

**AC 2008-1559: EUROPEAN CIVIL ENGINEERING MANAGEMENT (ECEM) -  
IMPLEMENTATION AND MANAGEMENT OF AN INTERNATIONAL  
EDUCATION PROGRAM**

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## “European Civil Engineering Management (ECEM)” - Development and Management of an International Education Program -

### Introduction

The curriculum “European Civil Engineering Management (ECEM)” has been launched by the author in 1992 with four senior partners of higher education, three of them from EU-member states and one from Poland. At that time Poland was still living behind the iron curtain. This year ECEM discharges the 12th generation of graduated managerially skilled civil - and construction - engineers into the international market. About 550 students graduated since the first graduation in 1996.

Now an international group of 12 European institutions of higher education from 12 different countries (including Russia) are running this integrated program<sup>1,2,3,4,5,6,7,8,9,10,11,12</sup>. Even students from a Chinese partner university<sup>13</sup> are studying the “part abroad“ of the curriculum and, vice versa, some of our students study in China. The education profile abroad normally includes the managerial and only partly construction topics.

Thus, students of ECEM are prepared to meet the European and international demands in the field of management in civil and construction engineering. They have excellent language abilities in at least two foreign languages and they also have a very deep **insight** in the culture, socio-economic conditions and in the working conditions in a foreign country, and in a foreign company. By this they are mobile - personally and related to their education and knowledge – and able to **work** also in other countries and, thus, worldwide.

### Time Schedule of the ECEM-program

Due to the changes of the Bologna Process the new curriculum needs seven semesters or 3 ½ years of study (see Table 1). The study program consists of three semesters of more or less basic studies in civil and construction engineering at the home university - and of at least two foreign languages. The following four semesters are forming the main study period to consolidate the engineering knowledge, which is taught always in connection with managerial and additional skills. In the 5<sup>th</sup> and 6<sup>th</sup> semester the students are studying at one - and only one - of the partner institutions. This period consists of two theoretical semesters, which normally contains some weeks of practical placements in a foreign company. In the last semester (7<sup>th</sup> semester) the students are back home to finish with a practical placement in the building industry (8 weeks) and writing their bachelor thesis (another 8 weeks).

Semester	1.	2.	3.	4.	5.	6.	7.
Contents	Theory	Theory	Theory	Theory	Theory	Theory	Practical Project +
Studies	Stage I studies	Stage I studies	Advanced Studies	In-depth-studies	In-depth-studies		Bachelor-Thesis
Location	FH-OOW	FH-OOW	FH-OOW	FH-OOW	FH-students at partner university Foreign students at FH-OOW		FH-OOW or Partner University

Table 1: Time schedule of ECEM-program at FH OOW beginning in winter semester

## Educational Profile

The basic studies at FH OOW in Oldenburg contain all the modules of mathematics, physics and basic engineering topics as “normal” civil engineers have to learn them. These first three semesters are compulsory for all students of the department, independent whether they choose the “normal” civil engineering or managerial, or even economic education branch. The students can switch between these three branches during the first three semesters. So, also the ECEM-students have got a sound civil engineering background for their future work and can understand “pure” civil engineering colleagues. - In addition the ECEM-students have to learn English and as a second foreign language that of the later host country.

Normally the partner universities educate in a similar or at least equivalent way. But the “how” is left in the hands of the single partner university. This means that the education content of the first three study semesters is not part of the commonly regulated ECEM-program. This also means that there is some space for “individual” national education paths. The experience showed that knowledge gaps, if existing, will be filled by students’ efforts during their study at the partner university.

During the two theoretical semesters abroad all ECEM-partner universities follow the common educational frame, which has been fixed during a number of common planning and organizing meetings. The topics or contents of the respective modules are similarly oriented toward management skills in the very civil engineering context. They are not mirror like, but at least equivalent. The contents of the modules are clearly described at each partner university and have been agreed to by all involved partners during the regular meetings and by the respective academic boards. The written descriptions are part of the respective examination rules. Table 2 for the Dutch partner university Hanze University Groningen (HUG), Table 3 for FH-OOW and Table 4 for the Irish Galway Mayo Institute of Technology (GMIT) shall give an impression of what is meant by equivalent education. For these three examples the tables describe the obligatory modules, which students have to study and which are part of the common ECEM regulations.

All study programs have to come up with 30 ECTS-credits per semester, so the students have to earn 60 credits during their study abroad. (ECTS will be described in more detail in chapter 6). The given examples are simple insofar as all three partners use the same accreditation system. This is not the case with all of the others.

The last semester at home is used to focus and to transfer the “foreign” managerial education to “home conditions”. This is done first during 8 weeks of practical placement and then through the following bachelor thesis, which needs another 8 weeks. The study finishes with a colloquium for explaining and defending the thesis.

Semester	Module	HUG credits	FH-OOW credits
5	Introduction	1	1
5	Counseling	1	1
5	Water and Environmental Management	13	13
5	Dutch Language Level 2	2	2
5	Harbor and Coast	13	13
6	Dutch Language Level 3	4	4
6	Real Estate	13	13
6	Construction Management	13	13

Table 2: Modules at the Dutch partner university Hanze University Groningen (HUG)

<b>Modules Group 1</b>	<b>Hours per Week</b>	<b>ECTS-Credits</b>
Calculation	4	5
Project Management	4	5
Construction Execution Planning	4	5
Contract Management	4	5
Turnkey Construction	4	5
Cost Management	4	5
Communication and Conflict Management	4	5
Financing	4	5
Entrepreneurial Leadership	4	5
Law and Contract Management	4	5
<b>Modules Group 2</b>		
Project Development	4	5
Quality Management and Safety and Health Coordination	4	5
Technical Building Equipment	4	5
Personnel Management	4	5
Law and Rights of the Engineer and Project Manager	4	5
Project	4	5
In each of the 5 <sup>th</sup> or 6 <sup>th</sup> semester the students have to study 6 modules. 5 have to be taken from each of both groups 1 and 2. The last 2 modules may be chosen from the normal civil engineering course program. In addition 2 (small) modules in German language education have to be		

Table 3: Modules at FH-OOW for foreign students (and German students who stay at home)

<b>Semester</b>	<b>Module</b>	<b>GMIT Credits</b>	<b>FH-OOW Credits</b>
5/6	Applied Building Studies	5	5
5/6	Construction Technology	5	5
5/6	Services Technology	5	5
5/6	Contract Administration	5	5
5/6	Economics	5	5
5/6	Financial and Business Administration	5	5
5/6	Interim and Fund Accounts	5	5
5/6	Applied Legal Studies	5	5
5/6	Project	5	5

Table 4: Modules at Irish partner university Galway Mayo Institute of Technology (GMIT)

The inclusion of a practical placement at the end of the study time has three aspects:

1. The thesis is elaborated in close co-operation with a building company or project office etc. It picks up a “practically oriented” problem and by this may connect the company closer to the university. In addition a representative of the company may become one of the examiners of the thesis.
2. The second aspect is the possibility for both the student and the company to get in so close contact to discuss a possible employment - without the need of costly public advertisement.
3. And thirdly the student has the possibility to compare two different working conditions - that of the host and the home country or building company.

The whole ECEM-program from all partner institutions of higher education can be found in the websites of FH OOW<sup>1</sup> ([www.fh-oow.de/fbbug/index.php?id=636](http://www.fh-oow.de/fbbug/index.php?id=636) and [www.ecem.de](http://www.ecem.de)), which gives the link to FH OOW, too), Up to now it is mostly in German language only, but very soon in English. Also the partner universities inform about ECEM on their websites; the addresses of all other partners are given in the bibliographic list<sup>2 - 13</sup>.

## Educational Aims and Fields of Employment

The development in the construction economy has shown that classically educated civil/construction engineers cannot always fulfill the many faceted duties and demands in modern civil engineering. It is not sufficient today to just work as technical engineer. The market more and more needs managers who are able to coordinate, guide, supervise and steer huge building projects in planning and execution, and to communicate efficiently with people of different specialties, and internationally.

With this idea the educational aims of ECEM are roughly described. In general the future employers are to be found in

- the building industry;
- engineering and architectural planning offices;
- consulting companies;
- departments of building and planning authorities;
- in project development and real estate companies;
- in big companies with international building activities;
- also in banks, commercial groups, industry, insurances.

The professional skills of an ECEM-absolvent target to work with

- contracting;
- site supervision;
- project management;
- execution planning, action planning;
- bidding calculation and quantity surveying;
- calculation and estimation;
- quality management;
- procurement of new projects;
- project development;
- turnkey construction.

## ECEM-partner Universities

The ECEM partners are listed in Table 5.

- |  |
|--|
| <ul style="list-style-type: none"><li>- University of Applied Sciences (<b>FH OOW</b>) as initiator and coordinator, Oldenburg, Germany;</li><li>- Czech Technical University of Prague (<b>CVUT</b>), Prague, Czech Republic;</li><li>- Ecole Supérieure d'Ingénieurs des Travaux de la Construction de Cachan/Paris, (<b>ESITC</b>), Cachan/Paris, France;</li><li>- Technical University of Szczecin (<b>TUoS</b>), Szczecin, Poland;</li><li>- Hanze University Groningen (<b>HUG</b>), Groningen, The Netherlands;</li><li>- University of Abertay Dundee (<b>UAD</b>), Dundee, United Kingdom;</li><li>- University of Wolverhampton, (<b>UoW</b>), United Kingdom;</li><li>- Högskolan Halmstad (<b>HH</b>), Halmstad, Sweden;</li><li>- Universidad Politecnica de Valencia, Escuela Tecnica Superior de Gestion en la Edificacion (<b>ETSGE</b>), Valencia, Spain;</li><li>- Szent Istvan University, Ybl Miklos School (<b>YMMF</b>), Budapest, Hungary;</li><li>- Galway Mayo Institute of Technology, (<b>GMIT</b>), Galway, Ireland;</li><li>- State University of Management / Institute of Business in Construction and Project Management (<b>SUM</b>), Moskau, Russia;</li><li>- Zhejiang University of Science and Technology (<b>ZUST</b>), Hangzhou, China (in the future)</li></ul> |
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Table 5: ECEM Partner universities

There is no restriction and no pretension to a special partner university. But the amount of receiving students depends on the capacity of the host university. Another most interesting point of view is that ECEM-partners do not charge the foreign students any tuition fees. The acceptance of students as based on this financial platform is again ruled by equivalence, which in this case means that on a long range the number of incoming and outgoing students is balanced for each partner university

The teaching languages of the partners are differently fixed. In Sweden, The Netherlands, Czech Republic and Poland offer their courses in English; the host country's language is necessary to "live" there. The teaching languages in UK, Ireland, France, Spain, Russia, China and Germany are the respective home languages. According to the requirements of the partners the language preparation at home is very important. - There are a number of ECEM-contacts to a lot of other universities in Europe and abroad.

### **Certificates and Double Diploma**

The students receive their diploma/certificate/bachelor degree/baccalaureus of .../etc. by the respective home universities. All marks which have been received at the home and the host university enter into the final marks of the certificate. This conversion takes into account the different study workloads of the students at the host universities and their special marking system.

In addition the certificates describe the study process at the partner university and all the study modules, and the received credits and marks of these single modules. This is done very similar to the diploma supplement as requested more and more in the European Higher Education Area (EHEA)<sup>14</sup>.

The common educational consensus is to speak of equivalence (see Tables 2, 3 and 4). By this consensus each partner university may teach a number of their specific and acknowledged topics. This consensus also includes the complete acknowledgement of a successful study period by counting the study load of the students in the same way: 30 ECTS-credits for each semester. Even if the partners have yet different accreditation systems, ECTS (see below) gives the conversion of earned "student money" at the partner universities.

In brief: **ECTS** is the **E**uropean **C**redit **T**ransfer (and **A**ccumulation) **S**ystem that describes the "workload" of students. Students earn the equivalent of 60 ECTS credits per year by successfully studying the modules of their curriculum. The workload for an average student is the same as for normal professionals. This consists of 8 hours a day, 40 – 50 hours per week and, thus, about 1,600 working hours per year. This includes all contact hours (about 50%) at the university and another 50% for "free" work. Even if not yet used in all European universities ECTS will become the single accreditation system in the whole Bologna region very soon. All of the partner universities, except the Chinese partner, are members of the Bologna region and from 2010 within the EHEA. -

The work load of students will be counted in a relative easy way by the percentage rate of modules compared to the total study load. This study load has to be converted to a total sum of 30 ECTS-credits per semester.

But it is a much more difficult task to transfer or convert the marks. The following Table 6. may give an overview over the different marking systems of the officially involved ECEM-partner institutions (the Chinese partner university ZUST is missing up to now). The common marking system is ECTS (right column). As one may realize the table does not give a stringent connection between the different marking systems. So the marking is always worth some words of discussion between the ECEM-coordinators.

FHOOW	UoW	HvG	TUoS	CVUT	YMMF	ESITC	HH	EUAT	GMIT	SUM	ECTS*
1.0	A 16	10	5	1	5	19. / 20.0	6	10.0	100	5	A
1.0	A 15					19.0	5.7 – 5.9		67	5	A
1.3	A 14	9.5				17.0 – 18.5	5.4 – 5.6	9.5/9.0	64	5	B
1.7	B 13	9.0	4.5			16.0 / 16.5	5.1 – 5.3	8.5	61	5	B
2.0	B 12	8.5		2	4	15.0 / 15.5	4.8 – 5.0	8.0	58	4	C
2.3	B 11	8.0	4			14.5	4.5 – 4.7	7.5	55	4	C
2.7	C 10	7.5				14.0	4.3 – 4.4	7.0	52	4	D
3.0	C 9	7.0	3.5	3	3	13.5	4.1 – 4.2	6.5	49	3	D
3.3	C 8	6.5				13.0	3.8 - 4.0	6.0	46	3	D
3.7	D 7	6.0	3			12.5	3.5 – 3.7	5.5	43	3	E
4.0	D 6, D5	5.5			2	12.0	3.0 – 3.4	5.0	40	3	E
5.0	E 4	5.0	2	4	1	0.0 – 11.5	none	<5.0	fail	2	FX

\* A = Excellent

\* B = Very good

\* C = Good

\* D = Satisfactory

\* E = Sufficient

\* FX = Failure with exception (only UoW)

\* F = Failure

Table 6: Conversion matrix of ECEM-partner universities (without ZUST)

(\* ECTS is the common European marking system, not only for ECEM-partners)

A lot of students have the possibility to award two diplomas or as we say a double diploma: one from the home and the other one from the host university. Up to now there is no automatism in it but with a very small amount of additional work e.g. translation of the thesis and/or some additional modules students may receive it.

The biggest cohort of such interested students are the Polish students who study in Oldenburg because they have the great advantage to be a close neighbor and to get employment in German companies, or even better in joint venture companies in Poland and in Germany. So, they and our students can earn a double diploma from FH OOW, Oldenburg, and respectively from TUoS, Poland. The other partners up to now are HUG, Groningen, and HH, Halmstad, with whom both our students may earn a double degree, too. The language of the double diploma thesis is fixed according to the language of the host university, but most universities also offer English. The Polish partner offers German as a third language, whereas the French partner has the restriction just to French.

### Exchange Programs

The EU aims to create a highly attractive education region. Especially the ERASMUS-program as that part of the SOCRATES-program, which is offered to universities, and the LEONARDO-DA-VINCI-program<sup>15</sup> are examples of strong and rather efficient programs in the tertiary education field in Europe. They support both the mobility of students and academic staff and, in addition, foster the co-operation with industry .

All ECEM-students of the EU-partner universities have high profits from it. Most students receive scholarships from these programs; the amount is not too high to cover the normal living costs, but it covers all the tuition fees, which are really not negligible.

In Germany the ECEM-program has got special and additional benefits from the powerful German Academic Exchange Service (DAAD)<sup>16</sup> especially by the two programs

- GO EAST that fosters German students to study in east, south-east and the former GUS-states and/or
- ISAP, which stands for **I**nternational **S**tudy and **E**ducation **P**artnership).

The GO EAST-program gives financial support to all outgoing students from Oldenburg in Germany to Poland and/or the Czech Republic. The ISAP-program pays nearly all living and studying costs for the German students going to SUM, Moscow, and to ZUST, Hangzhou, and vice versa. The conditions are that the students have to stay at least one year in the foreign country, have to study one semester of theory, and one of practical placement. In addition they come or go in a cohort of at least three students. The program lasted three years; this year regretfully is the last year of the contract.

### **EU-internal and International Markets**

With the growing European and global market new demands on professional qualifications and new working possibilities are seen to develop and to be developed. Today Europe envisages the situation of cross border mobility of students and professionals. The Bologna process fosters the cooperation between universities and especially it supports mobility of students in so called integrated study curricula within the EU-member states. And the new “Directive of the European Parliament and of the Council on the Recognition of Professional Qualifications (EU-directive 2005/36/EC)” fosters the cross border working possibilities by settlement and/or delivering services by professionals<sup>17</sup>.

Thus, students of ECEM are well prepared to meet the European and international demands in the field of civil/construction engineering. They not only have excellent language abilities in at least two foreign languages, but they also have a deep insight in the culture, socio-economic conditions and in the working conditions in a foreign country and in a foreign company. By this they gained the ability of being mobile to work in the international civil engineering business environment.

### **Development and Organization of the Program**

The common ECEM-program is a unique program; it is a rather short undergraduate bachelor curriculum, but nevertheless it

- offers a variety of different host countries;
- integrates 1 year of study abroad;
- includes some practical experience abroad;
- gives the possibility of double diploma certificates.

When ECEM started in 1992, the students had to study three semesters abroad, one of which was a complete practical placement semester. At that time Poland was not an EU-member. So, it was extremely difficult to get a work permit for each of the students. At that time – and a little bit even today – the discrepancy between the living standards was extremely high. Also it was necessary to involve all types of funding. The German-Polish society was involved. TEMPUS as the most powerful European funding program at that time for the MOE-countries served with the big amount of about 1.6 Mio ECU (nearly equal to EURO) for an installment period of three years to support the academic exchange of students



and teachers, and to help investing in computer and library facilities. – It was a good time of future views and steps forward in a merging Europe.

The organization of the curriculum development and its changes, as well as the exchange programs themselves have been and are still very much time consuming, and not easy to handle. Each year all partner universities are coming together for at least one meeting. The chair of the meeting and organization is circulating each year to another university.

### **Bologna Process**

The curriculum is part of the normal academic education program of each involved university and, thus, accredited by the respective accreditation boards. In the future – at least till 2010 - all study programs in Europe have to be changed according to the two-tier system within the Bologna process. Not all partners did this change up to now. It is open whether and how a changed ECEM-course will be accredited by the respective national boards.

The Bologna declaration is not only directed to the national governments responsible for the (higher) education, but also to the single universities, their associations and co-operation nets. A lot of universities and professional organisations have started a Bologna orientated action before having been forced by their government. Within the Bologna process it is left open also to the single university to fix the study time of their bachelor and master curricula. So, different lengths of study time and different organization procedures have to be matched.

So, due to the first four topics of the Bologna declaration all curricula have to be changed, renewed or stronger shaped, or totally built up in a new way according to the two-tier or two cycle system. The First Cycle leads to a Bachelor degree and has to be attested as entrance to the professional market; the wording is employability. The Second Cycle leads to a Master degree and can be studied after having achieved a first cycle degree in an appropriate study programme. The second cycle programme can be a more professionally oriented programme or a more academically one.

### **Modularisation and Study Load (ECTS)**

In addition all curricula have to be taught or learned in modules, which is a more “bit”-wise education compared to the former more “closed and overarching circle” education. All modules as well as the total curriculum have to be given a description of the study load of the “normal” student. This study load is at least the time, which is necessary for a “normal” student to fulfil the demands of the study programme and, thus, to successfully finish his studies. The study load of one semester is 30 ECTS-credits, which are awarded to the successful student semester per semester.

The student accumulates these semester credit points at any European (partner) university in an appropriate study programme until he earned enough credits to be awarded the respective degree. Typically the two cycles have no sharply fixed duration. The EU-directive on Professional Qualification as well as the Bologna (Follow-up) Declarations now gives a small span of duration or credits for each cycle as follows:

### **Accreditation**

The EU-supported project **E**uropean **A**ccredited **E**ngineer (EUR-ACE)<sup>18</sup> worked out procedures and methodologies for the accreditation of engineering study programs. Within the context of the Bologna follow-up activities it took a decisive step forward, towards the setting-up of a European Accreditation system/procedure for the entire engineering sector. The activity of EUR-ACE was a major tool to improve and assess quality in engineering education, as well as to increase practices of mutual trans-national recognition of engineering

titles for bachelor, master and PhD degrees. The main aims of the standards and procedures, and eventually a European system for accreditation of engineering education will be to

- provide an appropriate “European label” to the graduates of the accredited educational programmes;
- ensure consistency between existing national “engineering” accreditation systems;
- improve the quality of educational programmes in engineering;
- facilitate trans-national recognition by the label marking;
- facilitate recognition by the competent authorities, in accord with the EU-directives;
- facilitate mutual recognition agreements.

EUR-ACE finished its work at the end of last year, but gave birth to the new supervising European accreditation agency for engineering programs. As described above this agency does not work e.g. like ABET, but as an agency, which lays down accreditation rules for its independent national member accreditation agencies.

### **Programme Outcomes**

The renewed curricula have to be oriented towards outcomes, which will be assessed and accredited. There are six EUR-ACE Programme Outcomes of accredited engineering degree program as follows:

- Knowledge and Understanding;
- Engineering Analysis;
- Engineering Design;
- Investigations;
- Engineering Practice;
- Transferable Skills.

Although all six of the Programme Outcomes apply to both the First Cycle and the Second Cycle programs, there are important differences in the requirements at the two levels. These differences in the levels of First and Second Cycle accredited engineering programmes should inform the interpretation of the Programme Outcomes by Higher Education Institutions (HEI) and by accrediting panels. The differences are particularly relevant to those learning activities that contribute directly to the three Programme Outcomes concerned with engineering applications, Engineering Analysis, Engineering Design, and Investigations. Obviously it needs a lot of common work to put together the different national study contents and outcomes within an integrated international study program, even if it is mainly restricted to Europe.

### **Outlook**

The ECEM-group is looking for an American and Canadian partner university, and would find DAAD and Socrates support. Especially DAAD is very much interested in supporting double degrees of German and American and Canadian universities. Two years ago it organised a workshop in Chicago with this title and just three days before, or better to say, in connection with the annual ASEE-conference 2006 in Chicago. About 25 German and 25 American and Canadian universities participated. The results are collected and presented on the DAAD website<sup>16</sup>.

Concerning Continuous Professional Development there are two European directives to be mentioned. The first one is the EU-directive on Recognition of the Professional Qualification (2005/36/EC)<sup>17</sup>, which came into power in autumn last year. The second one is a proposal for a Recommendation on the “Establishment of the European Qualifications Framework for Lifelong Learning” (2006/0163 (COC))<sup>17</sup>.

### **Bibliographic Information**

1. [www.fh-oow.de/fbbug](http://www.fh-oow.de/fbbug)
2. [www.tpu.fi/servlet/sivu/0/250343](http://www.tpu.fi/servlet/sivu/0/250343)
3. [www.esitc-cachan.fr/56k/56k.htm](http://www.esitc-cachan.fr/56k/56k.htm)
4. [www.hanze.nl/](http://www.hanze.nl/)
5. [www.gmti.ie/prospective\\_students/engineering](http://www.gmti.ie/prospective_students/engineering)
6. [www.tuniv.szczecin.pl/eng\\_index1.htm/](http://www.tuniv.szczecin.pl/eng_index1.htm/)
7. [www.guu.ru/navigate\\_eng.asp](http://www.guu.ru/navigate_eng.asp)
8. [www.hh.se/english/education.htm](http://www.hh.se/english/education.htm)
9. [www.upv.es/perfiles/estudiantes.html](http://www.upv.es/perfiles/estudiantes.html)
10. [www.cvut.cz/en/education.html](http://www.cvut.cz/en/education.html)
11. [www.ymmf.hu/kulkaps/courses.html](http://www.ymmf.hu/kulkaps/courses.html)
12. [www.wlv.ac.uk](http://www.wlv.ac.uk)
13. [www.zust.cn](http://www.zust.cn)
14. [www.bologna-bergen.no](http://www.bologna-bergen.no)
15. [www.europa.eu.int/comm/education/programmes/socrates/erasmus/ects](http://www.europa.eu.int/comm/education/programmes/socrates/erasmus/ects)
16. [www.daad.de](http://www.daad.de) or <http://go-east.daad.de/>
17. [www.europa.eu.int](http://www.europa.eu.int)
18. [www.feani.org](http://www.feani.org)

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