

German Report

The Bachelor gets going in civil engineering

Following the introduction of the Bologna Process a complex discussion on structural changes in the German system of university education is currently being held in the field of synergies between the academic and professional worlds in Germany. This new situation is controversially discussed especially at the universities, but also in the building industry. In 2010 all the Diploma Study programs should be replaced by the Bachelor and Master programs. But according to an actual survey with 5,000 personnel experts showed considerable reservation concerning the qualification of the latest generation of students in June 2008. Especially aspirants with a Bachelor degree might have problems getting a job. 61,4 percent of the surveyed personnel experts prefer the diploma as the better alternative.

Also the students are in two minds about the Bachelor system – that's the result of the tenth "Studierendensurveys" (Studentssurveys) published by the Ministry of Education. Only 12 percent of the surveyed students assume good job chances having a Bachelor degree. In 2001 this number was about 25 percent. 44 percent advance the view, that the Bachelor system limits the individual study arrangements. The exact opposite was the main aim of the Bologna reforms. 52 percent do expect that the Bachelor is developing to a graduate of second class. Especially students of the engineering sciences threat the Bachelor system with reserve. Meanwhile the German Hochschullehrerverband (Association of University Professors) is speaking about a red alert concerning the Bologna reforms. A few employers are trying to reraise these fears. Therefore 38 companies gave new impulses to the initiative "Bachelor Welcome" during the 30th June 2008 in Berlin. In order to understand better, why the discussion is so controversial it is worth to have a look briefly at the traditional engineering education and at the current situation in the construction industry in Germany.

There are in principle two systems of German engineering education, the Fachhochschule (FH) and the Technische Hochschule or Technische Universität (TH/TU). According to the constitution of the Federal Republic of Germany, education is the responsibility of the federal states. The federation only controls the general principles of the higher education system which are set in the Federal Higher Education Framework Act.

"The higher education system promotes and develops science and art through research, education and studies. The institutes of higher education prepare (students) for professional activities which require the application of scientific know-how and methods... . The different types of schools contribute to this aim according to their specific tasks. Universities link education and research in order to provide a

primarily scientific education. ... Fachhochschulen offer application-oriented education which enables students to make use of scientific methods in professional practice. Fachhochschulen may pursue applied research and development projects which support their educational tasks in so far as they are financed by third party funding. (Article 2)”

German engineering education normally does not have a tutorial system or fixed learning groups. Students are expected to initiate their own study teams. It is a system in which the student acts primarily as an autodidact drawing educational benefits from the system according to his or her own estimation and decision with a certain amount of orientation naturally being given by assistant staff and fellow students. However, the system does not actively “form” the student as is the aim of the French system of formation. Students become formed by succeeding in the system, open and liberal as it is.

While attendance of lectures and tutorials is in general not compulsory, examination prerequisites in the form of calculations, design work and lab reports are controlled thoroughly and the examination themselves are subject to strict organization and high standards. Although there is now a tendency to prescribe a more strict schedule in particular for the basic study phase, German engineering students are not usually obliged to sit an exam immediately after the semester in which they attended the particular course.

The typical engineering professor at a university works at a considerable distance from the students. His or her function is to run a unit (Lehrstuhl, Institut) which is engaged at once in research and in education. The professor is responsible for the management and maintenance of this unit, the development of research projects and for raising sufficient funding. During the lecture period (there are two per academic year, each of 15 weeks) he or she gives 8 lecture hours (each of 45 minutes) per week and is active in academic coordination and self-administration. In the lecture-free period he or she has to organize and supervise the examinations. It is mainly the advanced and postgraduate students who pursue project work in a research unit or are employed in a research team who have the opportunity to learn through personal interaction with the engineering professor.

The situation is, to some extent, different at the Fachhochschule: the FH-professor gives 18 lecture hours per week, the FH-lecture period comprises 9 weeks more than that at the university and the schools and their sub-units are smaller. Research activities play a minor role. The professor at the Fachhochschule therefore has more contact with his or her students. This situation is, however, affected by a surplus of students and a shortage of teaching staff.

It is primarily the level of mathematical instruction and the extent to which subjects such as physics and mechanics are based upon advanced mathematical methods

which make the actual difference between the education provided at the Fachhochschule and the Technische Universität. Both institutions stress their practice-oriented approach, their point of reference obviously differs: the FH refers to the professional practice of engineers, the TH/TU to the practice of advanced R & D. The position of both institutions in relation to each other is a permanent subject of reflection and discussion in Germany.

The Fachhochschulen have far fewer assistant scientific staff as well as less equipment, and funding and therefore do not have the capacity to pursue basic research and complex R & D projects. The education provided by the FH is thus not designed to promote a particular research ability among the engineering students.

Due to the uncertainties of the economic development in Germany, and in Europe as a whole, it is not possible to forecast the demand for engineers more precisely. The interest of school-leavers in engineering studies obviously reflects the movements in the labour market. Placement problems usually reduce the number of new students, which leads to a shortage of engineers after one cycle of studies.

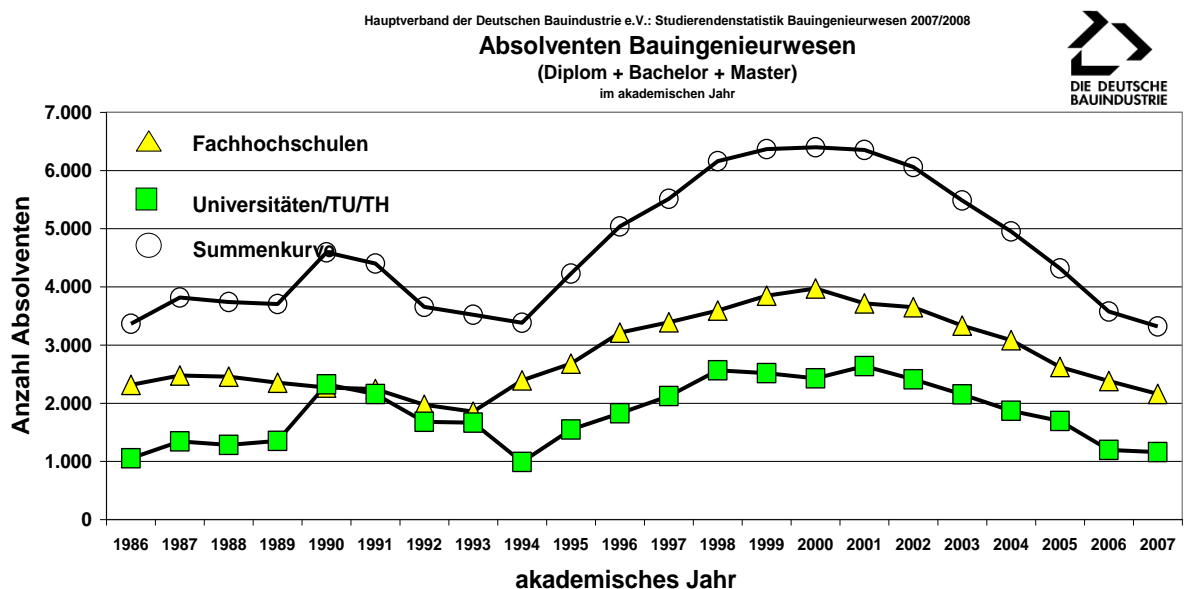
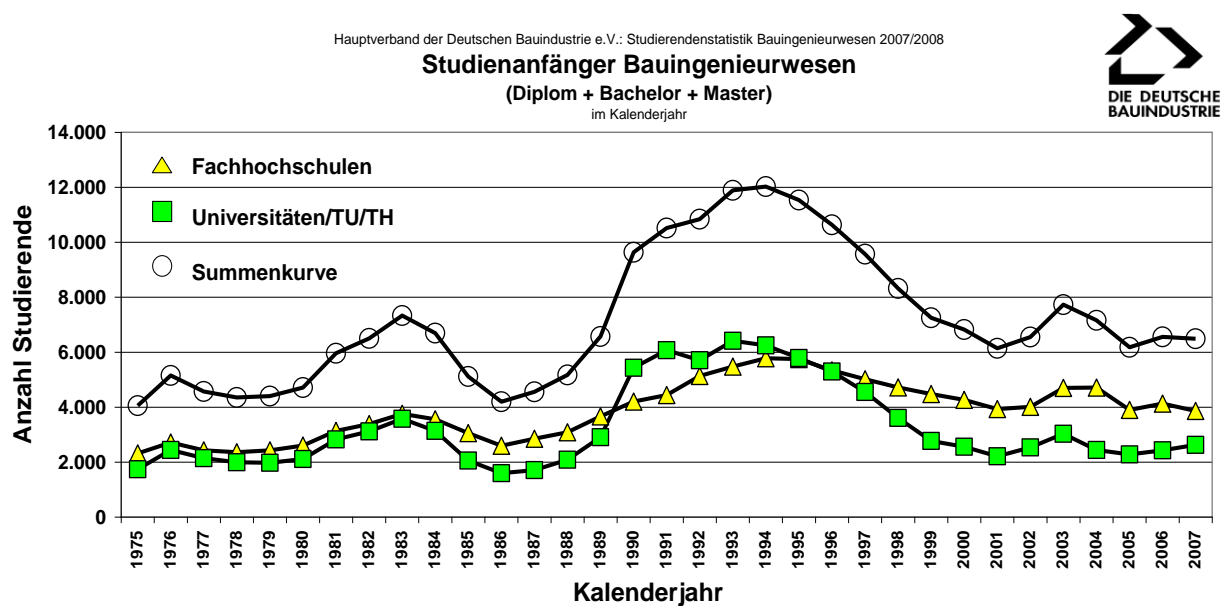
The number of newcomers in the civil engineering in Germany has during the years vigorously declined. In 2001 the number of newcomers has stabilized, but on a very low level! The information is for the whole building industry alerting. Since 1997/1998 the number of newcomers in all kinds of universities declined at 40 %. It is especially dramatic in technical universities, where future managers are educated. This group of beginners has declined at almost 60 % in whole Germany in the considered period of time.

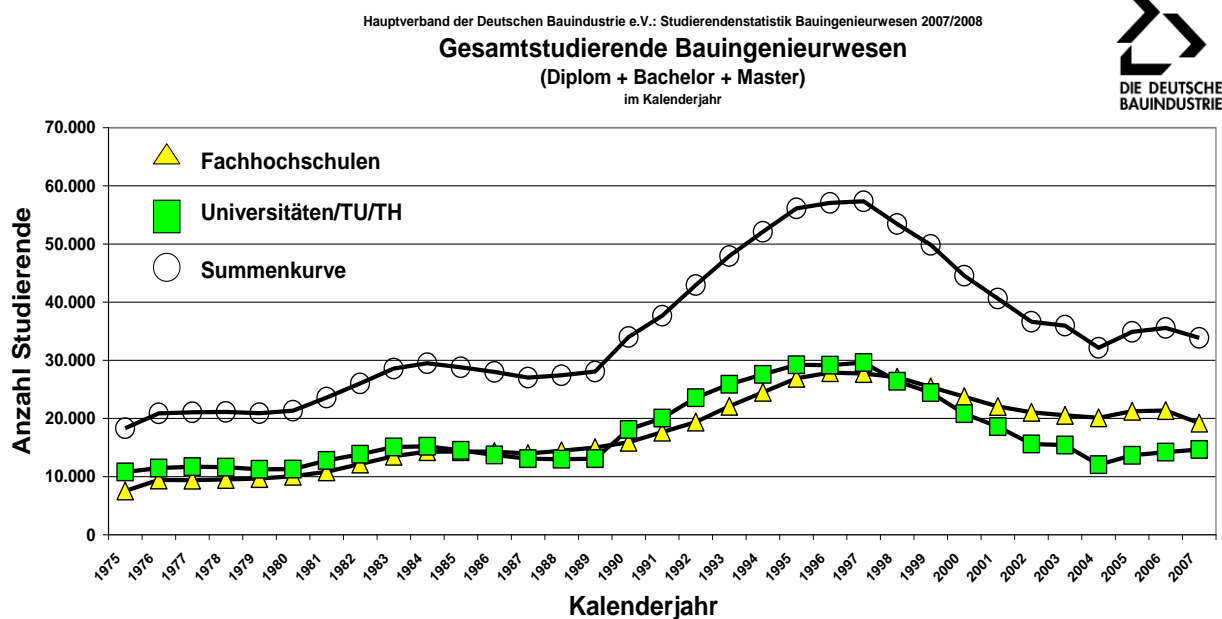
The major reason for the loss of applicants for a place at the universities are mostly negative headlines about the decline of building activity or the spectacular failures, but not the number of unemployed engineers. It is true, that the building branch has to put up with the reduction of investments. But that fact could not really surprise, because the reintegration of East Germany caused an unusual building boom, which had to fade away inevitably. The negative development, which was purely a German problem – in Europa and the whole world the figures are quite different – is in the meantime to the greatest possible extent abated.

The fact remains, that each 12th employee in Germany is directly or indirectly engaged in the building branch. The building industry remains a key national industry. With a 14 % share in the gross domestic product it is one of the most important branches of industry in Germany. However the building branch is at structural change, which demands a unanimous notion of all engineering experts and especially long-termed highly qualified personnel, it means civil engineers, who graduate from universities.

Quality and quantity should be proportional

From point of view of the civil engineers the question of the quality of education needs to be answered as urgently as the question of quantity of the young academics. The latest release of statistics concerning the number of civil engineering students from of the Hauptverband der Deutschen Bauindustrie (Association of German construction industry) shows more Bachelor and Master students than diploma students for the first time. In the summer term 2007 and in the winter term 2007/2008 4676 freshman students enrolled to the Bachelor systems (3150 at Fachhochschulen, 1526 at universities) but only 1326 matriculated to the diploma system. That means 78 percent of freshman students prefers the Bachelor system. The total number of the first term-students in civil engineering decreased to 6.002, which means 0.8 percent less when compared to the lowest level of 2006.





The trend points downward

The number of graduates in civil engineering is decreasing as well. 3,083 students graduated in civil engineering in 2007, which means an decrease of 8,6 percent compared to the year before. The graduates of the diploma system are still the majority, counting 4,872 students. Only 211 students of the Bachelor system graduated last year. The average duration of study for civil engineers (diploma) rose in 2007 to 9.5 semesters (Fachhochschule) and 13.6 semesters (university). No average duration numbers until graduation in the Bachelor program for civil engineers are available at this point.

Based on the regular period of study and the quota of drop-outs of the last ten years the Hauptverband der Deutschen Bauindustrie (Association of German Construction Industry) predicts a yearly average number of graduated civil engineers till 2012 of only 3,800 to 3,400 – with a declining trend.

The consequences for the job market are clear. Already in 2006 numerous civil engineering jobs in companies could not be occupied because of the absence of a sufficient number of graduated aspirants. The number of unemployed civil engineers is decreasing continuously since 2006 from 14,000 to about 4,000 in August of 2008. The Institut der Deutschen Wirtschaft estimated 9,100 open positions in civil engineering and 5,700 unemployed civil engineers in average of the year 2007. In summer of 2008 the difference between open positions and unemployed civil engineers was about 5,000.

Aims towards 2010

The lack of qualified personnel is threatening to become an impediment to the growth of the German construction industry (Prof. Manfred Nußbaumer, Vice President of the Association of German construction industry). Even if the number of civil engineering students should rise disproportionately high, the question of the quality of the Bachelor education system remains unanswered. Until 2010 the requirements and the demands on quality needs to be adapted by all involved, because the Bachelor gets going in civil engineering.

Bibliography

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