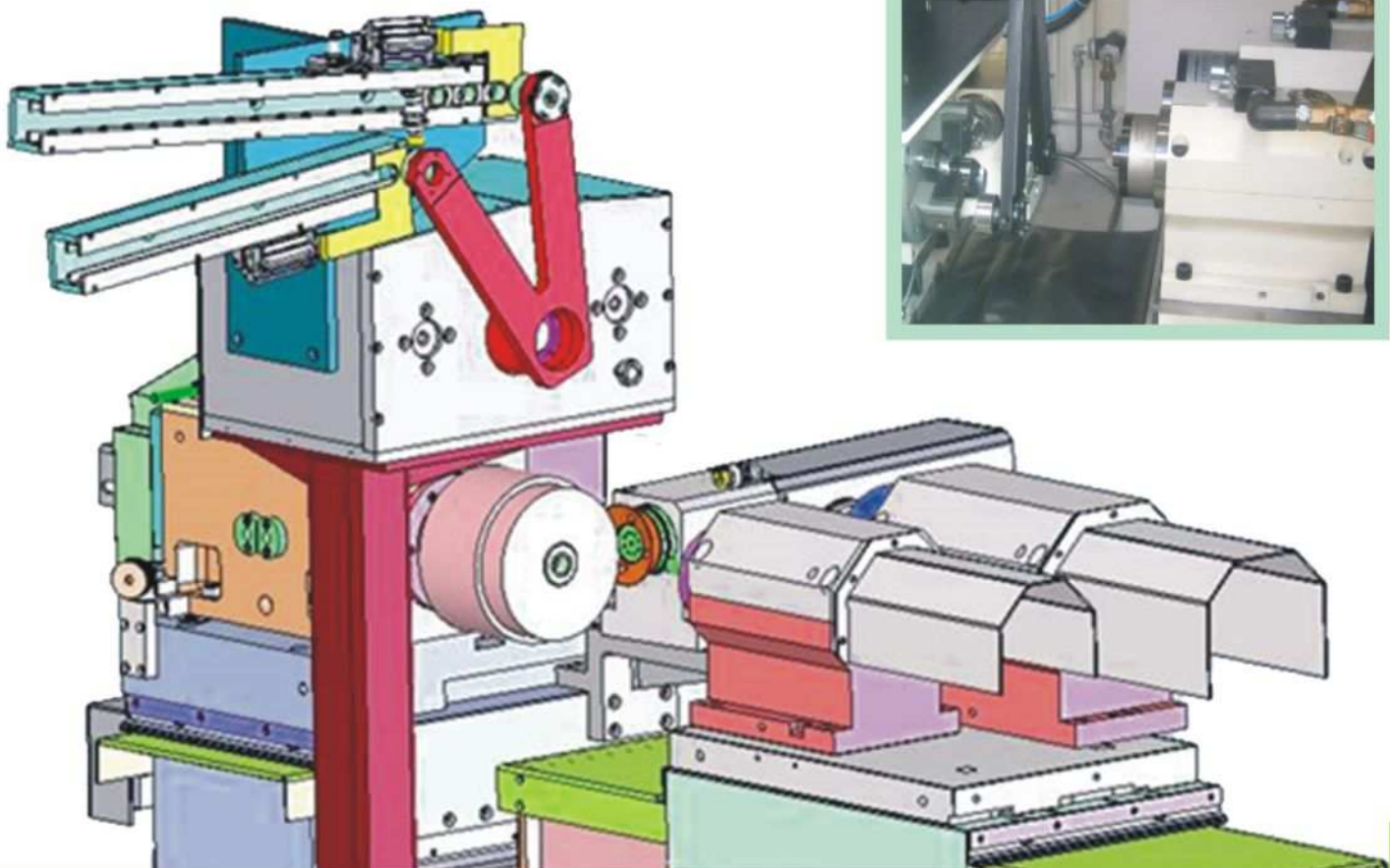
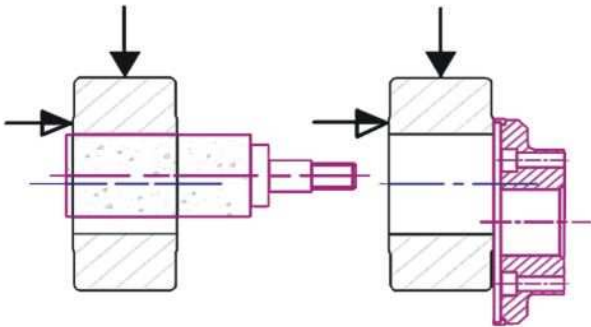
# Increased Productivity & Safety through Simple Automation

MGT's simple automation on this high-speed Internal Grinder IG-50 completely eliminates unsafe loading-unloading, besides being an import substitution for the customer. Recurring direct 'skilled labour cost' is also reduced by 90% as 30 pcs. are loaded simultaneously once every 40 min. by an unskilled operator. Customer has been able to reduce his per piece cost by 30% through enhanced productivity.

## CBN INTERNAL GRINDER IG-50

IG-50 CNC is a robust, 3-axis, twin spindle (for Bore and Face grinding in single setup) fully equipped machine with servo automation. CBN grinding delivers consistent higher throughput, reliability and precision for this critical process.

| Result Achieved   |                            |
|-------------------|----------------------------|
| Cycle Time        | 65 Seconds with automation |
| Roundness         | 0.0015 mm                  |
| Straightness      | within 0.001 mm            |
| Surface Roughness | < 0.4 Ra                   |



# Caring for Your **Long Term Success** Through Value Added Services - VAS

## **GET BETTER RETURNS ON YOUR INVESTMENT**

Being a customer centric company, Micromatic Grinding Technologies had always harnessed its immense technological strength to provide its customers not just machines, but total solutions.

It works in tandem with its customers to help optimise the productivity of their machines by providing Value Added Services, through a dedicated VAS division that offers :

1

**TOTAL  
SOLUTIONS  
BACKED BY**

**42**

**YEARS EXPERTISE IN  
GRINDING TECHNOLOGY**

2

**TOTAL  
SOLUTIONS  
THROUGH**

Re-tooling of machine ◉ Automation solutions  
In process Gauge fitment ◉ CNC system replacement  
Reduction in setup time ◉ Optimization of process parameter

- ◉ Refurbishing of machine
- ◉ Reconditioning of machine
- ◉ Conversion of Hydraulic/ PLC machine to CNC

**UPGRADATION  
OF MACHINES**

**OTHER  
SERVICES**

- Machine Condition/ Health Survey
- ◉ Preventive Maintenance ◉ Training ◉ Maintenance
  - Trouble Shooting ◉ Setting of Machine ◉ Customized



# Going Global

# EMO Milano



## MGT MACHINES In Turkey turkey



Chairman and Directors of M/s. Elzemwax, Konya, Turkey along with Mr. Prashant Godse of MGT



Details of MGT machine being explained to the customer

## Customer Recognition

### TIMELY AND SUCCESSFUL MACHINE COMMISSIONING AT TATA MOTORS JAMSHEDPUR



Mr. Sampath Kumar CEO TML Drivelines Jamshedpur at the Inauguration of MGT's SH-40 CNC Grinder, alongwith Mr. Pramod Choudhary, Head - Manufacturing; Mr. Subhashis Das, AGM- Planning; Mr. Rajat Mathur, Head - Maintenance & Mr. Pradeep Pathak of MGT.

# Living The Values

## LIVING THE VALUES

Mr. Kiran Pal is another MGTian who has demonstrated excellent example of living our organizational value “Care for Society and Environment”

He is residing in a locality where nearby, no open area or parks are available. As he pursues MGT value, “Care for Society and Environment” he wanted to do something to give back to the society. One day an idea struck him, to create his own garden at his home terrace. And he realised his dream by cultivating many herbs and vegetables in his roof-top garden. Now he is using these herbs in many ways at his home and for neighbours.

He spends 2 to 3 hours daily to take care and cultivate these plants, which helps him to keep himself fit along with creating internal peace and a stress free environment. This also helps him perform his best, at the workplace too.



## CARE FOR SOCIETY IS PART OF MGT'S DNA

MGT is associated with a NGO named Gram Niyojan Kendra (GNK) since 1995, to contribute to the society, which are now called, CSR activities.

Under this, MGT supports and collaborates with GNK for education and health of Children and Women empowerment in nearby Rurban (Rural-Urban) areas. MGT believes these are important steps which contribute significantly to achieve an important part of MGT's Vision of “Harmony with the Society & the Environment”. MGTian's are regularly involved in these activities under guidance of mentors & MGT management, who carry out periodic onsite reviews.



GNK team with Mr. N. K. Dhand & Mr. R. K. Baghel

Child care center,  
Sadarpur sponsored by MGT



Child care center, Sadarpur Sponsored by MGT

# Culture at MGT

## LEADERSHIP DEVELOPMENT

MGT has been keenly focused on developing leaders, who can lead various portfolio in the organization. These, leaders are developed from the selected set of employees who had been working in various domains. To develop leadership in them, a 3 days Leadership Training Program was organized at MGT, Bengaluru.



## TEAM BUILDING

A training on Leadership & Team building was conducted in 2 batches – 2 days, each session with 20 people in each batch. Ms. Rashmi Datt from Dialog Services, Delhi was the trainer. Training was mainly intended to address the Senior & Middle management members on imbining Leadership qualities & Team working skills.



## Games at MGT



Volley ball match was organized at MGT GZB. This was inaugurated by Mr. N.K. Dhand.



52 employees from MGTB participated in Safety Marathon held by M/S TDPS in Dobaspet Industrial Area on 17th May'2015, for the good cause of creating awareness on safety in the society

# AWARDS & RECOGNITION

Recognized by **Musashi Auto Parts India Ltd**  
for “sincere efforts & superior performance  
in the field of **Quality**” to  
**Micromatic Grinding Technologies Ltd.**



Head office & North India Plant  
Micromatic Grinding Technologies Ltd.  
C- 27 & 28, Industrial Area, Meerut Road, Ghaziabad  
201003 Uttar Pradesh  
T: +91 120 2712137 / 69  
E: sales@micromaticgrinding.com

Bengaluru - South India Plant  
Micromatic Grinding Technologies Ltd.  
Plot No. 5-A, Somapura, Village Dobaspet,  
Industrial Area, Nelamangala Taluk,  
Bangalore - 562 123  
Phone : 080-27702449

[f](#) /micromaticgrindingtech [in](#) //tinyurl.com/z7264wo [globe](#) micromaticgrinding.com

**Ace Micromatic**  
Group Company