船舶修造英语

ENGLISH FOR SHIP BUILDING AND REPAIR

附光盘1张

王占礼　陈朝霞　主　编
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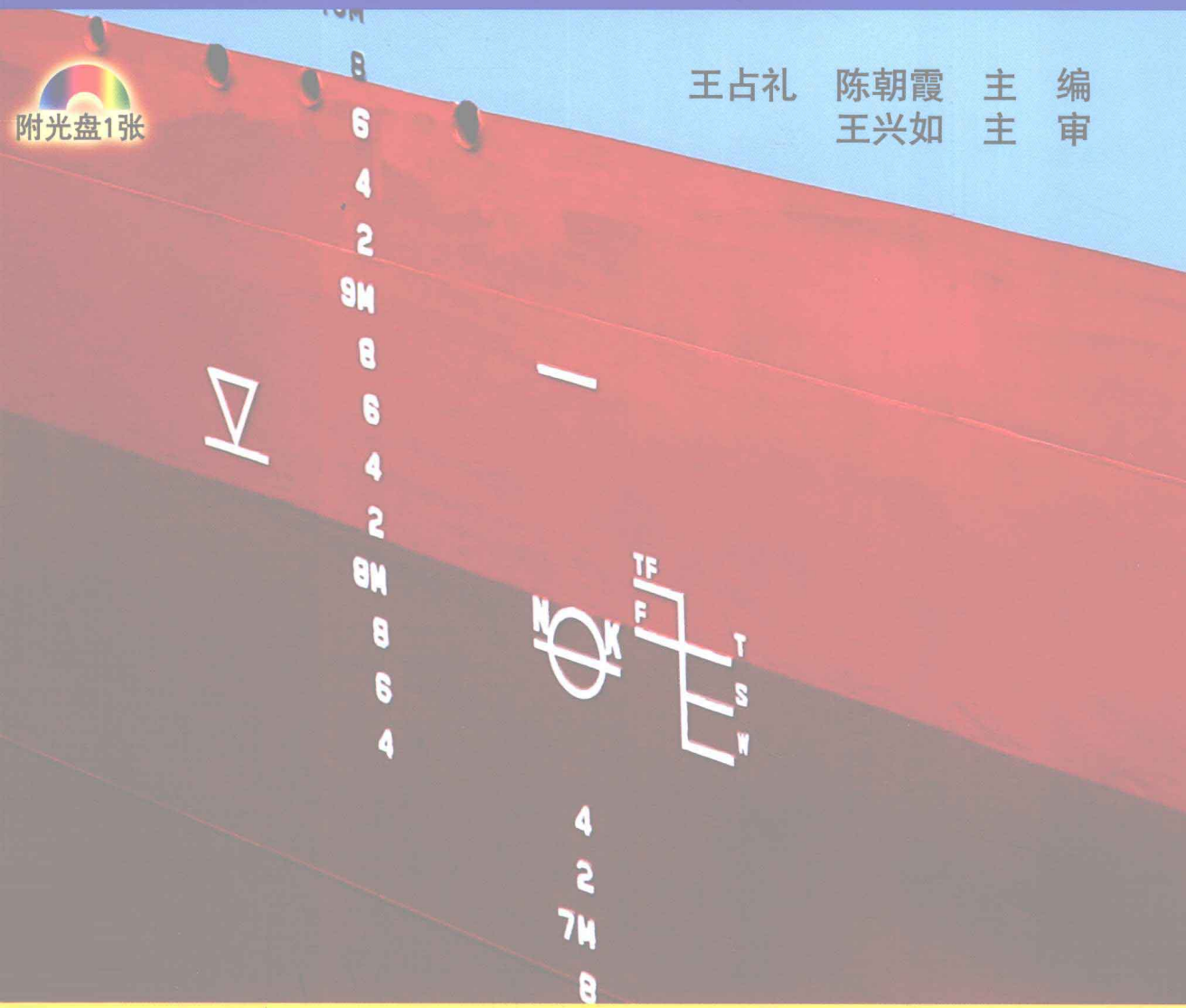

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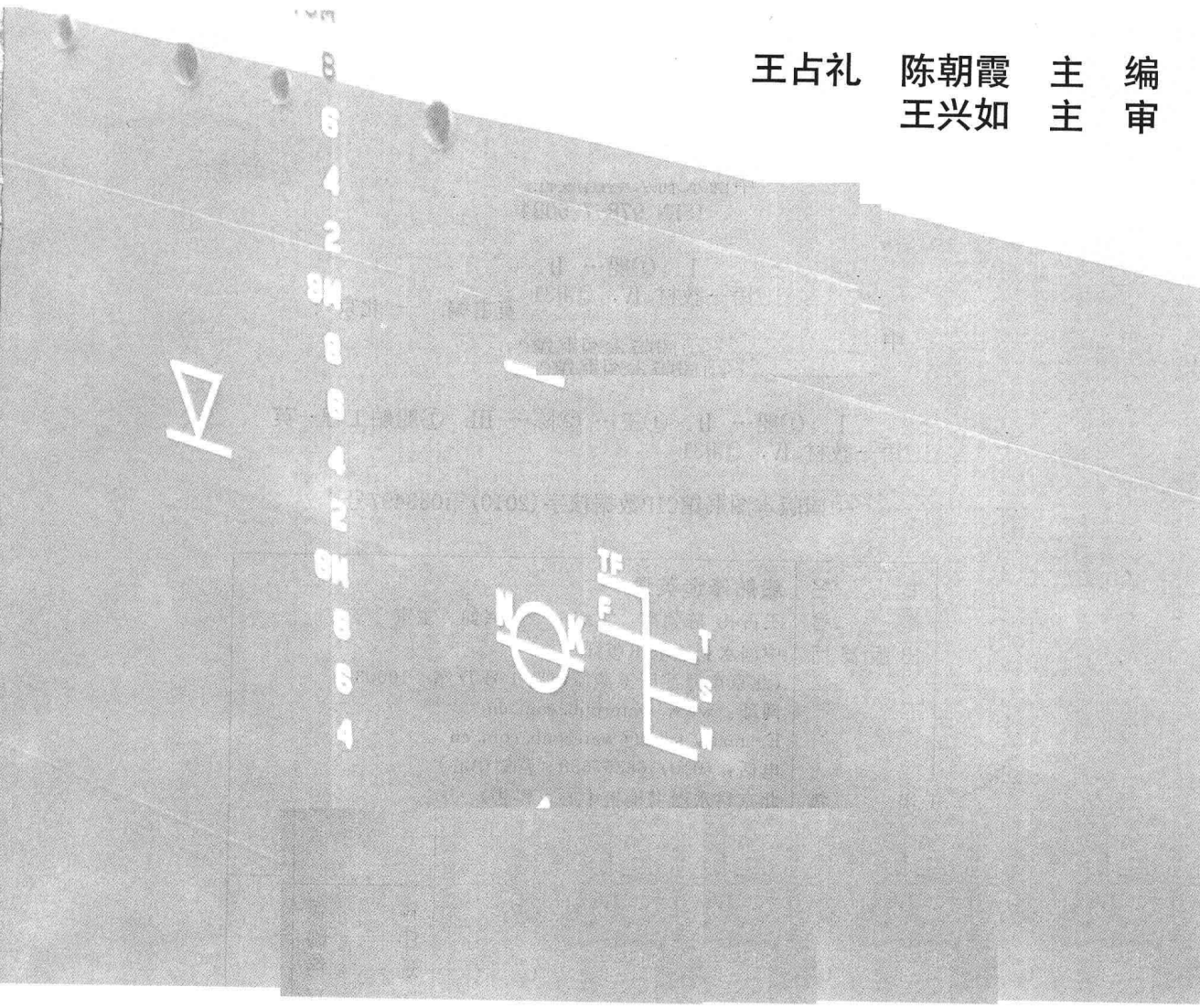

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内 容 提 要

本书是为船舶工程技术专业编写的专业英语教材，也可供修船业内从事生产、管理的技术人员英语培训使用。全书由船舶建造管理、船舶设计、船体结构、船机原理及构造、修船技术规范和修造船常用语组成。读者可以通过学习本书，熟练掌握常用修造船英语术语和句式，并有助于提高修造船业务能力，以熟练地进行船舶修造业务方面的英语交流。

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前　言

本书是在《船舶修理英语》的基础上修订而成。该书遵循了《船舶修理英语》的编写体例，且直接选用了该书的部分内容，在此对《船舶修理英语》编写组全体人员表示诚挚的感谢。

《船舶修造英语》是根据青岛远洋船员学院船舶工程技术专业教学大纲的要求，并结合中远船务工程集团有限公司船舶修造工作实际而编写的专业英语阅读教材。全书对船舶建造管理、船舶设计、船体结构、船机原理及构造、修船技术规范等进行了介绍，并附有完工单、船舶常用警示标志和修造船常用用语。

本书力求兼顾课堂教学之系统性与企业培训之实用性。每课选材典型，覆盖面广。但限于篇幅，有些内容无法纳入课文部分，则以阅读材料辅之；课文和阅读材料都未涵盖，而又在修造船过程中经常使用的，则在附录的“常用词汇和短语”中列出；练习部分不仅可以强化所学内容，也是对课文内容的补充和延伸。

书中术语翻译以国标为准，如国标未列入，则参照中远船务工程集团有限责任公司企业标准。为方便读者，有些术语采用了括号内加注“行话”处理。如，gasket 垫圈（床垫）。有些术语实在查不到现成翻译，笔者斗胆硬译了出来，如：snap connector，译为：快动接头。不当之处敬请方家斧正！

本书定位于中级及以上英语水平读者。建议船舶修造专业英语的初学者先学习本书前两部分：“船体”和“船机”，积累一定量的专业词汇后，再学习“船舶修理规范”；而对于工作繁忙的船厂读者，建议直接学习船舶修理规范部分。

本书由王占礼、陈朝霞主编，吴万千、刘宁、江园、张光波、陈蓓、姜向东、王春、刘蓓、涂志平、丁鑫及中国海洋大学于胜轮机长参加了本书部分章节编写工作。全书由青岛远洋船员学院王占礼副教授统稿，承蒙中远船

务工程集团有限公司总经理王兴如审核了全书。

本书在编写过程中得到了很多业内专家的指导和帮助。特别感谢张铎副教授、崔向东副教授、刘运新副教授、何昌伟副教授、卢永然老师、郑振豪老师、于永妍老师审阅了本书初稿。感谢郑振豪、张延涛两位老师对本书编写提出了宝贵建议。感谢本书的责任编辑徐丽娟女士及中国水利水电出版社相关人员对本书出版所给予的帮助。中远船务工程集团有限公司为本书提供了大量资料，并在修船业务上给予了指导，在此谨表谢意。

青岛远洋船员学院周明顺副院长始终对本书的编写给予关怀和支持，机电系主任赵晓玲副教授给予了大力帮助，谨表敬意和谢忱。

由于教材内容广泛，编者水平所限，不当之处在所难免，敬请读者批评指正！

《船舶修造英语》编写组

2010年1月

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Lesson 1 Realization of CIM Based on Systematization of Production Department

基于生产系统化的 CIM 模式

Text

Introduction

The increase in the rate of older employees and their wages in shipbuilding industry, as in the other industries, has accelerated the promotion of automation and computerized production system. In general, however, most of the works in shipbuilding fields are still resorted to manpower. It is, therefore, mandatory to build up a comprehensive production system taking due account of the work related to human system as well as the efficiency of each equipment.

The MHI Shipbuilding Division has developed and put into practical use, prior to the Production Department, the MARINE(Mitsubishi Advanced Real-time Initial design & Engineering System) and MATES(Mitsubishi Advanced Total Engineering System of Ships) design systems, taking into consideration the supply of information not only to the Design Department but also to the Production Department. Further, the Division has successfully developed and put into practice a production support system, aiming mainly at the improvement of control works in Production Department and the supply of accurate information to automated facilities.

With the adoption of the production support system as the foundation for field operation, and the introduction of automated facilities, the information from design to production has been integrated, thus realizing the MHI's shipbuilding CIM. This paper describes the outline of the shipbuilding CIM, focusing on the systemization of the Production Department.

Overall view of CIM

The shipbuilding CIM configuration is given in Fig.1.1. The shipbuilding CIM is composed of the initial design and engineering system MARINE used at the upstream, the total engineering system of ships, MATES, and the production support system to support the production works.

MARINE, an integrated CAE (Computer Aided Engineering) system to support the initial design, came under development project in 1984, and was put to practical use in 1986. The system was developed with a view to intensifying the capacity in ship dealings, improving the technical power, reducing the cost, and devising the reserve power of development.

MATES, a design CAD system covering a wide range from basic design and detail design to production design, works as nucleus of the shipbuilding CIM. Development on MATES started in

1983, and its application to actual ship started in 1986. Equipped with a high-degree design support function, the system greatly contributes to improving the design efficiency and shortening the design term.

The production support system, developed after an elapse of three years, has been put to full operation since 1996, supporting the Production Department in the fields of production control and parts control in different stages such as working, assembly, erection, outfitting and delivery. Further, the system is also used for supplying operation date to automated facilities such as robots, etc. and for collecting the operational records.

The shipbuilding CIM has been built up and put into practical use through a long-term development process based on aforesaid conceptions, with its application to actual ships widened, and its link with other systems enlarged to realize the commutation and integration of information.

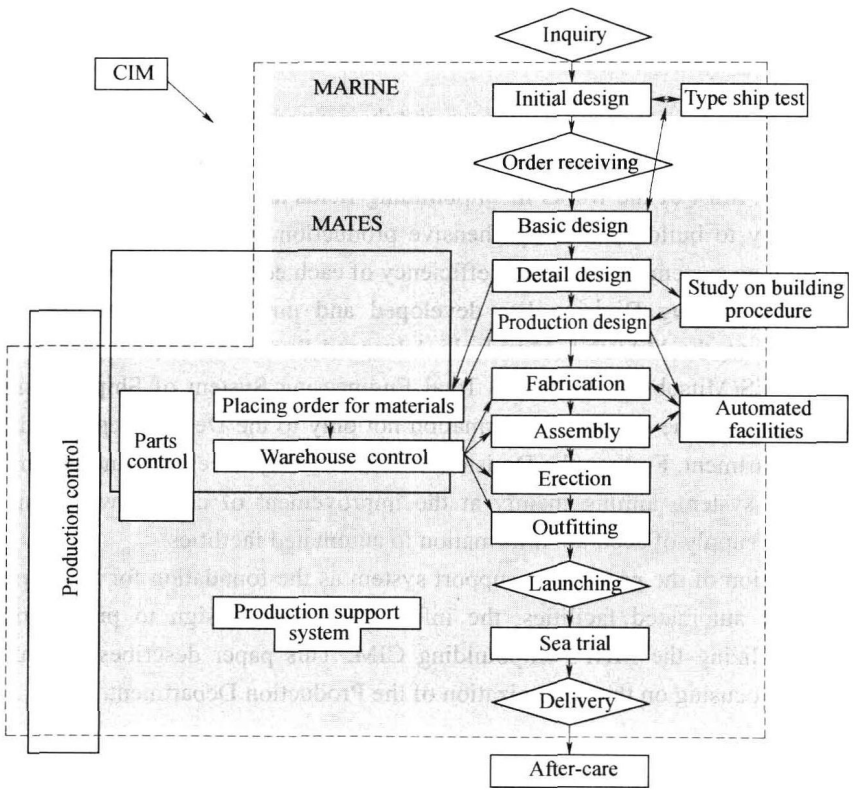

Fig.1.1 Systems coverage of CIM

Features of design systems

1. Features of MARINE

This system enables optimization of design under given conditions by creating the desired ship model on the basis of type ship, and promptly repeating various performance calculations, and has the features given below.

- Study of effective design due to powerful GUI(Graphic User Interface)

- Visual check and evaluation of input data and calculation results
- Groups of substantial programs to support the evaluation of lines/performance
- Smooth system operation due to various data base control functions

2. Features of MATES

A nucleus of CAD system to support basic design, detail design and production design, MATES is composed of hull system and outfitting system. The system particularly features in its functions to meet flexibly with diversified alterations due to trial and error in addition to the basic functions of an ordinary CAD.

The system also includes the distinctive functions given below.

- Various CAE functions to realize efficient design
- Substantial correcting function for diversion design
- Automatic processing function for parts making etc. in production design stage
- Data check and automatic set functions including design know-how

Furthermore, the design systems supply the material amount for production control like welding length, weight, etc., the three-dimensional structural data required for operating the automated facilities in production site, and working data to the production support system at the downstream.

Functions and features of production support system

The unique production support system, newly developed by making use of the design data of MATES, has actually been put into practical use in Production Department, contributing drastically to the improvement in the efficiency of production management. The newly developed system extends a wide support ranging from initial production planning to detailed production control tasks: mainly the precise tasks per work type and per facility controlled by a foreman, promotes integration of production information, and is equipped with various automated functions to support the optimization of production planning. The system is developed particularly with a view to implementation of target control for task group or individual.

The design data such as welding length is fed into this system to get processed into material amounts required for production control before being used for calculating the number of man-hour or leveling the process. Detailed design data is essential to improve precision target control. Further, the design data is also used for preparing the action data and processing data to operate the NC cutting machine, automated pipe assembly factory, high-precision assembly system, and automated facilities such as sub-assembly and welding robots, etc.

In production control, the production schedule mesh gets successively fragmented from manager or managing staff to foremen and workers, whereas the production record is subjected inversely to proceeding control as the whole factory by integrating the data obtained by the foremen.

Described below are the representative systems to support the aforesaid tasks.

- Long-term scheduling system
- Mid-term scheduling system

- Detail scheduling/Production control system

1. Functions and features of long-term scheduling system

This system has been developed for the manager or the staff in Production Planning Department.

The long-term scheduling calls for making plans several years ahead when the design is not yet completed. This system sums up the long-stored records regarding work types and machines, and is equipped with the following functions required for effective scheduling on the basis of parameters obtained through regression analysis.

- Scheduling function
- Personnel planning function
- Register function of sum

2. Functions and features of mid-term scheduling system

This system, developed for the manager or the staff in Production Planning Department, is a support system for production control work involving adjustment of concrete production process some 3 to 4 months ahead based on the basic schedules made during long-term scheduling.

The system makes use of the design information such as welding length, obtained through MATES in making process adjustment, and carries out schedule adjustment by evaluating the work load, and is equipped with various functions befitting with the different scheduling methods such as optimization through simulation, etc. regarding the process adjustment and conveyor tact scheduling while making schedules for disposition places.

The mid-term scheduling system carries out various functions given below in accordance with the production control workflow, contributing to effective execution of work in each process.

Words

mandatory	['mændətəri]	*a.*	强制性的，强迫的
aforesaid	[ə'fɔ:sed]	*a.*	上述的，前述的（常用于法律文件）
commutation	[ˌkɔmju(:)'teiʃən]	*n.*	交换
optimization	[ˌɔptimai'zeiʃən]	*n.*	优化
drastically	['dræstikəli]	*ad.*	激烈地，彻底地
implementation	[ˌimplimen'teiʃən]	*n.*	贯彻，执行
level	['lev(ə)l]	*vt.*	使平（坦），变平
mesh	[meʃ]	*n.*	网状物
befit	[bi'fit]	*vt.*	适合于（某人），合适
execution	[ˌeksi'kju:ʃən]	*n.*	实行，完成
diversified	[dai'və:sifaid]	*a.*	多变化的，各种的

Phrases and Expressions

trial and error　　试错法，试凑法

regression analysis 回归分析

Abbreviations

MHI: Mitsubishi Heavy Industries, Ltd	三菱重工
MARINE: Mitsubishi Advanced Real-time Initial Design & Engineering System	三菱高级实时初始设计和工程系统
MATES: Mitsubishi Advanced Total Engineering System of Ships	三菱高级整体船舶工程系统
CIM: Computer Integrated Manufacturing	计算机集成制造
GUI: Graphic User Interface	图形用户界面

Exercises

Ⅰ. Reading Comprehension

1. Answer the following questions according to the text.

1) What led to the application of automation and computerized production system in shipbuilding industry?

2) What should be taken into account in a comprehensive production system of shipbuilding industry?

3) What works as a nucleus of the shipbuilding CIM?

4) What is MATES composed of?

5) What are the functions of the production support system?

6) What are the features of the production support system?

7) What are the representative production support systems?

8) What are the differences between long-term scheduling system and mid-term scheduling system?

9) What are the features of long-term scheduling system?

10) How does the mid-term scheduling system operate?

2. Choose the best answer to complete the following sentences according to the text.

1) According to the article, the shipbuilding CIM is made up of _____.

A. MARINE and MATES

B. MATES

C. MARINE, MATES and the production support system

D. MATES and the production support system

2) MARINE _____.

A. was put to practical use in 1984

B. is a total engineering system of ships

C. was developed in order to improve the technical power, etc.

D. is an integrated CAD system

3) The production support system supports the Production Department in the fields of

production control and parts control in different stages such as _____.

A. working, assembly, erection, outfitting and delivery

B. assembly, delivery

C. working, erection and assembly

D. outfitting

4) _____are regarded as the features of MARINE.

①Study of effective design;

②Visual check and evaluation of input data and calculation results;

③Groups of substantial programs to support the evaluation of lines/performance;

④Smooth system operation

A. ①④ B. ①②③④ C. ②③ D. ①③④

5) MATES _____.

A. is a design CAE system

B. has various CAD functions to realize efficient design

C. is equipped with a high-degree production support function

D. supplies the two-dimensional structural data required for operating the automated facilities in production site

6) The production system _____.

A. makes use of the design data of MARINE

B. contributes to the improvement in the efficiency of design department

C. extends a wide support ranging form initial production planning to detailed production control tasks

D. can transfer design data to MATES

7) The long-term scheduling system has the following functions except _____.

A. data check and automatic set

B. scheduling

C. personnel planning

D. register function of sum

8) General schedule adjusting function _____.

A. supports the erection schedule planning

B. carries out simultaneous planning

C. supports in making schedule adjustment for several ships per building or per equipment in the building for several months

D. allows automatic formation of standard schedules for the preceding assembly and working processes on the basis of the building block erection day

9) Which of the following is NOT true concerning staff and foreman support system?

A. Work instruction sheet is issued indicating the three-dimensional model diagram of the hull block.

B. The work records are fed into the production control server machine through the in-company LAN, and stored there to be used for data analysis etc..

C. This enables the workers to do their jobs effectively without having to consult the complicated drawings.

D. The information regarding any alterations in process proceedings in the shipbuilding yard is transmitted smoothly.

Ⅱ. Word study

1. Complete the sentences with the words and phrases given below in their proper forms.

dynamic optimization fragment server simulation

1) The _____ result can be intuitively demonstrated by VR technique.

2) Plant layouts shall _____ material travel, handling and value-added use of floor space, and shall facilitate synchronous material flow.

3) An unprecedented cooperation is developing among nations so that earth scientists will no longer look at our planet in the old, _____ way.

4) The user constructs a sentence from a _____ series of choices that always guarantees a valid result.

5) You restart the application, or sometimes the whole computer, only to find that the application lost your e-mail and, when you interrogate the _____ , you find that it has also erased your mail because the mail was already handed over to your application.

2. Match the following words with their explanations.

execution	a network; net
mesh	exchange
commutation	the action of carrying out sth.
interface	the use of regression to make quantitative predictions of one variablefrom the values of another
regression analysis	a program that controls a display for the user (usually on a computer monitor) and that allows the user to interact with the system

Ⅲ. Translation

1. Translate the following paragraph into Chinese.

Ship production is a complicated and complex process. An effective and efficient production management system for a shipyard should serve the following objectives:

- To provide a consistent work approach to utilize the learning process.
- To increase the productivity by integrating engineering and planning functions early on in the design process.
- To provide clear and concise requirements to demand planning (i.e. material, engineering and production departments) driven by ship production program.
- To provide an accurate, rational and concise analysis of project status to update and correct the production program. Furthermore, to provide straightforward impact analysis and rescheduling as deviations from the initial program occur.
- To provide tools for credible shop floor management which reflect the production strategy,

and to provide proper feedback and monitor progress and performance.

2. Translate the following paragraph into English.

CIMS 是英文 Computer Integrated Manufacturing Systems 的缩写，意思是计算机集成制造系统。计算机集成制造——CIM 的概念最早是由美国学者哈林顿博士于 1973 年提出。经过 30 多年工业化实践，现代 CIMS 以“公用数据和相关信息”为“核心”改为了以“顾客”为“核心”，实现人、技术和组织的集成，即借助于计算机硬件和软件，综合应用现代管理技术、制造技术、信息技术、自动化技术和系统工程技术等多种学科和技术，将企业全部生产过程中有关人、技术、经营管理、机器设备及其物流和信息有机地集成起来，实现整体优化。

Supplementary Reading

2.1 Erection schedule planning function

This is a function to support the erection schedule planning for the erection block of ship in dock. The erection sequence differs according to the ship, but there exists a standard schedule depending on the type of the ship, ship model, size, etc.. Systematization of these items has enabled automation and contributed to improving the efficiency of each work.

2.2 Scheduling and layout planning function

This is a function of carrying out simultaneous planning for schedule adjustment and block layout in grand assembly area around the building dock, with the adaptability between schedule and place constantly maintained through interference check function in order to prevent block overlap.

2.3 General schedule adjusting function

This function allows automatic formation of standard schedules for the preceding assembly and working processes on the basis of the building block erection day. The standard schedules are prepared, taking into consideration the block shape and assembly method, to ensure adaptability of all processes needed for one unit of block. The schedule adjustment is carried out while evaluating the workload, and the schedule thus fixed is used for determining the design drawing submitting day or material purchase day.

The material amount, indispensable to schedule adjustment, is automatically supplied from MATES in required units to respective processes. Precisely, the applicable material amounts are: individual welding length, number of pipes, quantity of hull and outfitting parts, painting area, weight, etc..

Since it is possible to refer to the work records and proceeding information, stored in detail schedule/production control system at the downstream, the adjustment can be made while observing the record.

2.4 Mid-term scheduling function

This function supports in making schedule adjustment for several ships per building or per equipment in the building for several months, allowing load adjustment of the concerned process while referring to the sum of the concerned building or equipment.