


**ENHANCEMENT OF THE PRODUCT DESIGN AND DEVELOPMENT  
ACTIVITIES BY APPLYING THE VE-TECHNIQUES AND  
ENERGIZING THE VALUE METHODOLOGY  
- A SUCCESS STORY ACHIEVED IN CHINA -**

**Dipl. rer. oec. Axel Peter Ried**  
President

 *Ried Management Methods International Technical Consultants*  
*Headquarters Hamburg, Germany*



Axel Peter Ried studied in Germany, Switzerland and the U.S.A. He obtained a Masters Degree in Business Administration and Applied Psychology. He also holds a Masters Degree of Machine Engineering.

During his early career, he worked as a Director of the Berlitz School of Chicago and as an Assistant VP of the Singer Corporation N.Y. In 1962, he started his technical consulting company, RMM-Ried Management Methods. In 1989, he founded a design and engineering company, Berner + Ried GmbH.

Mr. Ried has introduced Value Management, Value Analysis and Engineering in Germany starting in 1961. He has applied VM/VA/VE in several hundred companies of all branches of industry.

During the past 35 years, RMM has trained about 350.000 managers in VM/VA/VE, and coordinated about 5.000 project teams. Besides VM/VA/VE, Mr. Ried also is an expert in TQM.

Mr. Ried has written 15 books on various subjects and has presented numerous papers at international Value Management Conventions in Europe, the US, Japan, India and Singapore.

**ABSTRACT**

This paper presents a very challenging and comprehensive program to enhance the product design and development capabilities of SMTCL – Shenyang Machine Tool Corp. Ltd., the second largest machine tool maker of China.

**New Machine Tool Program**

The job which had to be achieved, was the development of seven different machine tool programs by enhancing the product design capabilities of SMTCL at the same time. It took only 25 months to complete successfully this pilot project of the World Bank.

All seven new machine programs were presented Oct. 99 at the Chinese International Machine Tool Show (CIMT) in Beijing.

**Energizing the Value Methodology**

Energizing the Value Methodology by intensive training and consequent application made it possible to achieve all targets within a very short period of time. All techniques of VE used will be explained. And also the solutions to overcome difficulties and cultural problems will be presented.

As the products of SMTCL will be sold in different key markets around the globe, world wide Value Engineering activities had to be organized and performed.

The Top Management Group of SMTCL as well as the Government of the Shenyang Municipality gave tremendous support to energize the Value Methodology.

**The Beginning**

In June 1995 we received a request from SMTCL – Shenyang Machine Tool Corporation Ltd., if we would be willing to enhance the product design capabilities of SMTCL. This project was part of a greater World Bank Project to substantially improve the industrial community of the City of Shenyang.

The specific and very sophisticated targets of this World Bank financed project were to enhance the product design capabilities of SMTCL in a way, that this company and its engineers would be able to design and develop highly sophisticated and very competitive machine tools of different kind on their own.

In August 1995 we paid a first visit to SMTCL in Shenyang to find out about the present situation and to define at which level the engineering knowledge of the engineers was.

The analysis of the findings basically told us that a technical and methodological gap of approximately 8-10 years had to be mastered. And that also almost no knowledge was available in the use of CAD.

**The Program**

Based on the information gathered and the evaluation results of our technological and knowledge level evaluations, we then designed a very well organized specific training and implementation program for SMTCL.

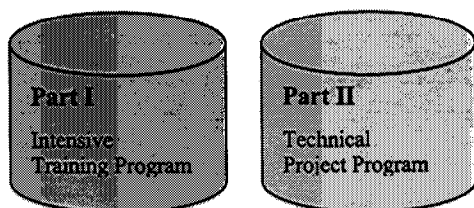
In order to really achieve the targets of this program:

“To enhance the design and development capabilities of SMTCL”

we decided to organize and structure this program by especially integrating and applying the VE Techniques and energizing the Value Methodology as we think that the VE approach supplies an excellent basis to achieve the program’s target.

Basically the program structure was as follows:

**Picture 1**



To make sure that SMTCL would not only receive a theoretical training, but would also learn at the same time how to implement the learned knowledge. The program included the design and development of 7 new machine tool programs:

- Horizontal Machining Centers
- Vertical Machining Centers
- Horizontal Turning Lathes
- Vertical Turning Lathes
- Special Piston Turning Lathes
- Round Table Machines
- Mass Centering Machines for Crankshafts

Of course, all machine programs should represent the highest possible technical features and application compared to U.S.-, European and Japanese machine tool makers.

After two years of rather tough and very intensive negotiations we finally signed the contract with SMTCL in July 97.

All seven new machines as part of the contract were planned to be presented at the CIMTS – Chinese International Machine Tool Show in Beijing in October 1999. So we actually had to achieve two very challenging goals for the World Bank, for the customer SMTCL and – last not least – for us:

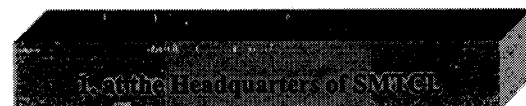
1. to enhance the product design and development capabilities of SMTCL’s engineers
2. to design and develop a very complex program of seven highly sophisticated and most modern machine tools at the same time.

**The Training**

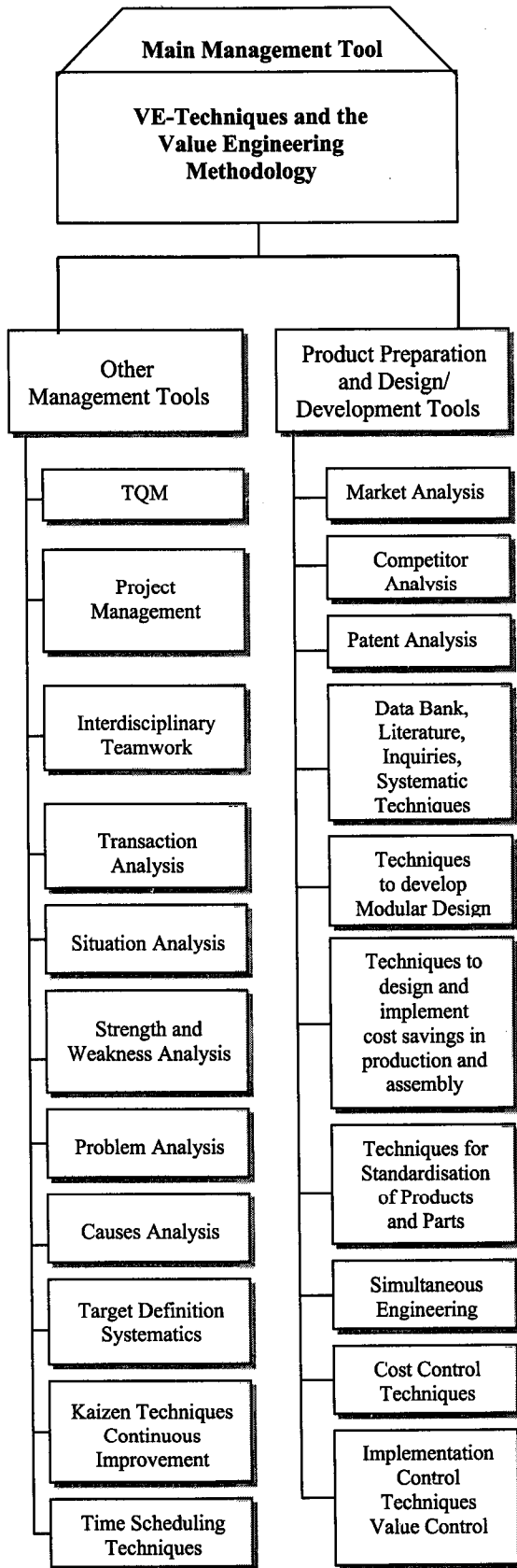
In close cooperation with SMTCL we decided to train a group of the most qualified 20 young engineers of SMTCL. This group was carefully selected out of 2000 engineers.

The training started in late August 97 and took place in two locations:

**Picture 2:**



2. at our offices in Germany



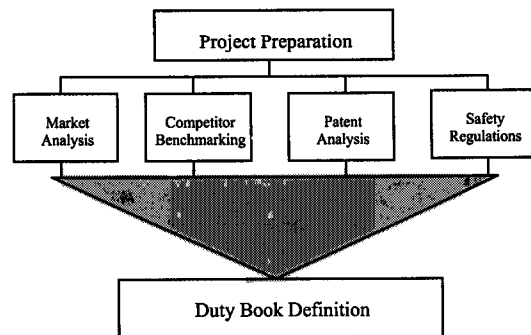
As already mentioned earlier, we selected the Value Engineering, Value Analysis and Value Management Techniques and the VE Methodology as the key instrument to fully achieve the sophisticated program targets. Of course, we also had to supply intensive training and consulting in many other Management Tools.

This very complex and comprehensive Training Program was conducted in China by two senior consultants of the Ried Management staff. It lasted 6 weeks and was completed in early October 97 including intensive knowledge and apprehension tests, on which basis the group of the 30 top engineers of SMTCL received their certificates.

**Product Design and Development Preparation**

Parallel to the above described Training Program world wide activities to prepare the Product Design and Development of the seven machines were carried out by the Management Methods Organization.

Picture 4:



These activities covered all future key markets for the SMTCL products such as

- North America (USA and Canada)
- Europe
- China

## Duty Book

Based on the tremendous amount of information gathered by these analysis actions the Duty Books of the new seven machine tool programs were cooperatively defined by 德意志 Ried Management Methods and SMTCL.

Each of the Duty Books included the following chapters:

1. Basic product requirements
  - 1.1 Primary functions
  - 1.2. Unique Selling Points (USPs)
2. Main customers in the key markets
3. Installation of the machines
4. Basic machine structure
5. Handling and comfort for operators
6. Machine appearance
7. Options for different applications
8. Control system requirements
9. Maintenance concept
10. Safety criteria
11. Required floor space
12. Packaging and shipping
13. Life Cycle Cost
14. Instruction manual
15. Market distribution price
16. Warranty

The Duty Books were approved middle of October 97 by 德意志 Ried Management Methods and the top Management Group of SMTCL in Shenyang, China.

## Project Management and Implementation – Design and Development Phase in Germany

After the approval of the Duty Books and the completion of the Training Program in China, the 30 top engineers of SMTCL were moved to our office location in Germany by the end of October 97.

The 30 engineers were assigned to the seven machine tools, i.e. seven Product Teams were constituted.

The application training of the techniques learned was performed by four members of our staff and was structured in two main milestones.

### Milestone 1

Development of concept ideas for the seven machines and concept decisions  
(November – December 97)

### Milestone 2

Design and engineering of all main function groups of the seven machines including cost calculation, manufacturing, assembly and testing techniques selection.

(January – April 97)

During the performance of these milestones the Value Engineering Techniques were continuously trained and applied systematically.

A lot of emphasis was spent to make the SMTCL engineers fully understand the Value Methodology. This was quite a challenge.

Also it was not so easy to generate their creative potentials as well as the desire and the clear will to really design and develop machine tools in a way that these would be absolutely competitive.

A lot of energy, motivation and positive thinking had to be created and permanently to be kept up. This required of course intensive and comprehensive training and skills on our side.

The enhancement of the product design and development capabilities of SMTCL's engineers also included

- ◆ CAD Application Training
- ◆ Know How Transfer
- ◆ Training in concentrated work during long hours
- ◆ the creation of competitive thinking
- ◆ the overcoming of cultural and emotional road blocks

### Milestone 1

was achieved on time December 22.99 and was approved by SMTCL's Top Management Group during a special meeting in Germany.

### Milestone 2

was also achieved on time by the end of April 98 and also approved by the top management group of SMTCL during a meeting in our offices in Germany.

**Project Management and Implementation Control in China**

End of April 98 the group of the 30 SMTCL engineers returned to China in order to complete the detail design work in Shenyang.

Starting in June 98 two of our expert senior consultants assisted and coached the detail design work of SMTCL's engineers by having a monthly one-week-meeting in Shenyang.

Many difficulties had to be solved and many ideas had to be generated and put into effect during this phase.

But due to the great engagement of the client's engineers and ourselves also this phase was successfully completed on time in September 98.

After the approval meeting of this detail design work phase, the implementation control performed by us was continued and included from now on:

- the manufacturing phase
- the coordination of the purchasing activities of parts and subunits
- the assembly phase
- the prototype completion phase
- the testing phase

Coaching meetings took place one week every six weeks and were performed by our two expert senior consultants.

Again many problems came up, as usual in any machine tool making company in the world. Especially suppliers of key elements and subunits created many headaches. But fortunately we were always able to offer solutions and to meet these extreme challenges successfully by energizing the Value Methodology continuously.

**Project Targets completely achieved**

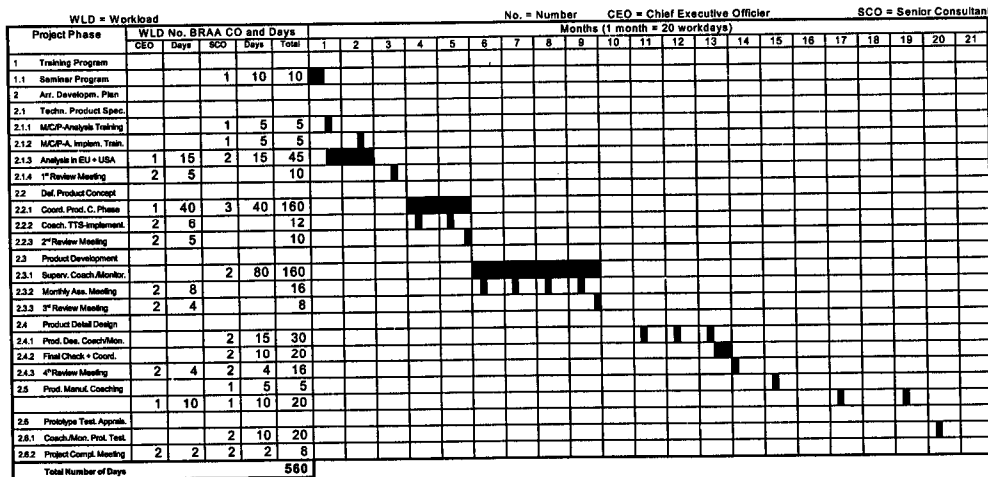
Due also to the consequent application of the VE-Techniques the Project Targets

- to enhance the product design and development capabilities of SMTCL
- and to present the seven new and very competitive machine tool programs during the CIMT Fair in October 1999 in Beijing.

were completely achieved exactly on time.

Picture 5:

**TIME SCHEDULE**



The success at the Fair was very good. The seven new machines were published in the actual Fair newspapers as the most innovative machines presented at this very important international machine tool show.

SMTCL is now to be considered as the most advanced Chinese machine tool manufacturer, which offers a most modern and competitive machine tool program to customers around the world.

### **Special Challenges of this Project**

During the completion of this World Bank Project, which was kind of a pilot program, some very special challenges had to be met:

- the conference and working language was English, but still many language interpretation and understanding problems came up,
- cultural differences had to be identified, understood and considered all the time,
- a gap of approximately 8-10 years of technical knowledge in all areas had to be filled,
- and trust between each other had to be created and continuously be kept up – all the time.

Trust between the partners of this project, the consultants and the client definitely is the key to the outstanding success of this project, which has a great importance for the Shenyang Industrial Community and saves many, many jobs.

At this point we want to express our thanks to the World Bank which always gave tremendous support, furthermore to SMTCL's top management and the 30 engineers who always gave their best to perform this important and significant project successfully.