

Analysis of the Master's Curriculum

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Abstract. Currently, the developed Master's Program is in the process of improvement and the emergence of new programs. One of such programs is the masters' preparation program in "Industrial and civil construction" opened at the department of architecture and civil engineering of the Ufa State Petroleum Technological University. . The opening of new master's programs, in this case, of the Master's degree in "Industrial and civil construction" requires a special approach to them. In this paper, the curriculum of masters is presented, from the day of their opening. The paper studies peculiarities of preparation for Master's degrees of "Construction" program track during the period 2000-2017 and suggests new project-oriented approaches, aimed at acquiring the experience of teamwork and individual work, practical skills that contribute to improving the quality of master's training with the introduction of new elements in the organization of the learning process. The analysis of the curricula showed their stability, the difference manifested itself in the content of professional disciplines. This has also affected the new program. The process of training masters in this program track requires a special approach. In this regard, the scope of their training in terms of acquiring work experience and skills in design, in technology of construction production and the ability to lead a team has been expanded. The proposed training program allows master degree students to graduate from university with already obtained work experience and professional competencies.

1. Introduction

The development of modern society gives rise to many problems of its existence. One of such problems is the creation of highly qualified personnel through the system of training in universities, in particular through the corresponding master's degree programs. The first master's programs at the USPTU appeared in 1998-2000. They existed simultaneously with the bachelor's programs (Bachelor in "Construction" (code – CB) since 1994) and specialist programs (since 1969). If at the initial stage



the bachelor's and master's degrees were a rare phenomenon and degree course presupposed a scientific and research works, at the current time, bachelor's and master's degrees have acquired a mass character (with 8 masters of only intramural form of study in the USPTU in 2000 ("Construction" program track), and 415 people of all courses and all forms of study in 11 programs in 2017). This made it difficult to conduct scientific research in large numbers. The philosophy of the bachelor and master degrees have changed.

Today, the process of training masters is in the period of renovation, improvement and development, taking into account the emerging professional standards, strengthening contacts with the employer, the introduction of new techniques and approaches. In the last 5 to 10 years, there has been a gap between theory and practice. As a result, the educational community has lost the goals of training masters and bachelors. There is a growing need for a transition to a completely new paradigm of training that takes into account the current trends in the development of the construction industry. Creation of curricula also requires a new approach, namely, educational works, research works, and manufacturing activity, with the introduction of progressive educational technologies to improve the effectiveness of student preparation, especially when carrying out term projects and course works.

One of the main tasks of the development program for the Institute of architecture and civil engineering of the USPTU is to improve the quality of specialist's training and provide a range of new master's programs that meet the needs of employers. Master's programs are the main element in the three-level education system consisting of bachelor's, master's degrees and graduate studies, where master courses have a special place. Since 2000, only two master programs have been opened (№1, "Theory of Design of Buildings and Structures" and №9, "Resource Conservation and Ecology of Building Materials, Products and Structures"). At the present time, there are 11 master programs, 3 of which were opened in 2017 ("Computer-assisted design of buildings and structures", "Industrial and civil construction", "Design and construction of buildings and structures of oil and gas industry").

The basis for the opening of these programs was the establishment of active interaction with enterprises that are consumers of the oil and gas and construction industries interested in expanding the areas of research and services.

This entire educational process must be linked to a single continuous chain of learning through the introduction of a basic educational program curriculum, interdisciplinary and transdisciplinary programs as the basis for the graduate qualification work of bachelors and research works of master's degree students, productive practices and educational internships. For this, it is necessary to develop special programs of practices and research projects, where master's programs are associated with bachelor and postgraduate programs, being an intermediate main link in these programs.

Particular attention should be paid to the range of courses taught within the framework of master's degree program – they should be special courses of professional disciplines that are read in bachelor's degree and reflect the focus of master's training, taking into account the problems of the construction complex of the region. The important aspects of modern training are the original lecture courses read by professors-professionals associated with the major of students and the research work of the departments, such as: "Building structures taking into account the development of the building complex"; "New approaches in construction technology, machinery and equipment"; "Issues of economic planning in modern market conditions"; "Logistics in regional and interregional construction"; "The newest technologies in the field of design and construction"; "Construction chemicals of the region under conditions of import substitution" etc.

Most employers are dissatisfied with the lack of experience of the graduate and a sufficiently long period of adaptation to the conditions of the actual production process. At the same time, the employer is not interested in (or very rarely interested in) the knowledge of a master's degree graduate in the sphere of research works. Readiness to perform professional tasks, the ability to work in a team, the ability to lead, diligence and professional competence are much more valued. This should be taken into account when drawing up the curriculum within the limits of the credit points assigned and it may be necessary to reconsider the degree of involvement of the graduate student in "research work".

Today, the existing legal framework makes it possible to embark on postgraduate studies or undertake a master's degree in the technical areas for "incidental" students who have a non-core and even non-technical education, which fundamentally violates the principles of continuity of such education. In our opinion, this should be possible only on special fields and programs that initially involve interdisciplinary links with non-related specialties, which is taken into account by the curricula of all levels. Training of a professional in construction should be based on the creation of a single curriculum, providing for a smooth transition from one step to another. In recent years, for admission to the Master's degree it is necessary to pass the test, which made possible the appearance in the University of so-called "incidental" students, who simply memorized test material. After this test, the department have to conduct an additional interview in order to determine the depth of knowledge of the "incidental" student in the field. Thus, the testing is not a necessary element for the students continuing education in this area in related programs. Students who have an education that does not correspond to the master's program should not be able to occupy budgetary places, since the lack of knowledge in this area reduces the chances for a proper quality of training a specialist for budgetary funds. The evidence from practice shows that such students, in order to successfully pass end-of-term exams, need to master the profile disciplines from the undergraduate program in parallel with the master's program, experiencing colossal overloads. The analysis of the curriculum of the master's programs of the Institute of architecture and civil engineering of USPTU in the field of "Construction" (Fig. 1, 2) over the past 10 years has shown their stability in terms of credit points. The actualization of the curriculum by years was due to a change in the content of the variable part and the discipline of choice, while preserving the volume of the hours.

Particular attention is paid to the program for the preparation of masters in "Industrial and civil construction".

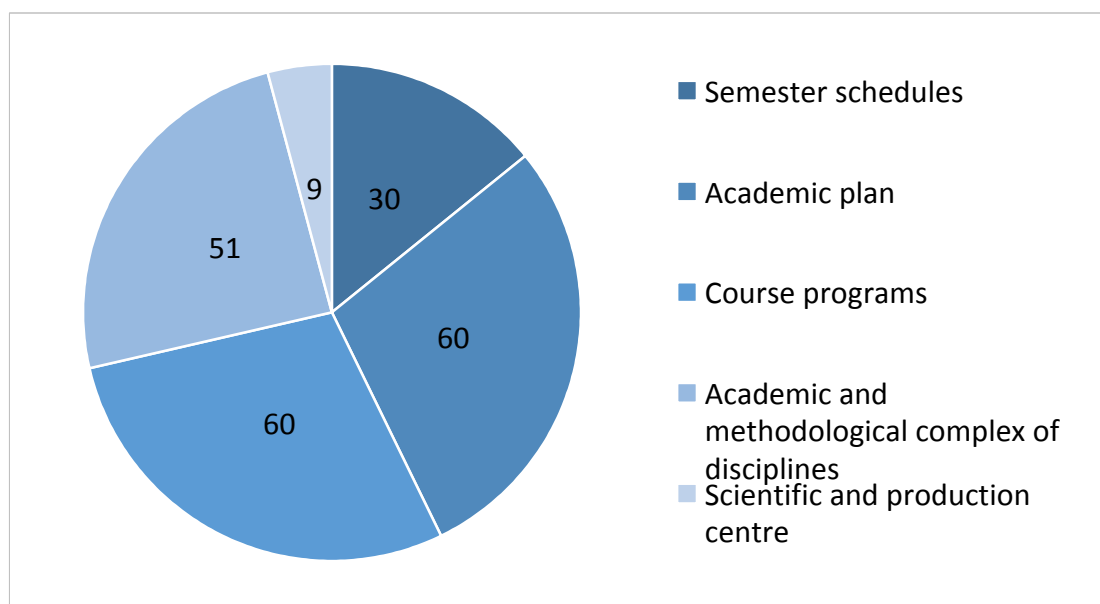


Figure 1. Structure of the main educational program of the Master's degree in «Industrial and civil construction»

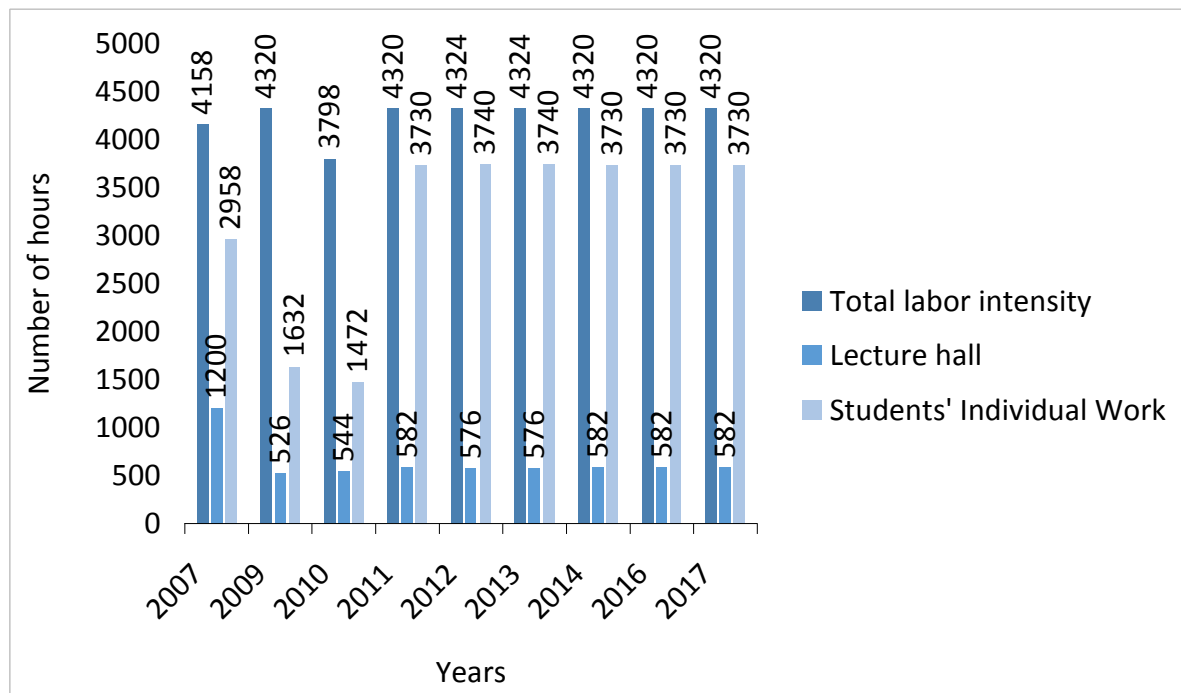


Figure 2. Distribution of hours for the Master's program in «Industrial and civil construction»

In order to gain professional experience in the process of studying at master's degree course it is advisable to change the content of curricula in the framework of research and practice. For this purpose, it is necessary to organize practical departments in line with the type of future activities under the guidance of experienced operatives. They can be design and engineering, engineering and manufacturing, technological, software-integrated, estimate-normative with elements of production management. Each of the master's degree students takes part in its work in accordance with the allocated schedule of the educational process. In addition, master's theses are carried out on their basis. To this end, a team of 4-5 students is created. They are faced with a specific production task related to the topic of the master's thesis. Each participant is given certain powers and tasks for one semester in accordance with the level of knowledge and readiness to solve the task. In subsequent semesters, the roles of the participants and team leaders are changing. During the process of education, students present their work in front of the audience. This presentation, in which they report on the results obtained, reveals the individual creativity of team members, increasing the level of intelligence of each student. In the end, each participant works gradually in all production centers, while gaining experience working as a team and leading a group. From the beginning of the first semester, work on the master's thesis begins. The presentation of the master's thesis can be carried out both in the team and independently by each of the groups, if everyone had his own field of research and analysis of the results obtained in the course of work.

2. Conclusion

Another method for the preparation of competent specialists may be the system of referrals from the academic and methodological council (department, faculty or institute) as the confirmation of the scientific and creative abilities of the bachelor to study at the master's degree in a certain program of the "Construction" program track on the basis of the Bachelor's graduate qualification work presentation results. Previously, the coordination councils of the program tracks carried out this role. Taking into account a sufficiently wide range of tasks for each level of education, it is advisable to form three-level councils within faculties and institutes in the structure of the universities: scientific

and methodological council (Bachelor's degree), scientific and technical council (Master's degree), postgraduate council. Such a structure will allow to take into account the specifics of training at each level and simultaneously implement continuity, expand the range of interaction with employers based on the tasks of each educational level, differentiate the areas of grant support for research and commercialization of results

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