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FINAL REPORT

Project No. and Title :

UNIDO Project No. DP/IND/91/026

Metals and Plastics Industries Service
Centre (MPISTC)
(A UNDP Assisted Tool Room Project of
Government of Goa)
Plot No. 200,201,202, Kundaim Industrial
Estate
KUNDAIM, Ponda-303110, Goa, INDIA

UNIDO Contract No. : 95/077

Contractor:

Central Manufacturing Technology Institute
Tumkur Road
BANGALORE - 560022
INDIA

Phone : +91-80-3375081
Fax : +91-80-3370428
E-mail : tis@cmtl.ernet.in

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FINAL REPORT

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1 . BACKGROUND INFORMATION

The establishment of Metals and Plastic Industries Service and Training Centre (MPISTC) in Kundaim Industrial Estate. Goa. India by Department of Industries and Mines. Government of Goa and United Nation Industrial Development Organization in association with ILO, is in progress.

The project is expected to facilitate the setting up of a full fledged institution which will be capable of tackling some of the various problems Goan industries are facing by having sophisticated facilities in design and tool development, precision machining and inspection as well as skill development.

It is planned that the centre will have the following infrastructure facilities which will be of direct benefit to the local industries.

- Consultancy services to industry to effect methods improvement
- Training of technician and engineers from industry for short term training courses
- Long term training course in tool design/tool making
- Inspection and testing of mechanical components and parts from industry
- Design and manufacture of precision tools dies, jigs and fixtures
- Establishment of a data bank and technical library.

In order to fulfill the various tasks named above, UNIDO/UNDP has supplied computer hardware and software as well as sophisticated CNC machinery, aimed to establish modern Computer Aided Design, Computer Aided Manufacturing (CAD/CAM) facilities at the centre for its operation and demonstration to Goan industries.

UNIDO has awarded contract to Central Manufacturing Technology Institute (CMTI), Bangalore, India, to establish and install computer hardware, software, local area network (LAN) and training of the MPISTC personnel in CAD/CAM, computer system management.

2. SCOPE OF WORK OF CMTI

CMTI is expected to field expert in the MPISTC project site to install the computer hardware, software, network and train the MPISTC personnel in CAD/CAM, operation and programming of CNC machines and computer system management.

The specific tasks of CMTI are as follows.

- Identification and checking of equipments and programmes available.
- Proposal for practical layout and site planning.
- Electronic installation of computer hardware and software (Operating System).
- Installation of the CAD/CAM system.
- Integration of the CNC equipment/machine tools to the CAD/CAM system.
- DNC system checking with the CNC production machines.
- Training of the centre's staff in the operation of the above system at site.
- Training of project staff at the contractor's facilities in CAD/CAM, NC programming for two weeks (Three persons).

In order to fulfill the above tasks an expert was deputed to MPISTC, Goa from 14th to 22nd March 1995. The expert has completed the detailed inspection of computer hardware and software. The Interim Report submitted earlier explains the details of work carried out.

Subsequently two experts were deputed to MPISTC, Goa from 28th March 1996 to 9th April 1996 for installation of PC's, CAD/CAM, LAN, Training of MPISTC staff on Computer hardware, software and Network. The draft final report submitted earlier explains the details of work carried out.

Based on the request of Mr. V. Koloskov, Contract Officer, UNIDO after acceptance of Draft Final Report, one expert from CMTI was deputed to MPISTC, Goa from 10th December 1996 to 16th December 1996 for feasibility study of Integration of the Zoller Tool Presetter to the production control Computer. This integration has been completed eventhough it is outside the scope of current contract.

3. INSPECTION OF COMPUTER SITE PLANNING

Electrical Power :

- 10 KVA UPS has been installed and it is working satisfactorily.
- UPS unit shifted to Deckel machine room (adjacent to the existing position).
- One power socket board consisting of 4 Nos. Universal 5A sockets, a switch, a fuse and an indicator is provided near workstation WS1.

4. INSTALLATION OF COMPUTER HARDWARE AND SOFTWARE

4.1 HARDWARE

The computers, LAN servers and the peripheral equipments were arranged and placed as indicated in Annexure-1.

Installed the following Hardware equipments in the CAD/CAM room

- One Hewlett Packard NetServer 4d/66LE, File server
- One Hewlett Packard NetServer 4d/66LE, Computer
- One Hewlett Packard Vectra 486/33N Computer
- Two Epson LQ1070+ 24 pin dot matrix printer
- One Hewlett Packard LaserJet 4 printer
- Two 20" Ultra VGA 1600 color monitor to workstations
- One ANSEL 2900 8-port Hub/concentrator
- Two Oce-graphics G6422 18"x12" digitizer
- One AST PowerExec PC 4/33SL
- One Hewlett Packard ScanJet II Scanner
- One Control Keyboard similar to Sin820T/820M controller

Functionality of all the installed hardware were checked. and found to be working satisfactorily

- d. All the Hewlett Packard Computers are having mini |DIN connectors for connecting the Keyboard. SL-Control keyboard which simulates the control panel of Sinumerik 820T/820M has normal DIN connector. Hence SL-Keyboard has been connected to a Local Personal Computer and checked the functionality and SL-control keyboard is working satisfactorily.

List of File server, Computers, peripherals connected to computers and the softwares loaded in specific computers are listed in Annexure-2.

File server FS1 and Ansel 2900 8-port Hub /Concentrator are installed. HP Vectra File server and computers are connected in Local Area Network using UTP (cat-3) cable. Supervised and carried out the UTP cable laying, crimping and LAN connectivity. File server FS1, Hewlett Packard computers - WS1, WS2, WS3, WS4 and WS5 are connected in the Local Area Network.

Hewlett Packard Draft pro plus plotter is installed and working. It has two ports-one serial and one parallel. Serial port is connected to Hewlett Packard computer (running NC-Polaris software) WS4 and parallel port is connected to the File server FS. At any point of time either the serial port or the parallel port can be used for plotting using AutoCAD, Genius or NC-Polaris. The instructions given in Help Sheet-1 will help in using the Hewlett Packard - Draft pro plotter.

Digitizer Oce Graphics G6422 are interfaced to the Hewlett Packard computers WS2 & WS3 (Refer to Annexure^t -1), running AutoCAD & Genius mechanical engineering software. There are two templates one for AutoCAD and another for Genius. Templates for using Genius and AutoCAD R12 are

fixed on the digitizer. Digitizer can be configured for using either AutoCAD or Genius software. At present Digitizer is configured for using Genius software. The instructions given in Help Sheet -2 will help in configuring the digitizer for AutoCAD/Genius software.

4.2 SOFTWARE

Installed AutoCAD Release 12 CAD, Industrial drafting software and also Advanced Modeling Extension (AME) in the following computer.

- Hewlett Packard Vectra 486/33N, WS2
- Hewlett Packard Vectra 486/33N, WS3
- Hewlett Packard Netserver 4d/66LE, WS4

Installed Genius 12, Mechanical Engineering software with associated library in the following computers.

- Hewlett Packard Vectra 486/33N, WS2
- Hewlett Packard Vectra 486/33N, WS3

Installed NC-Polaris V5.0 CAD/CAM programming software with associated library in the following computers

- Hewlett Packard Vectra 486/33N, WS3
- Hewlett Packard Netserver 4d/66LE, WS4

Installed SL-CNC Simulation software package for NC programming and simulation in the following computers.

- Hewlett Packard Netserver 4d/66LE, WS4
- Local 386DX/33 Personal Computer, WS6

Installed HAPPY-CAM software package in the following workstations / computers

- Hewlett Packard Vectra 486/33N, WS5
- Hewlett Packard Netserver 4d/66LE, WS4

Installed ScanJet II drivers and associated software in the following computer

- Hewlett Packard Vectra 486/33N, WS1

Installed client software for Novell Netware 3.12 in all workstations for accessing the File Server.

All the system administrative tasks such as system setup, setting up system files like Autoexec.bat, login script, creating customized queues, defining printers, creating & setting up user accounts were carried out for the file server running Novell Netware 3.12. Novell Netware 3.12 is configured and is working satisfactorily.

Annexure - 2 gives the list of software loaded in the computers.

Noticed the following problems during the software installation.

- During installation (specifically Genius) most of the CAD software floppy diskettes were showing 'data error while reading'. It was possible to load the software after repeated retries. Backup of all the CAD softwares were taken as a precautionary measure.
- Hardware license No. 10376 : Solid Sheet Metal loading:- While using Solid Sheet Metal loading software (part of Genius), Genius is prompting the user to enter the authorization code (AC). Although correct and valid code printed on the floppy disk is entered, the system is giving "Invalid Authorization Code" and exiting. M/s Alcams should be requested to send the valid Authorization code or another floppy containing the Solid Sheet Metal loading software which works with hardware lock number 10376. (If we enter the AC printed on the floppy labeled Solid Sheet 3.0 [DN:10376, SN:813190, AC: bb5c67d93ede2065121] the system is giving "Invalid Authorization Code" & exiting). However, the same Solid Sheet Metal software of other set of Genius (Hardware license No. 10377) is working fine after entering the authorization code, as printed on the respective floppy diskette.

We have requested Mr. K. Schulz, CTA to help in getting the correct authorization code either from M/s Alcams or from the supplier M/s GENIUS CAD Software, GmbH.

5. UNSOLVED POINTS REPORTED IN THE DETAILED INSPECTION OF HARDWARE AND SOFTWARE

During the visit to project site by our expert , for detailed inspection of hardware and software items, an Interim Report was submitted. Following points mentioned in the report remains unsolved.

- a) It was strongly recommended to get DOS & Windows software on 3.5" floppy disk distribution media from M/s Glenyork, LONDON.
- b) It was also recommended to get NC-Polaris software on a 3.5" floppy disk distribution media from M/s. ALCAMS.

CNC-WORKMAN

M/s. ALCAMS have supplied replacement floppy for CNC-Workman. Installed CNC-Workman in Workstation 4, and is working satisfactorily. However, M/s. ALCAMS have not supplied the user manual for CNC-Workman.

SL-CNC SIMULATION AND TRAINING SOFTWARE

Disk labeled, Drehen (PAL) reports 'Disk read error' during installation. It should be replaced by a good working floppy. It was also noticed that some of the screens are in German. It is recommended that all the messages and information should be in English language. (This problem has been reported earlier and it is still existing).

We have requested Mr. K. Schulz, CTA to help in getting the correct authorization code either from M/s Alcams or from the supplier M/s SL-Automatisierungstechnik GmbH.

6. TRAINING OF MPISTC STAFF ON COMPUTER HARDWARE, SOFTWARE & NETWORK

Training was imparted to seven MPISTC personnel for two days (on 6-APR-96 and 7-APR-96) in the usage of computers, printers, plotter and Novell Netware Network.

The following topics were covered during the training program.

- Introduction to Personal Computer
- Introduction to MS-DOS 6.0 operation system
- Using MS-DOS commands
- Introduction to MS-Windows 3.11
- Introduction to Novell Netware 3.12 operating system.
- Novell Netware
 - Logging in
 - Logging out
- Plotting on AutoCAD plot file on HP plotter using the Novell Netware
- Operation of HP Draft pro plotter
- Operation of OCE-Graphics tablet
- Configuring OCE-Graphics tablet for AutoCAD and Genius
- Plotting on HP-DraftPro plotter
 - Locally on WS4
 - Using File Server sitting in any workstation

- Training of MPISTC Staff on CAD/CAM at CMTI is scheduled from 20th January 1997 and 3 persons are expected to come for training. The training schedule is as per Annexure - 3

7. Establishment of DNC

A DNC (Direct Numerical Control) system connects a production control computer to a CNC through serial RS-232C interface for part program transfer from computer to CNC and from CNC to computer. The NC programs for Deckel FP4 with Dialog 11 CNC system are generated using CAD/CAM Software and stored on the computer. These NC programs are transferred electronically through serial RS-232C interface to Dialog 11 CNC system on request which are subsequently used for manufacturing the components.

A DNC has been established for Deckel FP4 with Dialog 11 CNC system and it is working satisfactorily (Refer Sl. No. 10 and 11 of work plan).

8. Work Done Outside the Scope of Contract

After accepting the Draft Final Report observation was made by Mr. V. Koloskov, Contract Officer UNIDO, Vienna, to consider Integration of the Tool Presetter to the production control computer. Eventhough this work was outside the scope of current contract one expert from CMTI was deputed to MPISTC, Goa from 10th December 1996 to 16th December 1996 for feasibility study of Integration of the Zoller Tool Presetter to the production control Computer. This integration has been completed.

The Zoller V420 Junior Vertical Tool Presetter has been interfaced to the production control computer through serial RS-232C interface. A software has been developed by the contractor (CMTI) and installed at project site (MPISTC) on the production control computer. This software collects the tool data from the Zoller Electronic System DA 6051 of Zoller Tool Presetter and stores in the computer for furhter processing. The user manual of Zoller Tool Data Logging Software is enclosed.

9. TIME SCHEDULE OF CONTRACTOR STAFF INVOLVEMENT

Name	Duration	Activity as per Work Plan	Status
V. S. Hiremath.	14-MAR-1995 To 22-MAR-1995	2 and 3	Completed
S. Satish Kumar.	28-MAR-1996 To 09-APR-1996	6, 7, 8 and 9	Completed
K. S. Aithal.	28-MAR-1996 To 09-APR-1996	6, 7, 8 and 9	Completed
V. S. Hiremath.	10-DEC-1996 To 16-DEC-1996	10, 11	Completed
T. Gurumurthy.	20-JAN-1997 To 31-JAN-1997	12	Completed
		Activity Outside Work Plan	
V. S. Hiremath.	10-DEC-1996 To 16-DEC-1996	Feasibility Study of Integration of Zoller Tool Presetter to Production control computer	Completed
S. Satish Kumar.	13-JAN-1997 To 18-JAN-1997	Integration of Zoller Tool Presetter to Production control computer	Completed

Annexure - 3

Special Training Programme for MPISTC Engineers

On EDM, CNC Programming and CAD/CAM

Duration : **Two Weeks**
T.Gurumurthy

Coordinators: **Mr.V.S.Hiremath & Mr.**

Day	Time	Topic	Faculty	
Monday	0900-0915	Registration	Training Department	
	0915-1015	Inauguration	Mr. G. Sudheendra	
	1015-1030	CMTI Activities (Video)	Mr. K. G. N. Swamy	
	1030-1130	Introduction to Non-Traditional Machining	Mr. C. K. Srinivas	
	1130-1300	Principles of EDM, Wire EDM	Mr. C. K. Srinivas	
	1400-1500	Demo on EDM	Mr. C. K. Srinivas	
	1530-1645	Demo on Wire EDM Programming & AGIE Machine	Mr. S. V. Prasad	
	Tuesday	0900-1300	Part Programming	Mr. Somashekar Rao
		1400-1645	Part Programming with demo on MICRON/BOSTOMATIC	Mr. V. G. Yoganath Mr. P. Rajshekar
Wednesday		0900-1200	Part Programming Exercises	Mr. Somashekar Rao Mr. V. G. Yoganath Mr. S. Narashimmalu
	1200-1300	Introduction to Computers	Mr. V.S. Hiremath	
	1400-1500	Introduction to CAD/CAM	Mr. T. Gurumurthy	
	1530-1645	Demo on AutoCAD	Mrs.Asha R Upadhyaya	
	Thursday	0900-1015	Introductin to AutoCAD	Mr. T. S. R. Murthy
1030-1300		Demo on UGII CAD/CAM	Mr. T. Gurumurthy Mr. J. Jagannathan	
1400-1500		Introduction to CNC Systems	Mr. G. Sudhakar	
1530-1645		Demo on CNC System	Mr. K. N. Prabhakar Mr. G. Sudhakar	
Friday		0900-1030	NC Machining on UGII CAD/CAM	Mr. T. Gurumurthy Mr. J. Jagannathan Mr. S. C. Gopal
	1030-1300	Surface Modeling	Mr. T. Gurumurthy Mr. J. Jagannathan	

	1400- 1500	Introduction to DNC	Mr. S. C. Gopal Mr. E. S. Manjunath
	1500- 1645	Demonstration of DNC System Film Show on CNC Machines	Mr. K. S. Aithal Mr. K. G. N. Swamy
Monday	0900- 1300 1400- 1645	CAD Exercises on UGII CAD/CAM	Mr. J. Jagannathan Mr. S. C. Gopal
Tuesday	0900- 1300 1400- 1645	CAM Exercises on UGII CAD/CAM	Mr. J. Jagannathan Mr. S. C. Gopal
Wednesday	0900- 1300 1400- 1645	Exercises on UGII CAD/CAM	Mr. J. Jagannathan Mr. S. C. Gopal
Thursday	0900- 1100 1100- 1300 1400- 1645	Tooling for CNC Machines Features and types of CNC Systems Visit to NTTF	Mr. K. S. Swaminath Mr. G. Sudhakar
Friday	0900- 1200 1200- 1300 1400- 1500 1500- 1645	Computer Aided Inspection Demo on Applicon CAD/CAM (Solid Modeling) Film show on CAD/CAM Discussion & Concluding Section	Mr. P. V. Shashikumar Mr. S. N. Ravikumar Mr. Y. V. R. Murthy Mr. K. G. N. Swamy All Faculty

ZOLLER TOOL DATA LOGGING SOFTWARE

USER'S MANUAL

DECEMBER 1996

**CENTRAL MANUFACTURING TECHNOLOGY INSTITUTE
TUMKUR ROAD, BANGALORE - 560 022
INDIA**

Phone : +91 - 80 - 3375081

Fax : +91 - 80 - 3370428

E-mail : tis @ cmti.ernet.in

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INTRODUCTION

Zoller Presetter is a Universal Presetter for Machining Centres and Lathes. Zoller Presetter consists of DA 6051 Digital Display Unit. The measured tool dimensions are displayed on a seven digit, seven segment display for each axis. The digital display unit DA 6051 is equipped with a RS-232C serial interface. Computer serial communication port is connected to the serial interface of the Zoller presetter. Zoller tool data logging software executing at the computer , receives and stores the tool data from the Zoller presetter.

INSTALLATION OF ZOLLER TOOL DATA LOGGING SOFTWARE

The floppy diskette (3.5") supplied contains Zoller Tool Data Logging Software and Installation Software for installing the same.

Installation source drive is assumed as **A:**
Installation target drive is assumed as **C:**

Insert the Zoller Software installation diskette (1.44MB) in drive 'A' of the computer and at DOS prompt **A:>** type 'Install'.

A:> install <ENTER>

Installation of Zoller Tool Data Logging Software begins. A series of installation messages are displayed and the software gets installed. On successful completion, the following message is displayed,

"Zoller Software Installed Successfully"

SYSTEM OPERATION

Zoller tool data software program resides in 'C:\Zoller' directory and it contains the following files namely,

Zoller.Exe	:	Main Executable Program file
Main01.Exe	:	Overlay File for Zoller.Exe
*.CHR	:	Text Font files used by Zoller software
Tooldata.Log	:	Sample File containing logged tool data

Invoking the Zoller tool data software (At the Computer End) :

Change the current directory to the Zoller directory.

```
C:\>CD C:\Zoller
```

At the command prompt type 'Zoller' and press **ENTER**.

```
C:\Zoller> Zoller
```

The software displays welcome message as the first screen. After 5 Seconds, second screen is displayed which contain copyright information. On pressing **ENTER** key, the screen gets cleared and the following message is displayed.

Select communication Port COM1/COM2 (Default is COM1) :

Type '1' and press **ENTER**.
Selects **COM1** for communication.

Type '2' and press **ENTER**.
Selects **COM2** for communication.

Example :

Select Port COM1/COM2 (Default is COM1) : 2
will select COM2 communication port for
communication.

If **ENTER** key is pressed without keying in a NEW value , the software takes COM1 (which is displayed inside brackets) as the default port for communication.

After selecting the communication port, the following message is displayed.

Select the Baud Rate (1200, 2400, 4800, 9600) (Default is 4800) :

Enter the Baud Rate and press **ENTER** to select the Baud rate for communication.

Example:

Select the Baud Rate (1200, 2400, 4800, 9600) (Default is 4800) :
9600

Selects Communication Baud Rate as 9600.

If **ENTER** key is pressed without keying in NEW value, the default baud rate, 4800 is selected.

After selecting the baud rate the following message is displayed.

**Enter the name of the file to store tool data
(Default filename is tooldata.log) :**

Default file name can be accepted (which is displayed within the brackets) by typing **ENTER** key or enter the new file name (with or without extension) and press **ENTER**. The tool data received from the Zoller presetter gets stored in the filename selected.

Once the selection of the filename is complete, the screen gets cleared and displays the following message.

**Receiving the tool data
Press 'ESC' to Save and Exit**

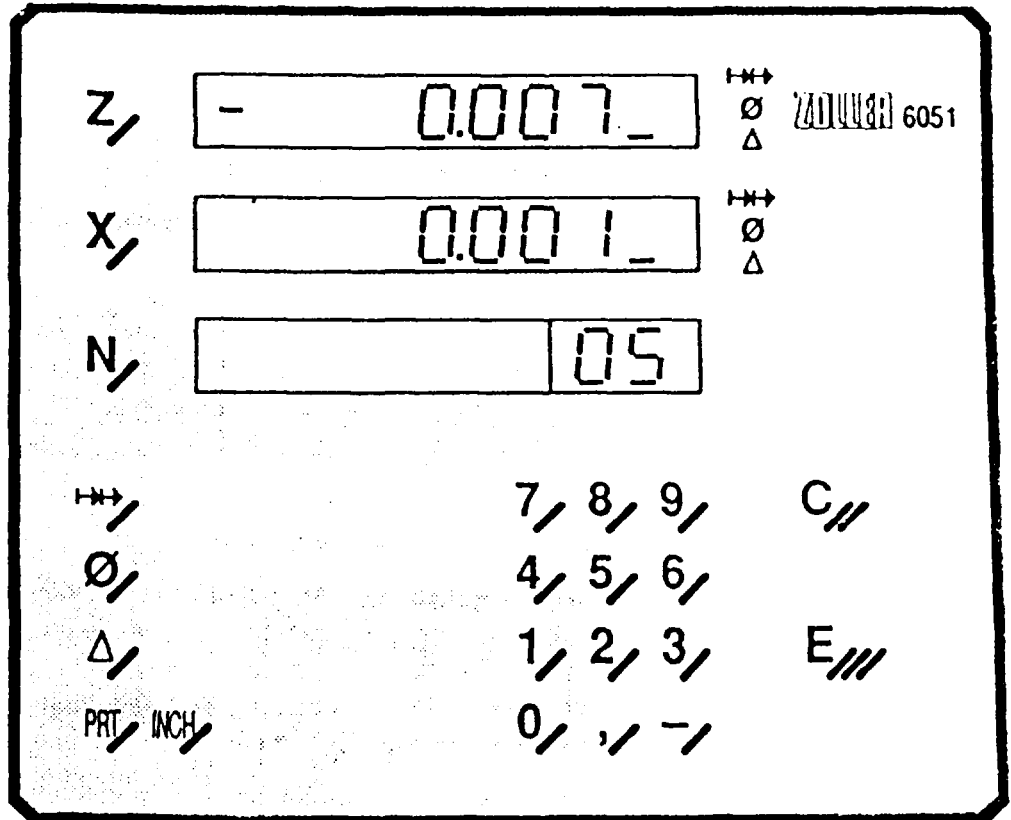
Upon receiving this message, the software is ready to receive the tool data information.

Now make the Zoller presetter ready for operation. The tool data values for two axes are stored in Adapter number N(N=0... N=98). The values stored in a particular adapter number is displayed by selecting the specific adapter number using the front panel membrane key. Upon selecting the adapter number, the measured values for the axis is displayed on the digital display unit. Data output is initiated by pressing the "PRT" Key. When "PRT" Key is pressed, the values corresponding to the current adapter number is sent to the computer. By following the above procedure all the values stored in the corresponding adapter numbers are sent to the computer. Once all the tool data are sent to the computer, then the software running at the computer is terminated by pressing 'ESC' key. Upon pressing the 'ESC' key, the tool data sent from the Zoller presetter, is stored in a file.

Note: Select different filenames for storing tool data for each session.

APPENDIX A

Zoller 6051 Front Panel Diagram



- N zero point selection (99)
setup mode selection through N = 99
- X Z axis selection
- INCH mm / inch changeover
- Δ differential / absolute dimension changeover
- ↔ incremental dimension changeover
- Ø radius / diameter changeover
- PRT starting V24 data transmission
- C reset key for digits and attributes
- E enter key
- 0 ... 9 numerical keyboard

APPENDIX C

Sample Printout of tooldata.log File

#01
Z=+ 180.460 ABS
X=+ 89.021 ABS

#02
Z=+ 180.460 ABS
X=+ 93.571 ABS

#03
Z=+ 180.460 ABS
X=+ 93.571 ABS

#04
Z=+ 180.460 ABS
X=+ 93.571 ABS

#05
Z=+ 180.460 ABS
X=+ 93.571 ABS

#06
Z=+ 180.460 ABS
X=+ 93.571 ABS

#07
Z=+ 181.781 ABS
X=+ 93.573 ABS

#08
Z=+ 182.755 ABS
X=+ 93.576 ABS

#09
Z=+ 183.820 ABS
X=+ 93.578 ABS

CENTRAL MANUFACTURING TECHNOLOGY INSTITUTE

Central Manufacturing Technology Institute is an industry-oriented research and development organisation. It renders technical assistance to machine tool and other engineering industries in :

- Design & development of machine tools, attachments & accessories and control systems
- Research and investigation of machine tool problems
- Standardization of machine tools, machine tool elements and accessories
- Development of tools and tooling
- Manufacturing advisory services in the progressive machining techniques, solution to specific manufacturing problems and selection of manufacturing equipment
- CAD/DAM/CAE/CNC/DNC/FMS services
- Development of computer aided systems, softwares, etc.
- Precision measurement & calibration of measuring equipment
- Computer aided technical information services and publications
Publishes Metalworking Abstracts, bulletins, directories, reports, calculation methods, etc.
- Computer Integrated Manufacturing (CIM)
- Robotics
- Total Quality Management (TQM) services and ISO 9000 Consultancy
- Training programmes in machine tool testing, machining technology, CAD/CAM/CAE/CNC/DNC/FMS, quality systems precision engineering and robotics

For further details please contact.

Central Manufacturing Technology Institute
Tumkur Road, Bangalore 560 022

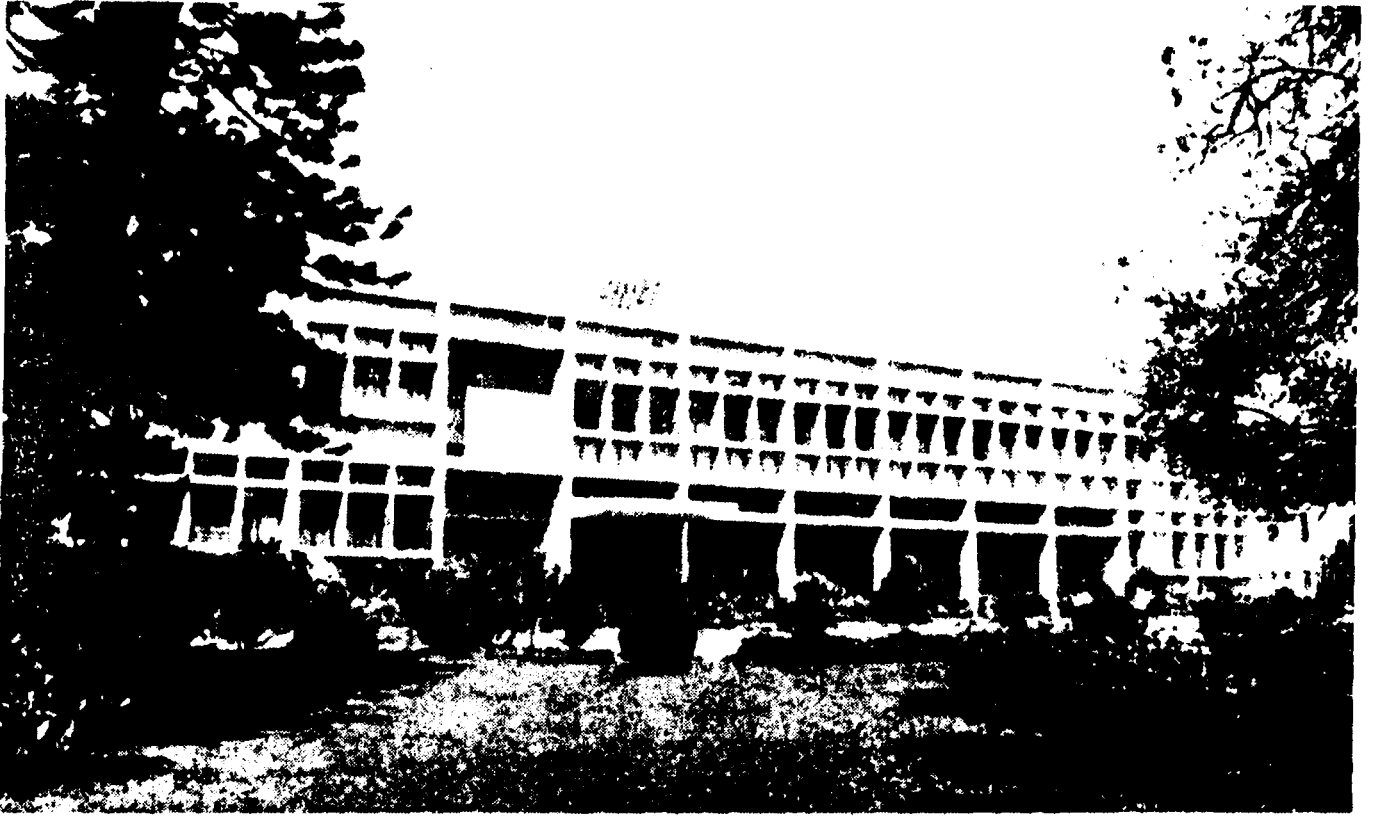
Ph . 337 5081/82/85, 337 4084, 337 5672

Tlx : 0845-2394

Fax : 337 0428

Grams : CEMTOOL

E-Mail : tis@cmti.ernet.in



सेन्ट्रल मैन्युफैक्चरिंग टेक्नोलॉजी इंस्टिट्यूट *cmti*
**CENTRAL MANUFACTURING
TECHNOLOGY INSTITUTE**
Tumkur Road, Bangalore-560 022, India

☎ 3375081, 3373462 Telex: 0845-2394 Fax: 3370428

E-Mail: tis@cmti.ernet.in