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UNIDO PROJECT DG/CPR/91/324

NC Turret

REPORT on FIELD MISSION No. 2

Mr. K.-F. Marwan

External Expert

18. 11. 1994



REPORT on FIELD MISSION No. 2

Mr. K.-F. Marwan - design and manufacturing expert

Overview

- 1 Time schedule
- 2 Organization/coordination of the field mission No. 2 in Yantai
- 3 Discussions
- 4 Lectures at YMTAW
- 5 Acceptance meeting
- 6 Summary



1 TIME SCHEDULE

- 21. 10. Flight Stuttgart - Zürich - Beijing
- 22. 10. Arrival in Beijing
- 23. 10. Flight Beijing - Yantai
- 24. 10. Discussion on the project in Yantai
- 25. 10. Discussion of the project progress with CAD-Group
- 26. 10. Sighting and selection of material for the lecture
- 27. 10. Establishing the time schedule for lectures
- 28. 10. Acceptance meeting
- 29. 10. Excursion
- 30. 10. Day off
- 31. 10. Discussion with CAD-Group and production engineers
- 1. 11. Lecture for designers and production engineers
- 2. 11. Lecture for designers and production engineers
- 3. 11. Discussion of the preceding lectures
- 4. 11. Lecture to selected members of the senior technical staff
- 5. 11. Flight Yantai - Beijing
- 9. 11. Discussion at UNIDO in Beijing
- 10. 11. Return flight Beijing - Zürich - Stuttgart



2 Organization of the field mission No. 2 in Yantai

Arrangement of the accommodation in Yantai and coordination of the external experts activities with the staff of YMTAW was taken care of efficiently by Mr. Lin Bin, Director-Chief Engineer Office.

3 Discussions

3.1 Discussions in Yantai

Persons present:

Mr. Qu Zhong Yi, Vice Director and Chief Engineer

Mr. Lin Bin, Director- Chief Engineer Office.

Mr. Liu Cong Bao, Vice Director, Research Institute

Members of the research, design and production departments

Mr. Marwan, External Expert

Mr. Qu gave a general outline on the progress of the project and on the production of the NC turret. He is quite satisfied with the successful completion of the project.

A discussion was held on the present situation of the machine tool trade on the market in the PR China, which showed that the recent worldwide recession in this field did not spare China either. As at present a recovery of the market in Europe, at least, seems to be on the way, this will hopefully spread to China as well. The measures taken by German machine tool manufacturers in order to cope with the recession, such as rationalisation, new developments and innovations, were discussed at length.

The forthcoming acceptance meeting of the NC turret project DG/CPR/91/324 was discussed as well. The planned lectures were another subject of the discussion. The actual planning of the lectures was done with Mr. Liu.

The precarious situation of the machine tool trade will make the marketing of the new turret rather difficult. Mr. Marwan recommended a thorough testing of the turret under



rough production conditions, best in an independent user's factory. Possible deficiencies, quite normal with new developed products, could thus be discovered and remedied. Mr. Qu quite agreed that this should be done before forcing the sale of the turret. The testing will take some time so that, hopefully, the recovery of the machine tool market will have spread to China by then, and marketing of the new turret should be easier than it would be at the present situation. More detailed discussions on the production and testing of the turret were held with the design team and the production engineers. No serious difficulties were encountered during production and assembly. The testing had not been carried out yet as the equipment supplied by Tianjin University was just being installed to be ready for operation at the acceptance meeting.

3.2 Discussion at UNIDO in Beijing

In this Mr. Nygard and Mr. Marwan agreed that it will not be easy to market the new design turret, particularly at the present situation of the machine tool industry on the domestic market.

Both agreed too, that testing the turret under rough production conditions in a factory should precede the forcing of sale.

In how far one of the objectives of the project, the dissamination of the knowledge and experience gained with the design and manufacture of the turret, will be realised has to be learned in the future.

4 Lectures at YMTAW

The actual planning and final decision on the topics of the lectures was done together with Mr. Liu, Vice Director of the Research Institute. Mr. Marwan brought a number of film pictures for the overhead projector and two video tapes with him for use in the lectures. This material was sighted together with Mr. Liu, a team of production engineers and the turret design team. Suitable, and of interest to the participants, material was compiled.

The lecture was held on two consecutive days to production engineers and designers



on the following subjects:

1st day Modern CNC lathes and machining methods on them, including the application of Y-axis and gear hobbing on a turn-mill center(INDEX).

Feed rates for cutting tools on modern CNC machine tools,
tool life, cutting forces.

Discussion

2nd day Automatic tool changers on CNC machining centers, types of tool changers and principles.

CNC machine tools accessories, dividing heads, tools.

New developments in the field of CNC machine tools e.g. hollow shaft motor as workspindle on CNC lathes, or linear motor (developed by ZFS) used for high speed axis drive instead of servomotor and ball screw (EX-CELL-O).

The same lecture, in a shortened version, was held on a third day to a selected team of senior production engineers and designers.

The lecture was accepted with great interest.

5 Acceptance meeting Unido project dg/cpr/91/324

The acceptance meeting took place in the conference room in the Haigang Road plant under the presidency of Mr. Li Shenggen, Director of Division 2 of CICETE. Speakers of MMI, CICETE, the YMTAW, Universities, UNIDO, the national and international subcontractors gave in short speeches their views and accounts of the project DG/CPR/91/324.

In the opinion of all speakers the successful completion of the project was the merit of the engagement and good cooperation of all parties involved, including the national(Tianjin University) and the international(ZFS) subcontractors.



The external expert, Mr. Marwan of the international subcontractor ZFS/Germany gave a brief review on the project as far as he was concerned with it.

A group of capable and talented designers (trainees) for training and the design of the NC turret was delegated to ZFS in Stuttgart/Germany. After a short introduction period and training on CAD system they worked with great engagement on the turret design under the guidance of the external expert and staff of the IfW (Institute for machine tools) of the University Stuttgart. The task was to design a modern NC turret to the latest state of art. This included hydraulic turret locking and an AC-servomotor for the indexing drive. The advantage of this design is that only one motor is required for the indexing of the turret and the drive of live tools when the appropriate module is added. This design was completed in Stuttgart. The design was altered in Yantai to indexing drive via a hydraulic motor. Thus only stationary (dead) tools can be used on the turret. This design, being more price economic than the original one, is more appropriate for the market in the PR China. One specimen of the turret has been completed and is being tested successfully - the result of good design, production planning and manufacturing.

The turret testing equipment, an important component of the project, designed and made by Tianjin University, has been installed ready for use in the new turret shop. (Testing the accuracy of the gear face coupling, the geometry and rigidity of the turret). This was explained by Prof. Zhang of Tianjin University.

The speaker of UNIDO, Mr. Nygard drew the attention to the future significance of the development of the turret and the dissemination of the experience and knowledge gained, to the country's machine tool industry.

6 Summary

The external expert's first encounter with the UNIDO project DG/CPR/91/324 was the training of four gentlemen from the Yantai Machine Tool Accessory Works at ZSF in Stuttgart/Germany.

From the view of the external expert, Mr. Marwan, the management of YMTAW made an excellent choice by selecting a group of capable and talented designers (trainees)



for training and the design of the NC turret at ZFS in Stuttgart/Germany.

After a short introduction period and training on CAD system they worked with great engagement on the turret design under the guidance of the external expert and staff of the ZFS/ Stuttgart.

The task was, to design an NC turret to the latest state of art, which is hydraulic turret locking and an AC-servomotor for the indexing drive. At the first glance an expensive solution, as a converter is required also. The advantage of this drive, however is, that only one motor is required for the indexing of the turret and the drive of live tools when the appropriate module is added. This design was completed in Stuttgart.

The design was altered in Yantai, however, to indexing drive by a hydraulic motor. Thus only stationary (dead) tools can be used in the turret. This, although not the latest state of art design, being more price economic than the original design, is more appropriate for the market in the PR China.

As expressed in the first Field Mission Report, (page 6, item 4, Summary), all plans of the YMTAW-management could be realised, i.e putting the new turret shop into operation and starting the production of the turret. The new turret shop is in full operation, now. It is a very modern building, with adequate modern electric power supply and underfloor chip disposal with a magnetic scraper type chip conveyor.

One specimen of the turret has been completed and is being tested successfully - as result of good design, production planning and manufacturing. The turret testing equipment, designed and made by Tianjin University, has been installed, ready for use. (Testing the accuracy of the gear face coupling, the geometry and rigidity of the turret). Modern equipment has been installed as well - 11 NC- CNC machine tools, - essential measures to ensure the manufacture of a quality product.

Now the next challenge is the marketing of the turret. This might prove not to be an easy task if the situation of the machine tool trade on the domestic market does not improve.

My recommendation is to carry out functional and reliability tests with more than one turret under rough production conditions in a user workshop. This gives the possibility to detect any shortcomings of the turret and to remedy them before starting sales.

ZENTRUM FERTIGUNGSTECHNIK STUTTGART

STIFTUNG DES ÖFFENTLICHEN RECHTS



On this point Mr. Qu, Vice Director of YMTAW and Chief designer, agreed. Mr. Lin Bin, Director Chief engineer Office, will arrange that two turrets are tested as suggested.

The result of the Field Mission No. 2 is the successful conclusion of the UNIDO project DG/CPR/91/324. and the assurance that YMTAW will be successful in manufacturing and marketing the new turret, be it with some hard work at the beginning.

I am quite confident that they will master this task.

Karl-F. Marwan

Wernau 18. 11. 1994