

70-YEAR HISTORY OF ENGINEERING EDUCATION IN ALTAI

*I.I. Polzunov Altai State Technical University
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Key words: *Engineering Education, Altai, I.I. Polzunov AltSTU*

The article presents the historical view of engineering education development in Altai. 70-year history of I. I. Polzunov Altai State Technical University is described.



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It was severe December, 1941 when the whole country lived under the slogan of the famous Soviet song "Sacred War":

«Rise up, tremendous country!
Rise up for the mortal fight
Against the dark fascist forces,
Against the cursed hordes!
May the noble fury
boil over like a wave.
The people's war is on its way
The sacred war!...»

And it was at this time when 12 faculty members and 20 students of Zaporozhskiy Engineering Institute together with their Director, Leonid G. Isakov [1, P. 16-22], arrived in Barnaul in two carriages of special evacuation train. On February 23, 1942 the Director issued an Order that resumed the classes despite the fact that the premises which were provided by local authorities for teaching accommodation were still being renovated. Under such heavy conditions, the studies were started. A month later, in March 1942, the first 77 students, evacuated from Moscow Auto Mechanical Institute along with their instructors, were enrolled in the first/second and third year of the Institute programs. It was Moscow students who became the first enrollment

of the third Institute department – Department of Automobiles and Tractors. By May 1942, 12 departments, with total number of faculty members reaching 27, had been established (Department of Mechanical Engineering Technology, Metal Technology and Metallurgy Department, Department of Strength of Materials and Machine Elements, Mechanics Department, Power Engineering and Automotive Industry Department, Department of Mathematics, Chemistry Department, Physics Department, Department of Marxism-Leninism, Department of Foreign Languages, Department of Military Training and Department of Physical Training).

Certainly, the most difficult task, i.e. to solve the problems in student and faculty housing, as well as setting up of Institute studies, fell on the Director and academic staff evacuated from Zaporozhye. Associate professor N.A. Govorov, a full brother of a legendary Marshal of the Soviet Union L.A. Govorov, was appointed as Dean of Mechanical Engineering Faculty. Associate professor V.P. Ilyachenko became a Head of Metal Technology and Metallurgy Department, while associate professor A.E. Gurvich accepted the call to become a Head of the Department of

Strength of Materials and Structures and agreed to manage scientific research and development in the Institute. Assistant Professor L.P. Leonov became a Head of Mathematics and Physics Department. Then, the Department of Mathematics became a separate academic unit and was headed by Doctor of Physics and Mathematics, Professor I.P. Natanson. He occupied this position up to 1944. When the Soviet troops fully lifted the siege of Leningrad, he returned to the Institute where he worked before. For a great number of Soviet students, his High Mathematics book became an indispensable guide for many years. The total number of students enrolled in fall 1942 was 484, in 1943 -389 students and in 1944- 326 students. At war-time, the number of students varied as a result of academic failure, however, it was not the only reason, for example, in 1943 approximately 200 students went off to war as they had no any occupational deterrent. During the 1944-45 academic year, many students returned to their home towns and regions which were released from occupation by Soviet soldiers. At this time, enrollment at the University swelled from the influx of young veterans, wounded men, as well as former students and instructors who survived and returned home. During the toughest and the most difficult years of World War II, from 1942 to 1945, Leonid G. Isakov, Director of the Institute, and faculty members ensured by the support of local authorities, managed to provide training of qualified engineers with the requirements of Altai defense industry. There were only 43 faculty members at all. In December 1943, the university was renamed as Altai Engineering Institute (AEI) in accordance with Government Order. On June 16, 1943, the regional newspaper "Altayskaya Pravda" published an article about the first 13 graduates of Altai Engineering Institute, where it was stated that "Barnaul Mechanical Engineering Institute can become and will become a real talent foundry which can prepare qualified industrial leaders for the country". Twenty years later, those proved to be fatidic words when Vasily G. Radchenko became the Head of the Institute and turned it to

the "alma mater of engineers" in Altai [1, P. 32, 62]. University facilities were also expanding. In 1943, the second housing area optimized for 100 students was constructed (the construction was completed by its own efforts next year, in January), the third housing area for students, instructors and institute staff was constructed in 1944. Besides, a number of laboratories and classrooms were built. The fund of the library numbered about 8 thousand volumes. Construction and renovation were made without any assistance. The Komsomol Committee formed groups of carpenters, plasterers and house-painters, which were comprised mainly of students and faculty members.

The year of 1947 saw a number of significant happenings. On September 4, in accordance with the Order of the Minister of Higher Professional and Vocational Secondary Education of the USSR, Altai Engineering Institute was reorganized into Agricultural Engineering Institute. At this time, there were 47 full-time instructors and 9 part-time instructors (only one professor, P.V. Melentiev, and 4 associate professors) who worked at 12 departments. Leonid Isakov, Director of the Institute, was conscious of the fact that to enhance prestige of the Institute and to improve educational quality, it was required to increase the number of highly qualified staff. Therefore, he and Deans of the faculties were actively involved in solving staffing problems. At this time, a number of engineers with Candidate Degree and vast industrial experience were employed in the Institute: I.V. Burgsdorf became a Head of Metal Technology and Metallurgy Department and worked as Vice-Rector for Research and Development from 1949 to 1965. A.D. Vorobieva and A.V. Gandler became the heads of the Departments of Chemistry and Mechanical Engineering Technology, respectively. Honors students graduated from the Institute in post-war years were invited to stay involved in the life of the university and to remain engaged with their faculty.

During these ten years (from 1942 to 1952), Agricultural Engineering Institute prepared 536 qualified

specialists with high professional education to meet the needs of defense industry and national economy not only of Altai, but the whole Soviet Union. The credit of this noble deed was due to Leonid G. Isakov, Director of the Institute.

В эти годы начато строительство учебно-научного центра. On May 20, 1952 Associate Professor, Candidate of Technical Science, Konstantin D. Shabanov was appointed to the position of the Director of the Institute (1910-1963) [1, P.23,31]. The task that faced him was not only to push the matter through but also provide sustainable development of the Institute. The main problems that the Institute had to solve were as follows: lack of possibility to improve poor educational and operational support facilities, shortage of enrollees and as a result non-competitive admission to the Institute, for example, the enrollment plan for 1952-1953 academic year was 200 students, however, only 170 entrance applicants were submitted. In 1952, the Institute celebrated its 10th anniversary. By this time 13 departments and 2 faculties (Faculty of Tractor Industry located in Barnaul and Faculty of Agricultural Engineering located in Rubtsovsk) had been established. There were 6 buildings, 5 of which were heated with furnaces, 18 laboratories and offices.

The Institute staff and students were engaged into different kinds of research and development work. For example, the first collection of AEI scientific papers was published in 1952, the second one – in 1957.

Due to the fact that industrial plants and agricultural industry were rapidly developing after breaking new ground and fallow lands in Altai, there appeared an urgent need for engineers of chemical, energetic and mechanical engineering industries, as well as specialists in grain storage and processing, construction and design of lift conveyors, machines and instruments for food-manufacturing industry. On May 20, 1959, Council of Ministers of the USSR adopted a Regulation establishing Altai Polytechnic University. A month later, Agricultural Engineering Institute was renamed as Altai Polytechnic Institute

(API) in accordance with the Order of the Minister of Higher Professional and Vocational Secondary Education of the USSR. 500 thousand roubles were granted to purchase teaching laboratory resources and classroom equipment. At that time, this sum of money was rather immense as, for example, a turning lathe cost 2 thousand roubles, while the prices for drills, cutters and millers varied from 10 kopecks to several roubles.

During the period from 1959 to 1960 there were also a number of significant events. On June 22, 1959, two new faculties were established: Faculty of Construction and Faculty of Chemical Engineering. Four Degree Programs were developed and introduced: "Industrial and Civil Construction", "Engineering Construction Manufacture", "Welding Equipment and Technology", "Machinery and Metal Processing methods". In June, the construction of educational building and two dormitories for 500 and 516 students was started. In August 1959, in accordance with the Decree of Regional Executive Committee of Communist Party of the Soviet Union, a new four-storeyed building intended for Regional Party School was granted to the Institute. In September 1959, there were 2500 students studying at four faculties which offered 11 degree programs. The academic staff numbered 147 full-time instructors, 18 of whom were Candidate's degree holders. However, there was no faculty member who held a Doctor's Degree. Enrollment in the fall of 1959 totaled 650 students, with full-time enrollment being 525 students and evening tuition – 125 students. On October 12, the number of academic staff members elected to the Academic Council was approved. Also, in October, the Institute initiated construction of the main building in the sandy waste land (14,4 hectares) where there was a small wood called by people "Dunkina" at the beginning of the XXth century. Under 8-year leadership of Konstantin D. Shabanov, the Institute became a famous higher professional establishment far from the central part of the country, which not only provided high quality training, but also carried out in-depth scientific

Table 1.2. Number of Students and Graduates in First 10 Years

Academic Year	Student Num-ber (person.)	Student Number (person.)	Academic Year	Student Number (person.)	Graduated Engineers (person.)
1942–1943	360	13	to 1.09.1949	721	72
1943–1944	389	13	to 1.09.1950	764	79
1944–1945	326	17	to 1.09.1951	856	94
to 1.09.1946	375	9	to 1.09.1952	911	140
to 1.09.1947	447	51			
to 1.09.1948	711	78		Total	536

Table 2.1. Student Enrollment and Number of Graduates in 1952–1960.

Year	Student Enrollment	Number of Graduates	Year	Student Enrollment	Number of Graduates
1952	911	139	1956	More than 1500	128
1953	937	98	1957	More than 1600	192
1954	1266	115	1958	More than 1800	236
1955	1480	133	1959	More than 2500	264
			1960	More than 3000	352
				Total	1657

research. Student enrollment is given in Table 2.1.

When Konstantin D. Shabanov abandoned his post, Vasily G. Radchenko, laureate of the Lenin Prize in Science and Technology, was appointed to the position of the Director of the Institute in accordance with the Order of the Minister of Higher Professional and Vocational Secondary Education of the USSR [1, P.32, 62]. With his natural activity, he got down to business and concentrated all his efforts on developing large professional institute in the South of West Siberia. At the end of 1960, the Institute comprised 4 faculties, 17 departments; the teaching staff included about 147 full-time faculty members, however, only 18 instructors were Candidate's degree holders and more than 70 instructors took the position of teaching assistants. Therefore, on December 9, 1960, under the chairmanship of Konstantin D. Shabanov, Academic Council took a decision to decrease teaching load of those instructors who were engaged in scientific research. Those young and perspective specialists were sent to participate in various post-graduate

programs offered by Professional institutions and universities of Moscow, Leningrad, Tomsk, Voronezh, Saratov, Kazan, Sverdlovsk.⁸⁴ faculty members entered post-graduate program in 1960, 1961 and 1962. In September 1960, the first Sambo sport club was established. In accordance with the Order of Minister of Higher Professional and Vocational Secondary Education of the USSR (from May 26, 1961), the institute was named after I.I. Polzunov, a talented Russian inventor of the first steam engine. The year 1961 involved many significant events which were important for the advancement of the sciences in the Institute. One of them was the establishment of the first post-graduate program. By September 1, 1961 there were 3823 students in Altai Polytechnic Institute, 2147 of them were full-time students and 708 evening students pursuing Degree in Barnaul, 268 evening degree students – in Biysk, 700 evening degree students – in Rubstovsk. In March 1962, Faculty of Extension was established. During the next three months, 6 new departments were created. A new Degree Program "Internal Combustion Engines" which was

previously offered by Tomsk Polytechnic Institute was introduced in API. To ensure successful program implementation, a distinguished scientist, Professor V.K. Nechaev was invited to API. His arrival became a powerful incentive to the advancement of sciences in API.

In September 1, 1963 there were 4979 students (2528 full-time students) studying at 28 departments. The teaching staff numbered 296 instructors, including 3 Doctor's Degree holders. The main building of the Institute had been constructed by the beginning of the 1964-1965 academic year. This building housed 34 lecture rooms, conference and sport halls, and a library with a reading room, with total capacity being 450 seats. Construction of 2 dormitories was completed in 1963 and 1964. Besides, a canteen for 300 persons was built in 1964 and the construction of a two-storeyed lab building was completed in December 1965. At this time, the Institute had 10,000 m² of educational and industrial premises. It should be noted that a special Community Service Office was organized by API Communist Party, which was headed by the Dean of Chemical Engineering Faculty, Associate Professor, L.A. Gerlakh. It is impossible to overstate the importance of this organization. About 2000 students and faculty members were involved in the construction of the main building of the Institute in summer of 1964. In general, students and their instructors devoted approximately 120000 hours of their personal time to the construction the Institute buildings in 1964.

This year the construction of the first Computer Center in Altai intended for mechanization and automation of research, mental and scientific work was initiated. In 1968, more advanced computer model "Minsk-22", which could be found not at every university of the country, was obtained. In January 1966, the Institute employed 450 instructors, 63 of them held academic degrees.

One of the most significant events took place on January 10, 1967 when API hosted All-Soviet Union Symposium dedicated to 200th anniversary of the first steam engine invented by

I.I. Polzunov and 25th anniversary of Altai Polytechnic University. Among participants of the symposium there were academicians of Siberian branch of USSR Academy of Sciences, i.e. its chairman – M.A. Lavrentiev, S.S. Kutateladze, V.V. Struminsky, A.V. Okladnikov, first secretary of Regional Communist Party – A.V. Georgiev, chief engineer of "Transmash" factory – L.V. Markin, chief designer of Barnaul Boiler Factory – N.V. Pavlov. More than 500 scientists from different towns, leading specialists, directors of various factories, API alumni attended the plenary meeting of the symposium. In 1970, three new departments were established: «Technology of Grain Storage and Processing», "Food Industry Machines and Instruments", "Economics and Industry Engineering". Biysk Affiliated branch of API launched the first full-time degree program "Chemical Plant Equipment". Altogether, the number of specialists graduated from the Institute this year was 1227, the total number of students was 9157 (full-time students – 4812). Under 12-year leadership of V.G. Radchenko, 10464 highly-qualified engineers graduated from the Institute.

One of the most important tasks was also to train qualified academic staff – candidate's and doctor's degree holders, professors and associate professors. To fulfill this task, the Institute was constantly increasing the number of the instructors involved in post-graduate program. Since 1959, special-purpose post-graduate programs were commonly offered by large higher education establishments of such cities as Moscow, Leningrad, Rostov-on-Don, Sverdlovsk, Novosibirsk and Tomsk. For example, in 1971, there were 119 postgraduates in API (special-purpose post-graduate program – 81 post-graduates, API postgraduate programs – 38 post-graduates), 18 post-graduates successfully defended Candidate's dissertations, 2 post-graduates – Doctor's dissertations. In 1981, the number of post-graduates was 189 (102 - special-purpose post-graduate program, 36 – one-year post-graduate program, 51 – API postgraduate program), 23 faculty members successfully defended Candidate's

dissertations, 2– Doctor’s dissertations. Overall, during 27 years, 1097 faculty members completed postgraduate course, 456 Candidate’s dissertations and 24 Doctor’s dissertations were successfully defended.

At this time the construction of the sixth dormitory designated for married students and education building for food production was initiated. A number of new department was established: “Industrial Power Supply”, “Building Constructions” (1971 r), “Soviet Legislation and Professional Safety” (1974 r). Department of Chemical Engineering Technology was established in API Affiliated branch in Biysk (1975 r). In 1976, Department of Foundation Engineering, Geo-engineering and Geodetics was established. It was headed by Professor G.I. Shevtsov who still has been occupying this position. Altai Polytechnic Institute named after I.I. Polzunov was the first technical institute and second higher education establishment in the Soviet Union which applied computer technologies in assessing applicant knowledge, skills and abilities in 1978. Moscow Institute of Economics and Statistics was the first higher educational establishment in Soviet Union which developed and introduced computer programs (automated control system “Admission”) in entrance exams. V.G. Radchenko decided to adopt this practice; however, there were some difficulties to be solved. Firstly, Moscow Institute of Economics and Statistics was 5 times smaller in terms of student number. Secondly, there were no entrance exams in Chemistry. That’s why, it can be stated that API became the first higher education institution in the country which introduced automated control system in Mathematics, Physics and Chemistry admission tests. Associate Professor of Chemical Engineering Department (at present - Professor) A.V. Vikharev developed a set of assignments in Chemistry. Since 1984, this system has been also applied in Russian Language and Literature admission tests. Based on the positive experience of API in implementing computer technologies in admission procedures, Ministry of Higher Education Institutions of

the USSR recommended all higher education institutions of the country to apply this automated control system. These recommendations were approved by the Committee of the Ministry of Higher Education of the USSR in January 1983. API was stated to be a leading higher education institution in terms of implementing this computer technology. This fact significantly raised the profile and improved the image of the Institute within the whole country.

Due to API faculty members, students and staff, API took the second place in socialist competition of higher professional institutions of the country in 1981. In January 1983, there were 12 thousand students in API, including its affiliated branches in Biysk and Rubtsovsk. On the whole 17, Doctor’s Degree and 398 Candidate’s Degree holders were involved in teaching process.

After stepping down as a Rector in 1987, V.G. Radchenko was appointed as the Head of Welding Equipment and Technology Department which was renamed Department of Small Business in Welding Engineering in 1997. He held this position until 2011. His high energy, bold and creative thinking, engineering experience and managerial skills helped him to provide the Institute with new facilities, manage the thousands of faculty members, maintain the schedule to expand Institute’s premises. As a result, a number of new teaching laboratory buildings, equipped with sophisticated equipment and teaching tools, dormitories and residential building, health and recreation center, roofed sports complex, canteen, health camp were constructed both in Barnaul and API affiliated branches in Biysk and Rubtsovsk (26 different buildings with floor area more than 133000 m², including Computer Center, Institute TV studio). Under his direction, the Institute expanded by establishing new 15 faculties and 56 departments which trained more than 35000 engineers and offered 26 education pro-grams. Annual total Institute enrollment was 2745 students. In general, under his 27-year supervision and guidance, API trained 35016 qualified engineers, became one

of the largest education establishments and scientific centers in Siberia and the whole country, which had significantly contributed to the development of higher professional education and scientific activity of the Academy of Sciences. It can be definitely stated that API has become a real talent foundry in Altai. After stepping down as a Rector, Vasily G. Radchenko defended Doctor's dissertation, became Lenin prize winner and Honored Master of Sciences and Engineering of the USSR, was awarded by four Orders of the Red Banner of Labor and 10 Medals of Honorary Citizen of Barnaul. On May 13, 2012, he died at the age of 86.

New Rector of Altai Polytechnic Institute (one of the largest polytechnic institutes in Siberia) was appointed in 1987. He was a representative of Tomsk scientific school, Doctor of Physics and Mathematics, Professor Vladimir V. Evstigneev [1., P. 6, 2, P.63,64]. Under his direction, Institute Economic and Social Development Plan for 1990-2000 was adopted in January 1988. During 1988-1990 years, the branches of Internal Combustion Engines Department, Automatic Manufacturing Technique Department and Engineering Automated System Department were established in "Transmash" and Barnaul Radio Manufacturing Plants. Besides, new departments such as Department of Higher Mathematics and Mathmodeling, Department of Physics and Composite Material Technology, Department of Experimental Physics and the Faculty of Automatic Manufacturing Technique were created. The first Humanitarian Faculty aimed at train-ing specialists in humanitarian sciences was established in API in April 1991. At the same year, the Faculty of Foreign Students was created. On September 1, 1991, 12 thousand students were enrolled in API, academic staff numbered 850 full-time instructors (560 Candidate's Degree holders and 29 Doctor's Degree holders).

Two remarkable events highlighted year 1992. First of all, Altai Polytechnic Institute named after I.I. Polzunov celebrated its 50th anniversary. Secondly, in December it was awarded a new status and renamed I.I. Polzunov Altai

State Technical University (ASTU). It is worth noting that during this 50-year period, faculty members trained 43691 specialists with higher professional education. It is the contribution that our Institute made to the industrial development of the world power country, the USSR. Vladimir V. Evstigneev paid special attention to the issues of doctoral training. Special program was launched in ASTU in 1992. Altogether, since 1960 the faculty of post-graduate studies has trained 3357 post-graduates and 201 doctoral students; 786 were involved in special-purpose post-graduate programs.

Under 27-year guidance of Vasily G. Radchenko, 361 post-graduates were enrolled in ASTU and 736 were involved in special-purpose post-graduate programs. 455 faculty members defended Candidate dissertations and 25 – Doctoral theses. However, the number of professors, holders of Doctor's Degree, was not so high. In 1987, there were only 18 faculty member who held Doctor's degree. Despite this fact, it can be stated that Vasily G. Radchenko laid the foundation of further Doctoral program by training a great number of Candidate's Degree holders. This is why ASTU was considered to be a talent foundry which trained engineers for national economy of industrial country – the Soviet Union. Rector Vladimir V. Evstigneev picked up the slack on post-graduate programs and increased the number of faculty members holding Doctor's Degree. Therefore, it can be stated that under the supervision of Vladimir V. Evstigneev (1987-1997), the University achieved significant academic results and raised the profile of the University both in Russia and abroad: number of graduated specialists – 13849, 133 Candidate's Degree holders and 47 Doctor's Degree holders.

By September 1, 1998, there were more than 11000 students studying at ASTU including affiliated branches in Biysk and Rubtsovsk, as well as Altai Academy of Economics and Law (8,5 thousand full-time students). Three-tier education system (Bachelor's degree – 4 years, Specialist's degree – 5 years, Master's degree – 6 years) was introduced in the context of 17 education programs and 43 specialties.

Vice-Rector for Research, Professor A.A. Maksimenko has significantly contributed to developing federal program "Students, Post-Graduates and Young Scientists for Small Science-Charged Business" – "Polzunov's Grants". Due to his insistence and special gift to persuade using numbers and facts, he convinced the members of the Ministry of Education and Science to endorse the initiative of ASTU to launch and coordinate the program "Polzunov's Grants". The program is designated to attract the youth to creation, development and implementation of products or technologies with substantial scientific capacity, which is of great importance in innovative development of Altai region.

During the period from 2007 to 2012 which is characterized by the reform of High School, transition to the multi-level education system, establishment of various federal, local and innovative universities, ASTU was headed by Doctor of Economics, Lev A. Korshunov. Today, the Rector of the largest higher educational institution in Western Siberia is Doctor of Technical Sciences, Professor Alexander A.Sitnikov who carries on the best traditions of

engineering school in compliance with new economic requirements.

In conclusion, it is necessary to summarize the results which were achieved by ASTU during its 70-year history. ASTU trained: 101581 specialists, 93192 of which are qualified as engineers; 19237 reserve officers; 201 Doctor's Degree holders and 1172 Candidate's Degree holders. Academic staff numbers 884 instructors, including 86 Doctor's Degree holders and professors, 1 – Lenin Prize winner, 5 Laureates of Presidential Awards, 28 honored workers of science, education, etc., 226 honorary workers of higher professional education of the Russian Federation. Main university buildings, 6 dormitories are located in Barnaul (12,7 hectares). Besides, there are affiliated branches in Biysk (Biysk Technological Institute) and Rubstovsk (Rubstovsk Industrial Institute).

All mentioned achievements definitely contribute to the positive profile of I.I. Polzunov Altai State Technical University and prove its dynamic development and constant quality enhancement.

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