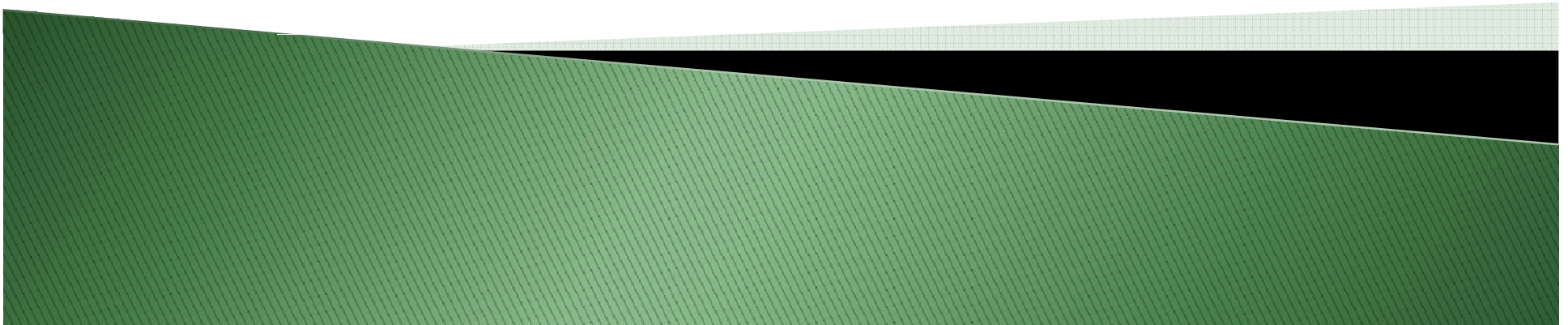


Engineering Education Accreditation in China

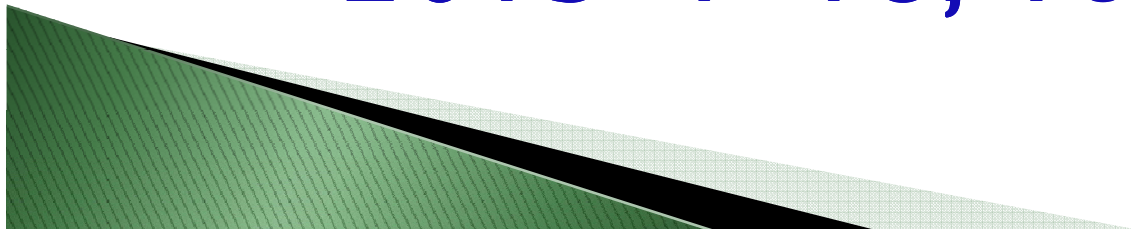


- ▶ **ENGINEERING EDUCATION
ACCREDITATION
IN CHINA**

- ▶ **Yu Shouwen**

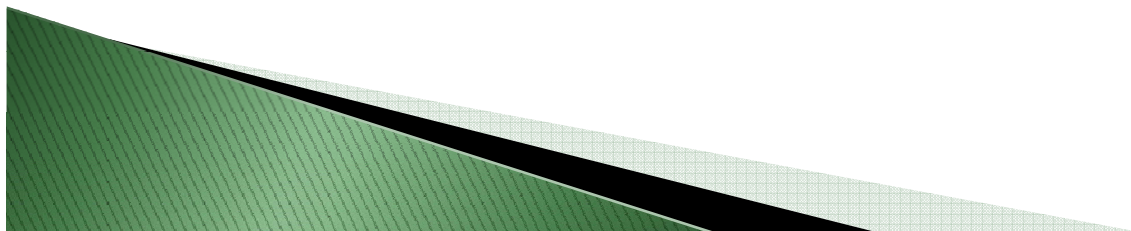
- ▶ **CAST, CEEAA,**

- ▶ **2013-1-18, Tokyo, Japan**

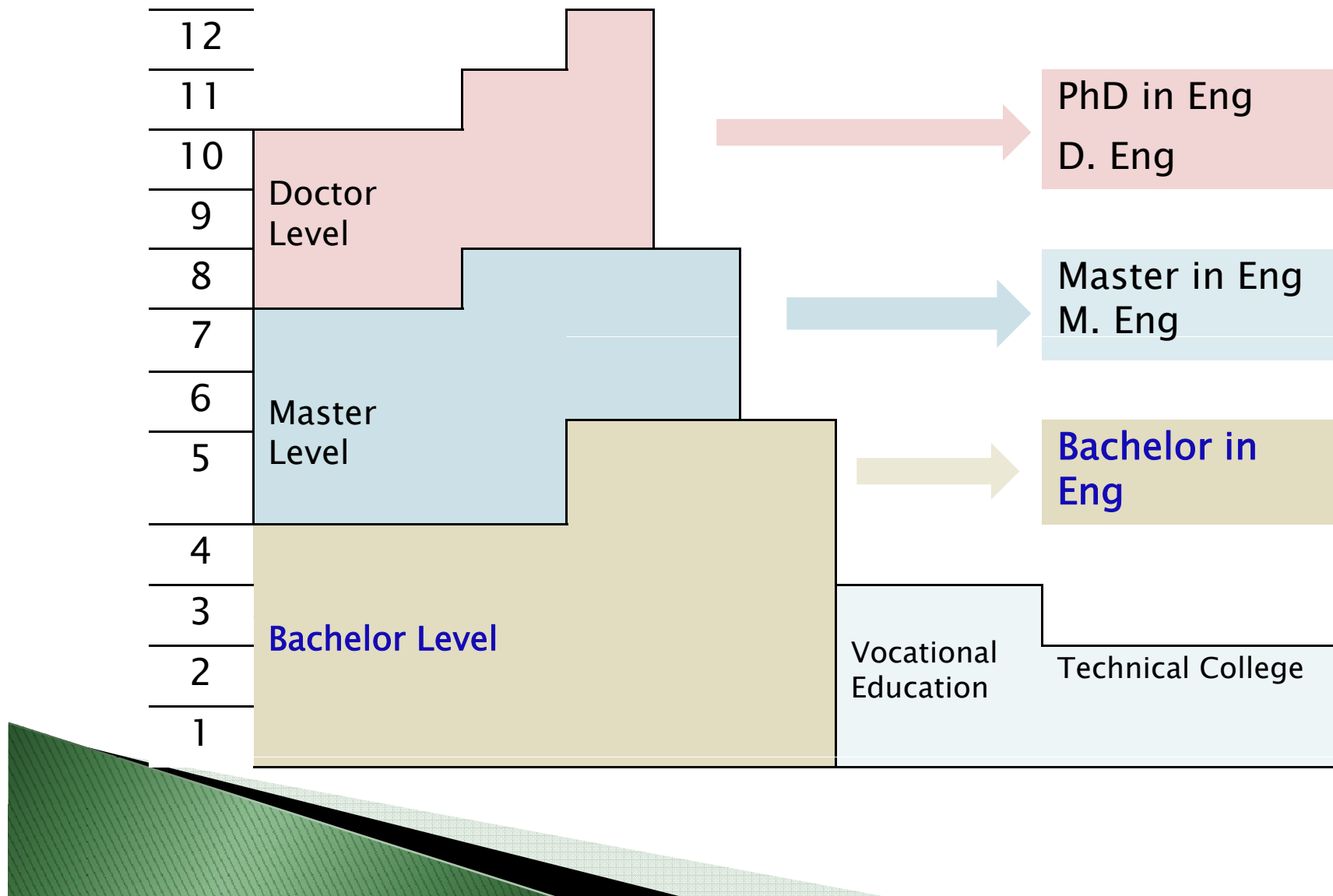


Outline

- ▶ Status and Development of Engineering Education in China
- ▶ Engineering Education Accreditation in China

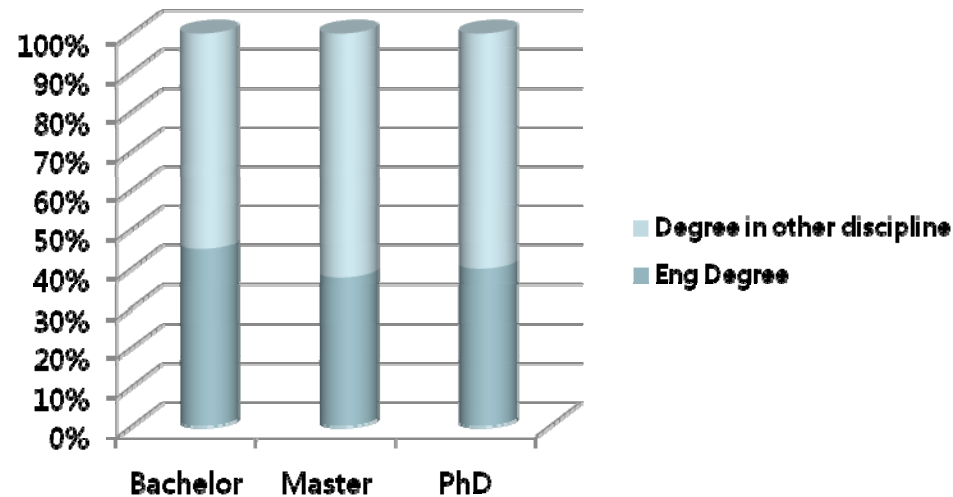


Engineering Education System in China



Scope of Engineering Education in China

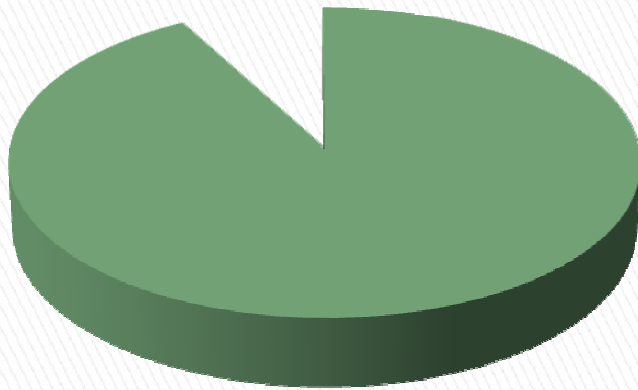
- ▶ In 2011, the number of engineering students in universities reached **4.276M.**, which accounted for **31.7%** of all the undergraduate students in China, and made China the largest engineering education country in the world.
- ▶ **30%** of the educational programs in universities **were engineering** programs.



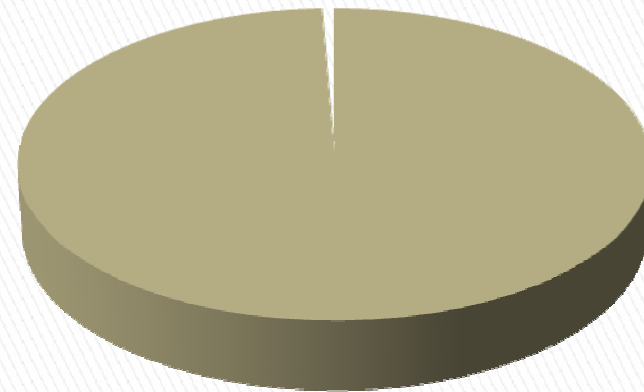
Percentage of Eng degrees in all degrees awarded by Chinese universities in 2010.

Resource: Educational Statistics in China, 2011.

Scope of Engineering Education in China (2010)



Universities which have Eng Programs
1003 out of 1090

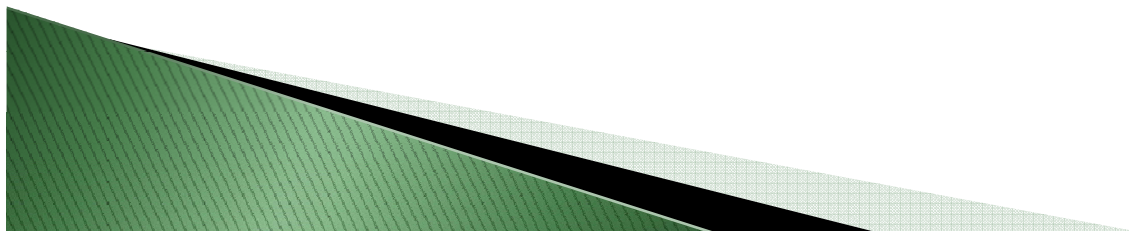


Colleges which have Eng Programs
1207 out of 1215

Resource: Educational Statistics in China, 2011.

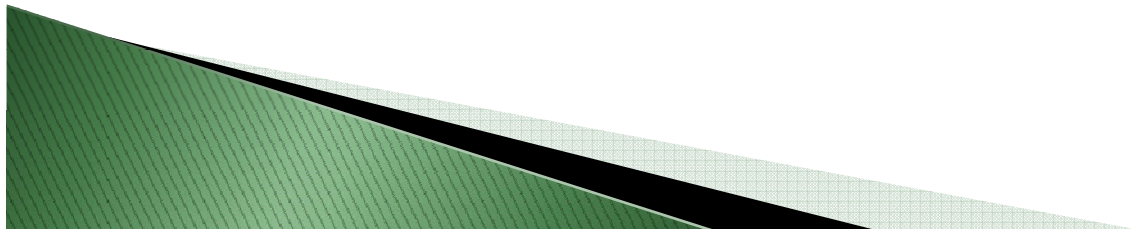
Future of Engineering Education in China

- ▶ It is estimated that **40000** high-level innovative engineering and technology talents will be needed in 2020 in China. Key industry fields in the country will be short of **5 million** people with expertise. These proposed new requirements for engineering education in China.
- ▶ China has initiated “**Excellent Engineers Education Program**” to facilitate the engineering education reform and improve the quality of engineering education in the country.



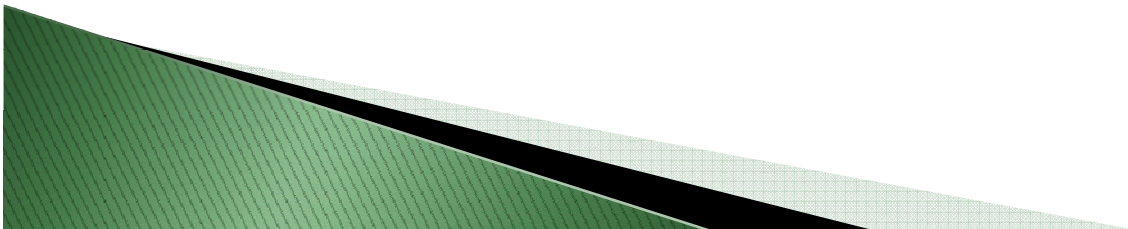
Outline

- ▶ Status and Development of Engineering Education in China
- ▶ Engineering Education Accreditation in China



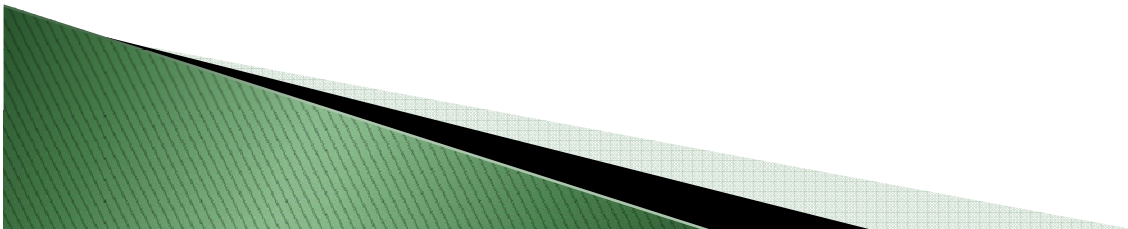
Purpose of Accreditation

- ▶ We hope engineering educational program accreditation will:
- ▶ Plays a key role in the **quality insurance** system of engineering education.
- ▶ **Links** engineering education with **industry** and being a driving force to promote the **reform of engineering education**.
- ▶ Promotes Chinese engineering and technology talents joining in the **international competition and mobility**.



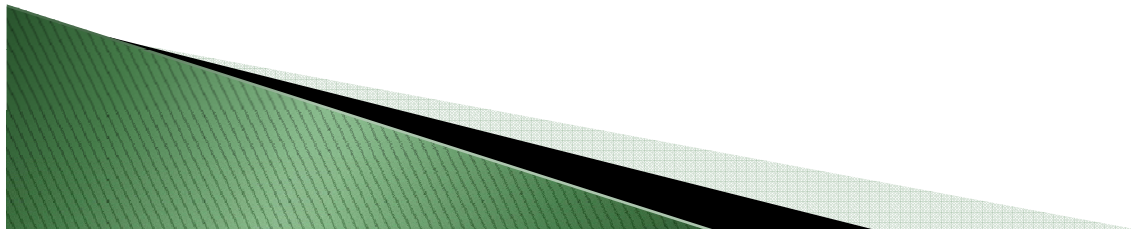
Development of Engineering Educational Accreditation in China

- ▶ The theoretical research and practice of program evaluation in China could be traced back to the late 20th century.
- ▶ The program evaluation of architecture, urban planning, civil engineering, construction environment and equipment engineering, water supply and drainage works, engineering management began in 1993.
- ▶ China launched the engineering educational program accreditation in 2006 and began to establish the accreditation system.



Programs been accredited

- ▶ Till 2011, there are:
 - 219 programs in the 6 fields of Architecture and civil engineering having been accredited.
 - 132 programs in mechanical, chemical, electrical, computer, hydraulic, transportation, environmental, light industry, food, safety and mineral engineering having been accredited.

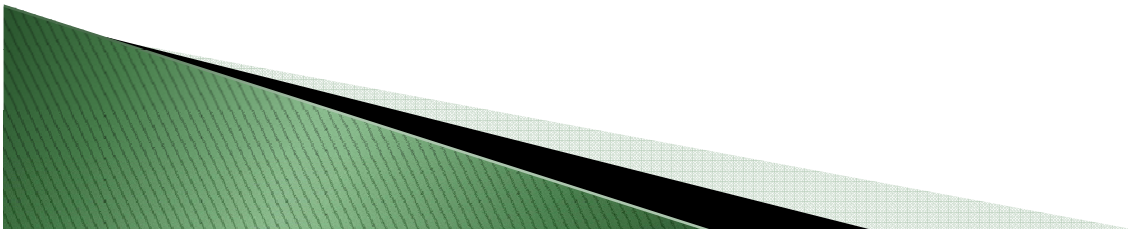


Programs been accredited

Discipline Fields	No. of Programs been accredited each year							No. of Programs in the country	Percentage of programs been accredited
	2006	2007	2008	2009	2010	2011	Subtotal		
Mechanical	2	2	2	6	5	5	22	1559	1.41%
Chemical	2	2	2	3	2	3	14	546	2.56%
EE	2	2	3	2	6	4	19	3295	0.58%
Computer	2	2	2	3	2	4	15	903	1.66%
Hydraulic		2	2	2	2	3	11	141	7.80%
Transportation		2	2	2	2	3	11	395	2.78%
Environmental		2	2	2	2	2	10	349	2.87%
Light industry and food		2	1	3	1	2	9	698	1.29%
Safety		2	2	3	3	3	13	134	9.70%
Mineral			1	3	2	2	8	239	3.35%
Subtotal	8	18	19	29	27	31	132	8529	1.55%
Architecture + Civil Engineering	1992-2011, 219 programs been accredited							1296	16.90%
Total	351							11602	3.03%

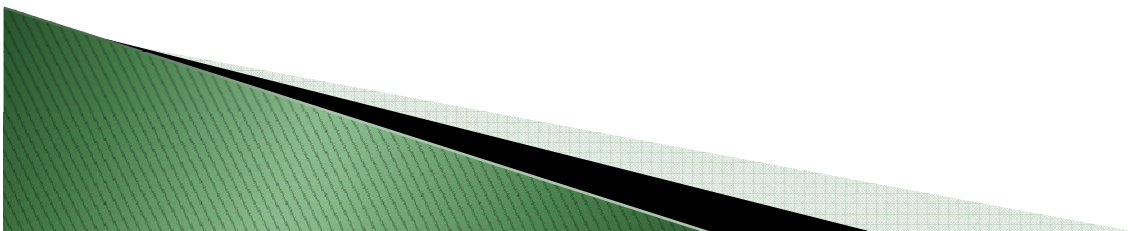
Future plan

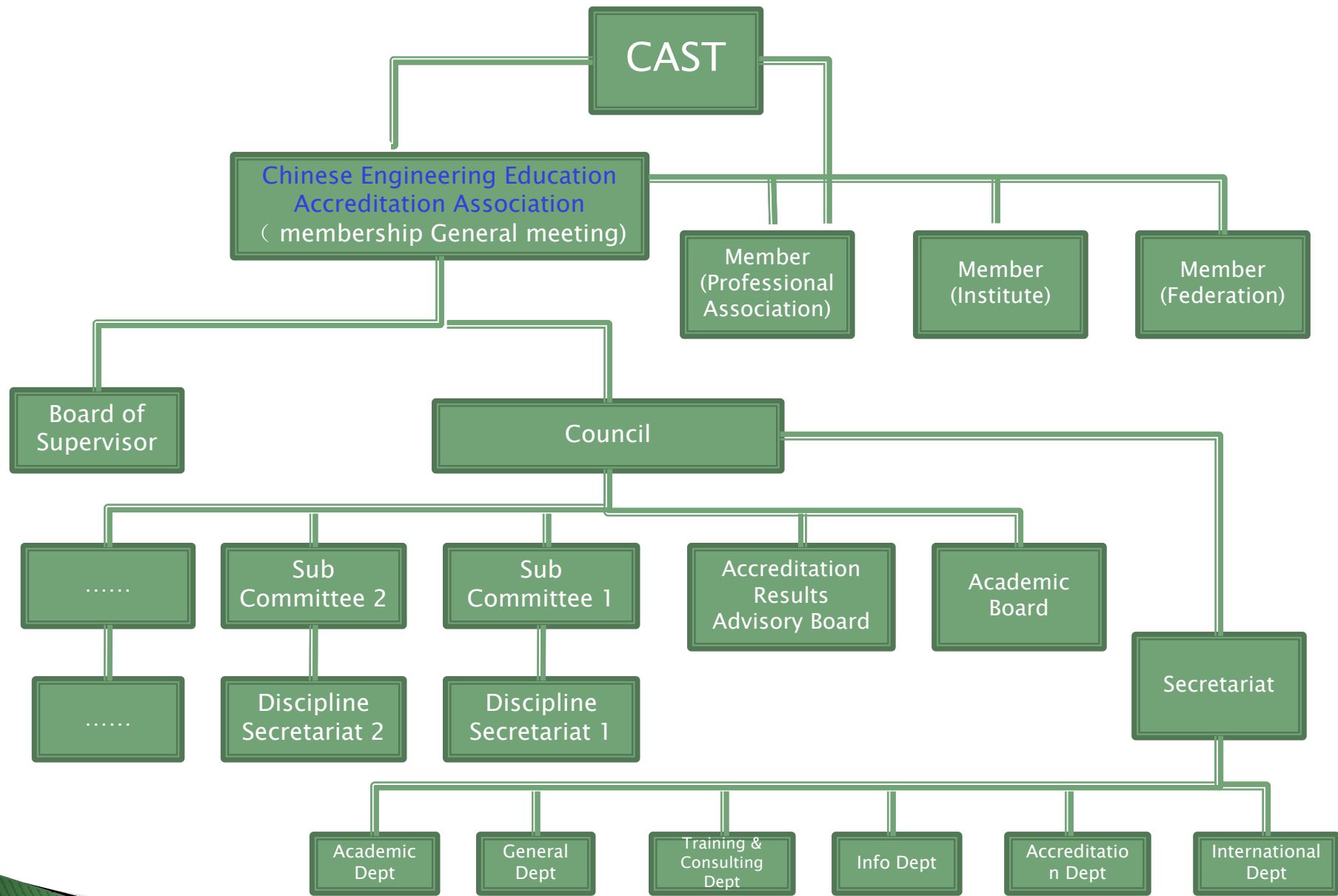
- ▶ According to the overall planning, program accreditation work **will cover most engineering disciplines** in China (around **30 categories**) within the next few years. Programs in materials, mapping, instrumentation engineering added in the accreditation calendar of **2012**. **39** programs accredited in 2012, the **total accredited programs number ---390**.
- ▶ We will gradually increase the number of engineering programs to be accredited and **enlarge the scope** of accreditation work, on the premise of the **quality** and **international comparability** of accreditation results.



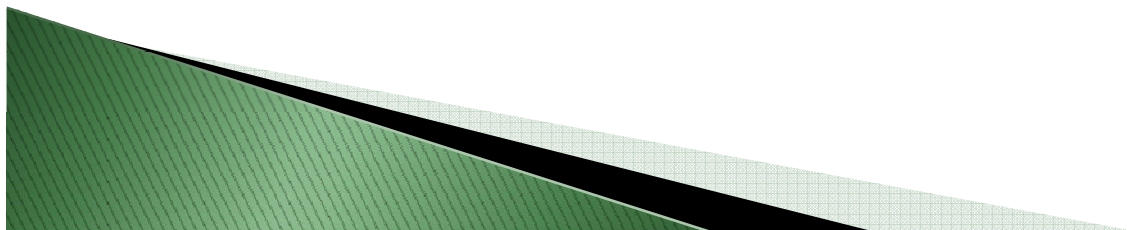
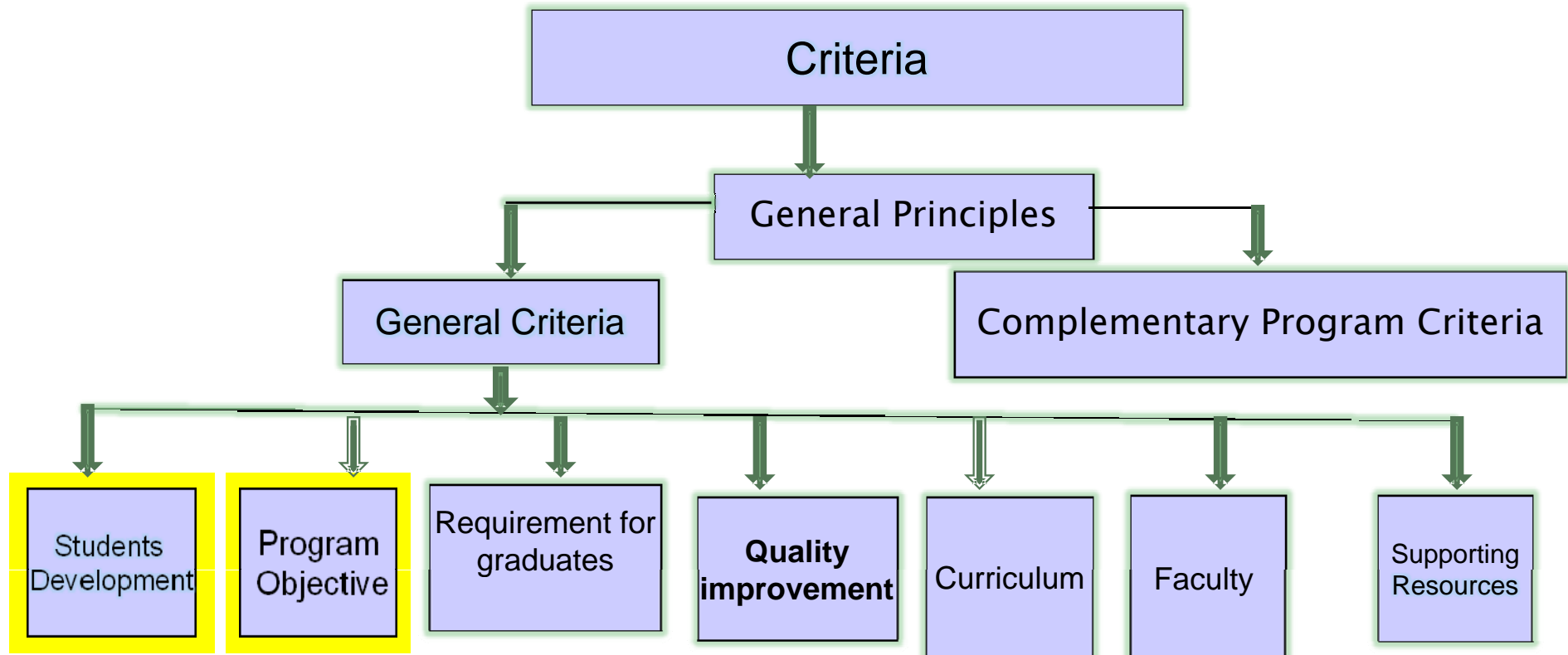
Structure of Engineering Educational Program Accreditation

- ▶ **Chinese Engineering Education Accreditation Association (CEEAA)** is a non-profit organization affiliated with China Association for Science and Technology (**CAST**) .
- ▶ It is authorized by the **Ministry of Education** to conduct engineering educational program accreditation in the territory of mainland China.
- ▶ **CEEAA** consists of over **30** national professional associations, institutes and federations, which cover most of the engineering and technology fields in the country. With the development of accreditation work, members of CEEAA will increase gradually.

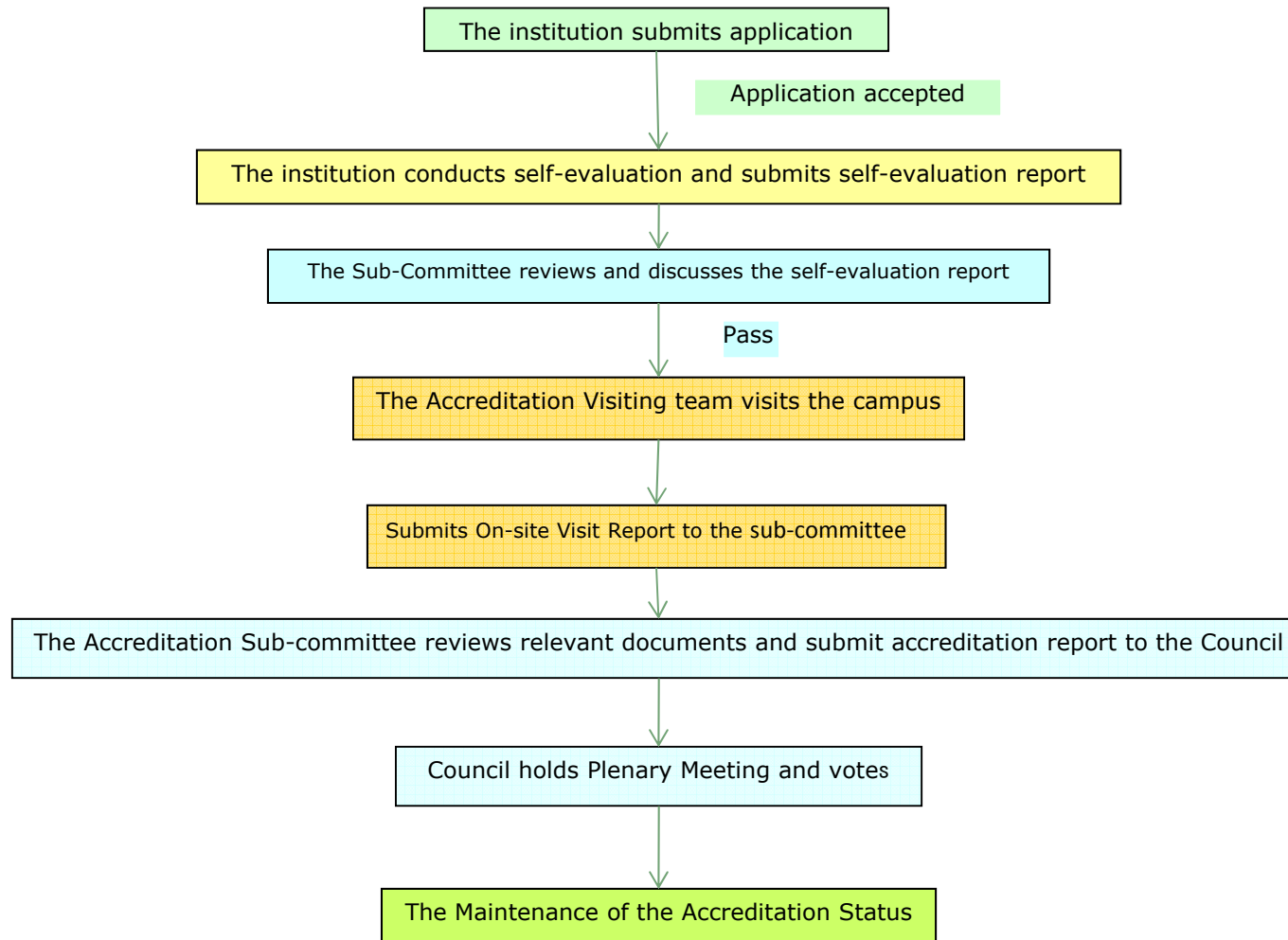




Accreditation Criteria

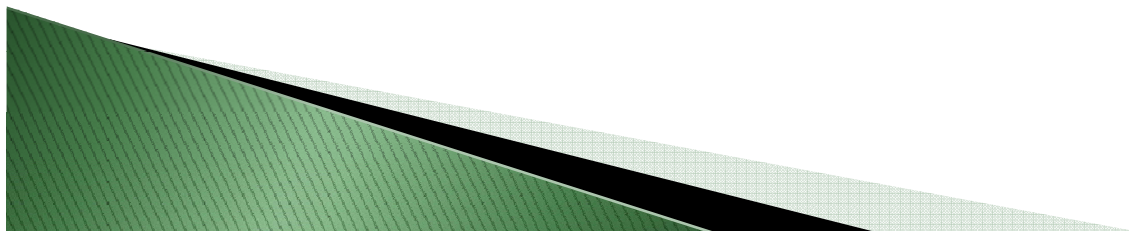


Accreditation Process



Accreditation Documents

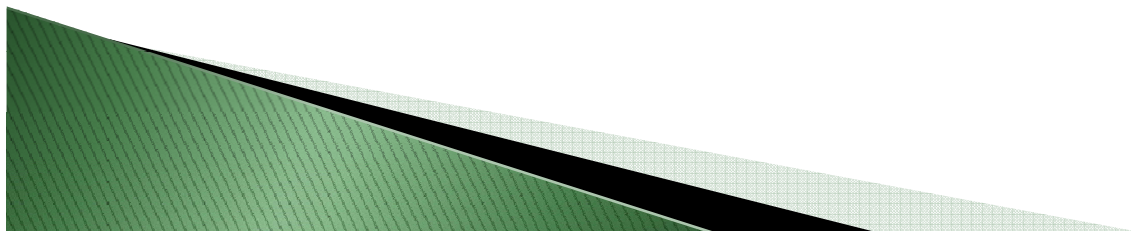
- ▶ Policy and Procedure of Engineering Educational Programs Accreditation
- ▶ The Engineering Educational Programs Accreditation Criteria
- ▶ The Evaluators Selection and Training Methods for Engineering Educational Programs Accreditation
- ▶ The Working Guidance for the Program Evaluators
- ▶ The Preparation Working Guidance for Programs to be Accredited
- ▶ (2006;2007;2008;2009;2010 ;2011Version)



General Principal for Accreditation

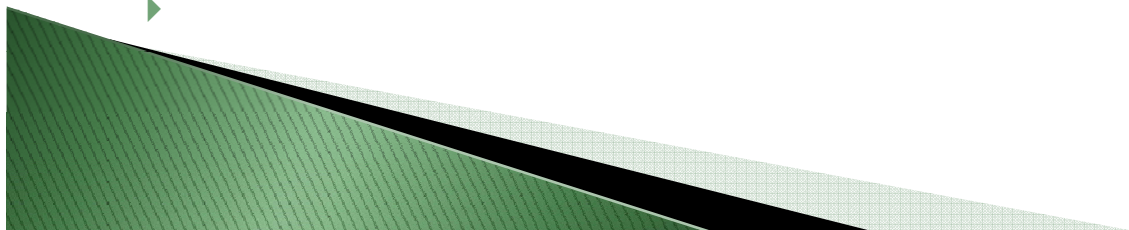
The establishment of engineering educational program accreditation system follows these general principals:

- ▶ **Substantial Equivalence** with international accreditation systems
- ▶ **Third party** accreditation body
- ▶ **Outcome based**
- ▶ **Rigorous and normative**



Exchanges with WA signatories

- ▶ We have actively **communicated with WA accreditation bodies and invited experts** from UK, Australia, USA, Chinese Hongkong and Chinese Taipei to observe our accreditation work . They gave active assessments to our accreditation system.
- ▶ **Engineers Australia and ECUK** has accepted CAST's invitation to be the nominators for CAST application to be provisional membership of Washington Accord in 2013.
- ▶ In September 2012, **Engineers Australia and ECUK** joint observed accreditation process of Technical University of Taiyuan (Computer Engineering program) and Northeastern University in Shenyang (program 1: Material Forming and Control Engineering and program 2: Automation)



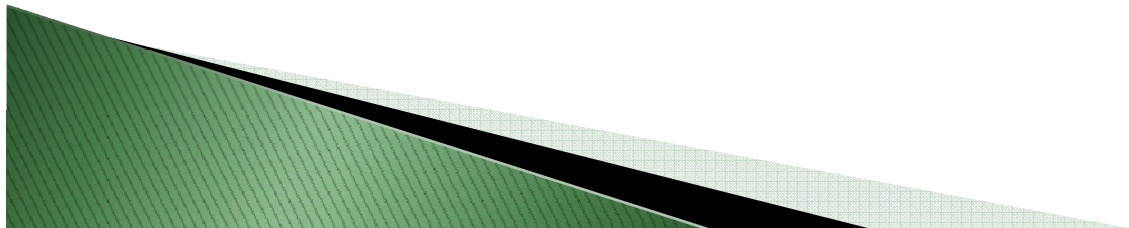
Exchanges with WA signatories

Feedback from Engineers Australia

The assessment of the Engineering Accreditation System, as administered by CAST, is based on the documents provided to the Observers, the observations made during the visits, the translations provided and the response to questions asked. Based on these qualifications, the following observations were made:

- ▶ 1. High level administrative support was evident as demonstrated by CAST Senior Management.
- ▶ 2. Well documented procedures were set out in the CAST Manuals provided to the Observers.
- ▶ 3. There appeared to be effective recruitment and training of Assessors. This was based on the documentation provided and comments from the meetings attended.
- ▶ 4. The Accreditation Panels observed were drawn from senior experienced engineers from academia and industry.
- ▶ 5. From the observations made, the Accreditation processes were perceived to be thorough but fair.
- ▶ 6. Appropriate governance structures were seen to be in place which could deliver consistence and fair outcomes within discipline areas and then the final determination being made by Council covering all disciplines.

The Chinese Engineering Accreditation System, as administered by CAST and observed during a visit to China 18 – 27 September 2012, was assessed to be ‘substantially equivalent’ to other Washington Accord Systems.

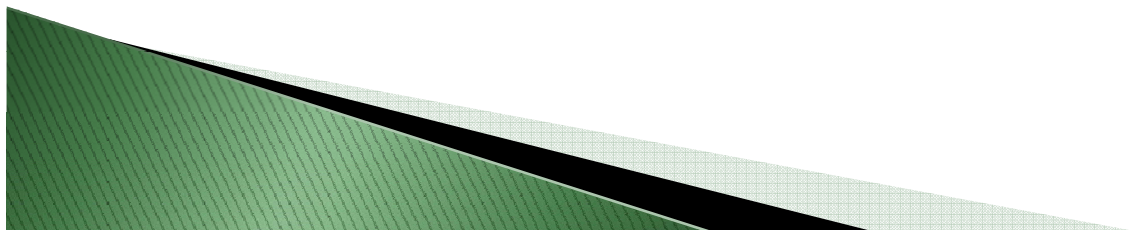


Exchanges with WA signatories

Feedback from ECUK

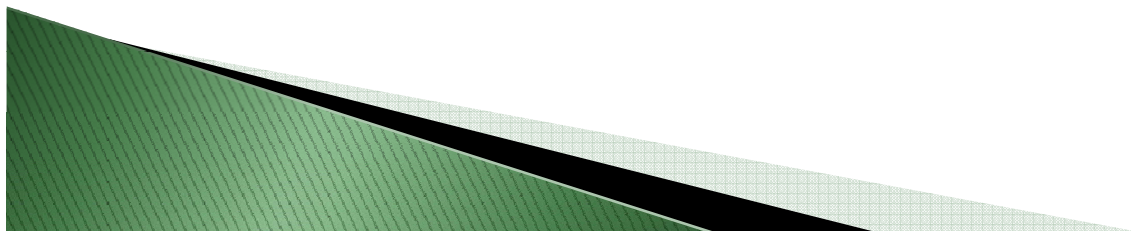
During the visits to Taiyuan University of Technology and Northeastern University in Shenyang, Professor Hicks reached the following conclusions:

- ▶ The CAST documentation is comprehensive in its scope and clearly sets out the criteria on which accreditation decisions are based;
- ▶ The accreditation visits were conducted in accordance with the CAST documentation;
- ▶ The expert team involved in the on-site visits adopted a robust and probing approach to the evaluation of the provision and the decisions reached were in line with the published accreditation criteria;
- ▶ The accreditation process developed and practiced by CAST is substantially equivalent to that used in other jurisdictions that are signatories to the Washington Accord.



A sample of the accreditation

- ▶ Engineering Education Accreditation on **Mechanical Engineering and Automation Program in Tsinghua University**
- ▶ Some data for TH ME Program;



The Accreditation Process

- ▶ Application: ----- Feb. 28th, 2009.
- ▶ Application Review:----- Mar. 22nd.
---Result---accept the application;
- Self-evaluation Report:--Report to Accreditation and Mechanical Sub-committee ----- on Aug. 7th.
- Self-evaluation Report Review:-(Oct.18th~21st)
- Teleconference:----- Oct. 15th and formed Evaluation Focuses
- On-site Visit:---on Oct. 18th~21st.

Leader of the Team was Prof. Peigen Li who was president of Huazhong University of Science and Technology and director member of the Mechanical Sub-committee.

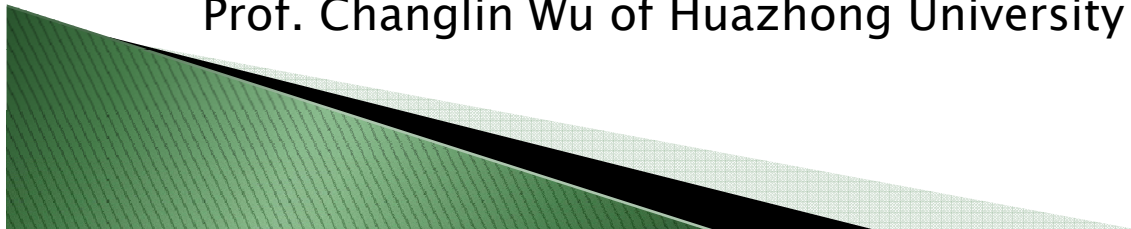
Team members included:

Prof. Ji Zhao, vice-president of Jilin University; ,

Senior Engineer Lu Gao of Chinese Mechanical Engineering Society.

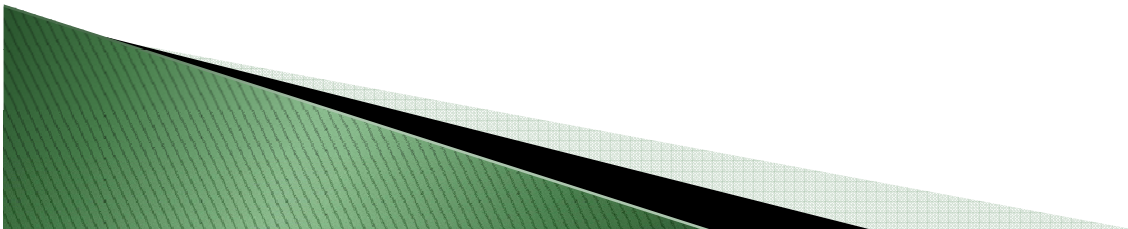
Prof. Guanlong Chen of Shanghai Jiaotong University,

Prof. Changlin Wu of Huazhong University of Science and Technology



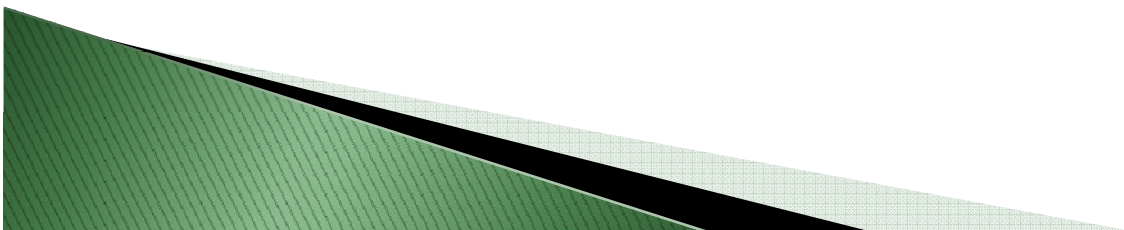
Data

- ▶ The **Mechanical Engineering and Automation** Program of Tsinghua University derived from the Department of Mechanical Engineering established in **1932** and is now **co-hosted** by **Department of Mechanical Engineering** and **Department of Precision Instruments and Mechanology**, who both belonged to **School of Mechanical Engineering**.

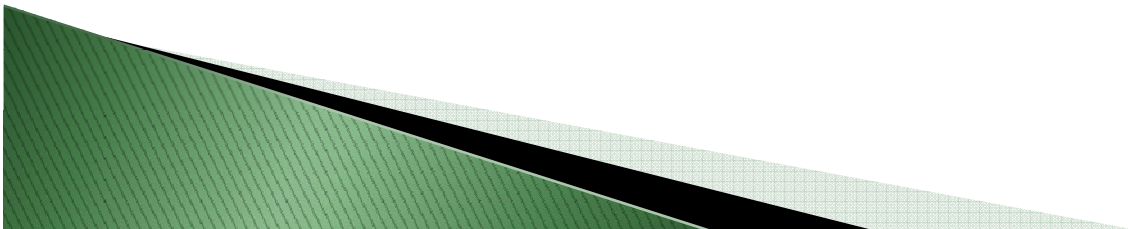


Data

- ▶ The program has **642 undergraduate students and 253 faculties**,
- ▶ among which are **77 professors**/researchers,
- ▶ **88 associate professors** and **56** assistant professors.
- ▶ **40 faculties** have practical experience of industry or social engineering, accounting for 20% of the total number of faculties.
- ▶ **182 faculties have been involved in research activities** with engineering background, accounting for 90% of the total number of faculties.
- ▶ **75% of the faculties have more than five years** teaching experience.

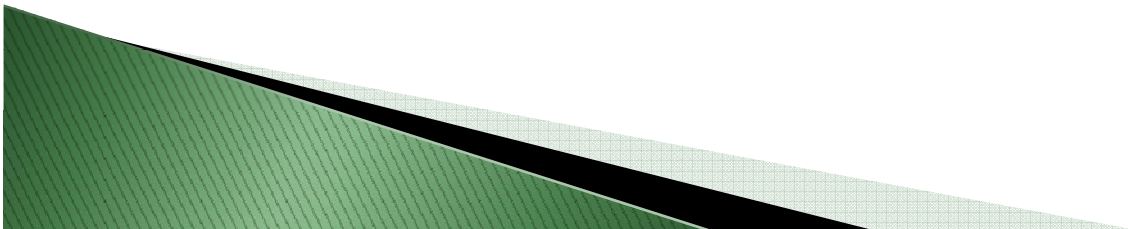


- ▶ The program follows the teaching thoughts of “**solid foundation, wide adaptability, practice focused and high quality**”, and guiding ideology as to “**optimize the knowledge structure, enhance capacity-building and improve the overall quality**” and commits to provide high-quality education and transport high-quality talents.



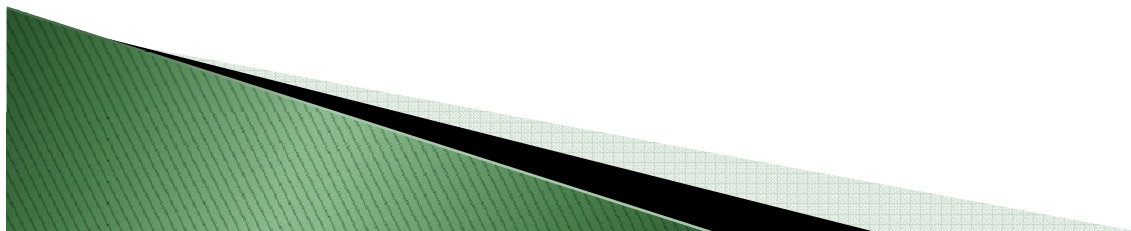
Characteristics of the Program

- ▶ (1) The program **insists on education as the fundamental task**. to cultivate the students' abilities on research, innovation and teamwork,
- ▶ (2) The program emphasized **faculty development**, young faculty training and teaching team building.



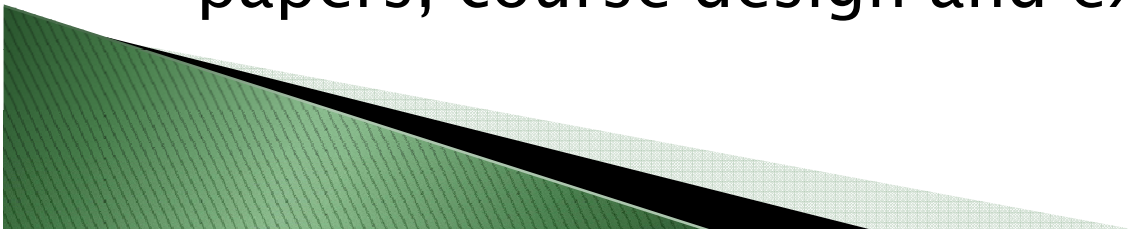
Review opinions of the Self-evaluation Report

- ▶ The Team considered that the program's teaching plan and curriculum setting was reasonable. Its knowledge system covered enough teaching compositions
- ▶ Items need to be reviewed and verified and the evaluation methods (see *Appendix 3*)



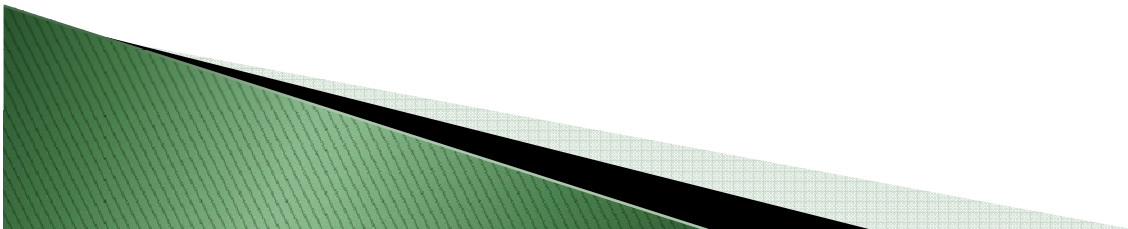
The On-site Visit

- ▶ met with people in charge of the program and some faculties. Prof. Zheng You,
- ▶ visited the teaching facilities
- ▶ The Team had 47 interviews with management personnel of the department and institution, students, teaching faculties, experiment staffs, graduates and employers;
- ▶ reviewed the syllabus, teaching plan, teaching materials, textbooks, assignments, test papers, course design and experiment report



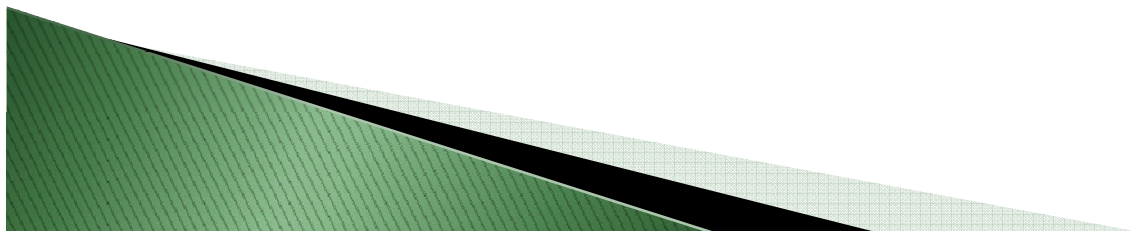
The On-site Visit--continue

- ▶ reviewed 167 graduate designs; heard 6 students reporting the Production Intern; and evaluated the students' abilities.
- ▶ The Team met with people in charge of the program and communicated the on-site visit on Oct. 21st.



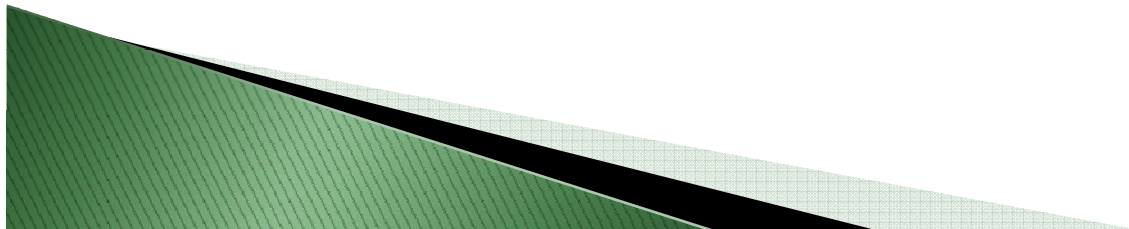
Accreditation Decision

- ▶ Accreditation Decision Suggestions: accreditation passed with validity period of 3 years.
- ▶ The National Experts Committee on Engineering Educational Programs Accreditation held a plenary meeting on Dec. 4th, 2009
- ▶ Accreditation Decision: accreditation passed with validity period of 3 years.



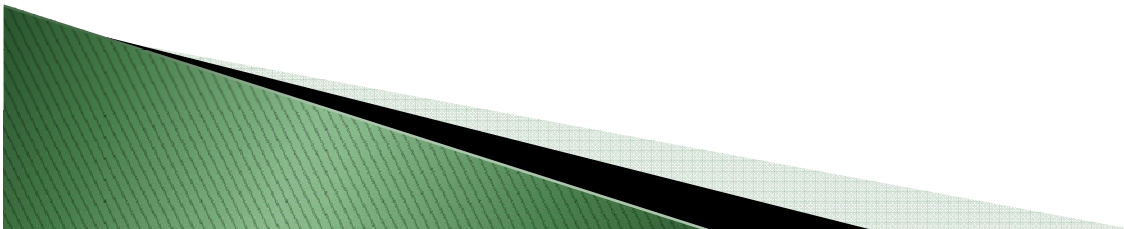
Current Evaluation Results

- ▶ Program Objective-----P
- ▶ Curriculum-----P/C
- ▶ Faculty-----P
- ▶ Supporting condition-----P
- ▶ Student's development-----P
- ▶ Management system-----P
- ▶ Quality Evaluation-----P

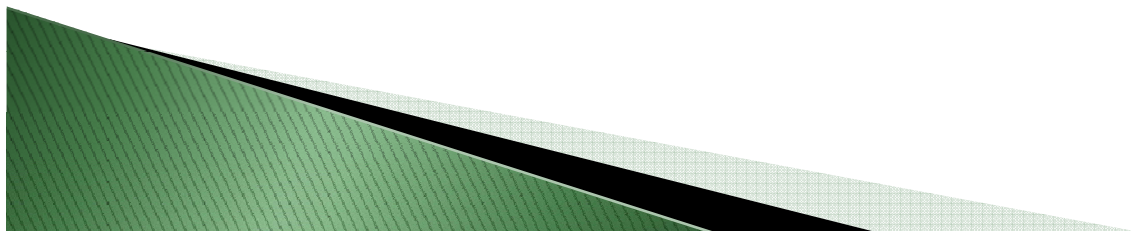


Content of Appendixes

- ▶
- ▶ Appendix 1. Evaluator's **Personal Analysis** on Self-evaluation
- ▶ Appendix 2. **The Conference Minutes** of On-site Visit Team Teleconference
- ▶ Appendix 3. **Evaluation Focuses** for On-site Visit Team
- ▶ Appendix 4. **Schedule** of On-site Visit
- ▶ Appendix 5. **On-site Visit Report** of Engineering Education Accreditation
- ▶ Appendix 6. **Engineering Education Accreditation Report**
- ▶ Appendix 7. 2009 **Accreditation Decisions** of the National Experts Committee on Engineering Educational Programs Accreditation
- ▶

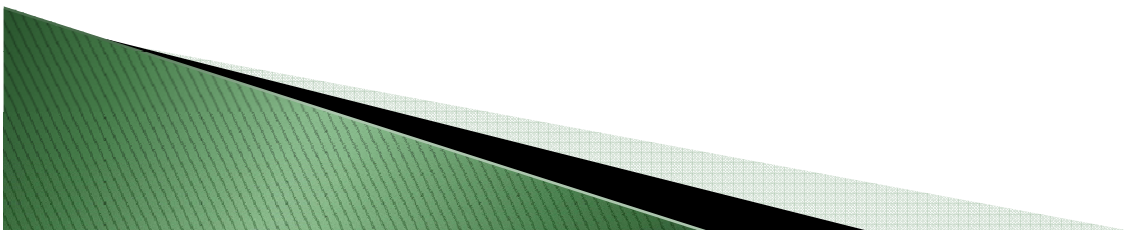


According to the Criteria for Engineering Educational Programs Accreditation --(2009). The Team proposed the following questions and suggestions:



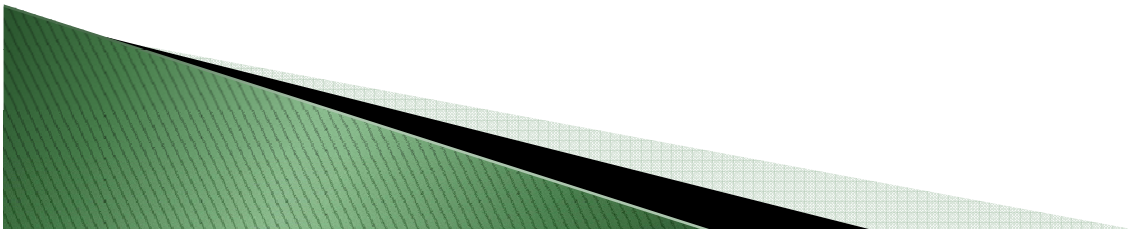
Curriculum:

- ▶ 1. The **program objectives were not fully reflected by the curriculum**. The syllabus should further clarify the requirements on knowledge transfer and capacity-building; the program **should strengthen the research and implementation of the relationship between program objectives, graduates outcomes and curriculum**.
- ▶ 2. The program should further improve the curriculum, which is suitable for educate generalist in mechanical engineering field, and strengthen **the integration of the program and courses in Department of Mechanical Engineering and Department of Precision Instrument**.
- ▶ 3. The program should further strengthen the students' **engineering training** and the cultivation of practice ability.



Supporting Resources:

- ▶ The Team suggested the program have closer links with industry, to promote enterprise and **industry experts involved in the program planning, curriculum settings and teaching activities.**



Thank you !

