

FORMATION AND DEVELOPMENT OF OIL-MECHANICAL ENGINEERING IN AZERBAIJAN IN 1920-1950s

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In the last quarter of the XIX century rapid progressing of Azerbaijan's petroleum industry had stimulated, naturally, a demand for machinery and a necessity of its repair. At the end of the XIX century there were already 18 mechanical and iron plants in Baku. They consisted of semi-handicraft machine-repair shops and small mechanical factories manufacturing primarily repair works and producing a foolproof commodity for oil fields and refineries (primitive sand reels, drilling machine tools of a percussion type, bits and others). These plants, as a rule, incorporated mechanical, small iron, forge and boiler shops. All by-works, as well as the haul between shops of semi-finished items and ready products were performed manually. The majority of these factories and mechanical plants were placed in industrial districts of Baku: Bibi-Heybat, Sabunci, Ramani, and Black and White cities.

The capital equipment and instruments operating in the Baku plants at the beginning of the XX century were either imported from abroad or delivered from other industrial regions of Russia. And the realization of an unrolled salvager and engineering reconstruction of the oil industry of Azerbaijan in 1920s required a great amount of new machinery, the fabrication of which was resolved to stage immediately in the Baku factories, accordingly having renovated them.

The basic commodity of the mechanical plants was the machinery for boring and exploitation of oil wells and also for oil processing and the storage of oil. Besides, the bits for percussion boring, bitch, steel and pig-iron casting were produced. The repair of

oil field and oil-refining machinery occupied a large place in the activity of the mechanical factories and workshops.

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The largest machine works on rigging the oil industry by the off-shelf machinery at that time were conducted in a former factory of Khatsov, subsequently named after Lieutenant Shmidt. Its engineering workshop was reefered with a great many of miscellaneous cutting machines; all with an individual actuator. The steel department was also reamed. In 1927 one of the first arc electric steel-fusion boards of the Geru type, and in 1929 – the second one, more powerful arc electric steel-fusion board were installed here.

It is necessary to mark that the start-up of these boards had allowed improving considerably the quality and longevity of the machinery produced by the factory, due to the fabrication of some parts from alloy steel. And in the pig-iron shop there were installed centrifugal ambulances, with the help of which the quantity production of high-quality bushes for deep pumps was organized.

In 1926, for the first time in the USSR, the factory named after Lieutenant Schmidt organized the production of hard alloys, such as “Vocar” for building-up welding of cutting edges of bits by them. The specialists of the factory also ran in building-up welding that has reduced in magnification of durability of bits and promoted a heightening of drilling rate. In connection with a solution of some problems of metallurgy, the experienced masters from other republics of the USSR were attached to the factory, which helped the factory in installation and development of machinery, and adjustment of production as well.

In a short time the collective of the factory managed to run in fabrication of the basic kit of major machinery for boring and exploitation of oil-wells, namely: double speed winches, rotary tables of an opened type, inserted journals, machine tools - rotary

balanced jacks, tackles system, deep pumps, wall hooks, mud mixers, mud pumps, compressors etc.

At the same time in the factory named after Lieutenant Schmidt the making of a production tree and deep pump rods was organized. Large assistance to the factory in this way was rendered by the industrial plants of Russia. Experience of the factory, and constructions of oil machinery designed by it have put a beginning of oil-machinery production in Azerbaijan.

At the factory named after Lieutenant Schmidt, great attention was paid to conducting of research works and trials. The test station reefed with the labware, most committed at that time, was constructed at the factory. By the way, this station was included later into the large research and development institute of a petroleum industry – AzNIINP, established in 1920.

Since 1925 the factory named after Lieutenant Schmidt initiated discharge of deep pumps. For this purpose, the gaseous machine shops of the Surakhany district constructed in the same year were transferred to the factory. Here came to be produced a rotary balanced jacks for a central power, jerkier rods, elevators for drill rods, core drills, drilling locks, strainers for deep pumps and other machinery. In 1930 the Surakhany workshops were withdrawn as an independent mechanical factory named after F. Dzerzhinskiy.

Production of rotary balanced jacks for the tackle systems was massed in the “Bakinskiy rabochiy” factory, created on the basis of the former Ben-Endorf Corporation's workshops in Sabunci. Production of drilling bits, elevators, locks for boring pipes, bells, and taps was organized in the former remedial field shops of the petroleum producer Mantashev. Later, they expanded and reorganized this factory (disposed in the present Surakhany district) and named it after Kirov. Another renovated factory, named after P.Montin, specialized in the production of different machinery for refineries (returbends, steam pumps of a piston type, pig-iron armature, pick hammers, tubes with square form etc.).

During the maiden years of the Soviet authority in Azerbaijan the oil industry machinery factories were reefed with the process equipment, new and committed for that period. Alongside the oil

machine industry in Baku, other branches of machine industry developed as well. For example, in the factory VSNKh #5 “Bakkommuna” production of tank machine tools was created, which met the demand for them from all over the Soviet country. In the same factory the production of large steel shaped casting for the cement industry of many USSR regions, first of all, of Transcaucasia, was adjusted. The discharge of steel castings for cement industry was organized also in the VSNKh #2 factory. Large production on repair of the sea vessels was unrolled then on the “Parizhskaya kommunna”, “Zakfederatsiya” and other factories.

It is necessary to state here that production of cutting machines (turning, drilling and shaping), which were shipped to other regions of the USSR, was well organized on the basis of mechanical educational workshops of a new Azerbaijani oil (subsequently - industrial) institute.

It is necessary to point out that the reconstruction of the Baku machine works became the beginning for perfecting the petroleum industry of Azerbaijan as leading branch of its economy. It was important for:

- 1) organization of a powerful base for oil machine industry;
- 2) creation and further progressing of domestic oil machinery and instrument constructions adequate to a level of engineering of that time;
- 3) full redemption of an oil producing industry of the import machinery. The reconstruction and building of new factories was carried out in short terms,

Mechanical engineering, which faced new severe technical problems, needed urgent solutions already during this period.

Large complications in rotary drilling were spawned in that time by curvature of the drilled wells' shaft. As a result of the creation and intrusion in Baku of a domestic construction of automatic regulator of a bit feeding (the first automatic machine by the Baku engineer Skvortsov), and also a vehicle on measuring curvature of well (also struck out by a group of the Baku specialists) it became possible to reduce curvature considerably.

Another weak link in boring was the poor stability of bits of the cutting type - PÕ. These difficulties were overcome by hard facing of cutting part of the bit by hard alloy.

The machinery released in that time, such as double speed winches, rotary tables of opened type, wood tubular derricks, the machine tools – rotary balanced jacks – were designed only for wells with a depth up to 1000 meters. For boring deeper wells and for increasing their exploitation performance more powerful machinery was required.

In connection with this, in January, 1931, for the first time in the former USSR, the research and technological basis for oil machine industries (subsequently - AzINMASH) was created in Azerbaijan, which aimed at the speeding-up of developing domestic constructions for the oil-field machinery and at redemption from import dependence. In cooperation with the designer office of the factory, named after Lieutenant Schmidt, this institute constructed new types of equipment for boring deep wells (2500-3000 m) within two-three years. The factory produced the maiden sample of a new four-fast-track hoist. During the same period, AzINMASH, together with several other factories, developed and ran in production the following items: a rotary table of enclosed type, motor reduction gearbox (with the factory named after lieutenant Schmidt); metallic tubular derricks, drill-rings and machine tools - rotary balanced jack (with the “Bakinskiy rabochiy” factory); two-shaft mud mixer and other equipment (with the “Oktyabrskaya revolyutsiya” factory).

Mastering with the Baku factories of new engineering in the shortest possible time ensured realization of the problem of reconstruction of the boring and oil extracting on the basis of new-type oil machinery. The new-type engineering first of all equipped oil extracting with pulling machines, metallic machine tools – rotary balanced jacks, flushing aggregate and other machinery. So, the discharge of turbodrills of Kapelyushnikov system and 4 size types of the deep pumps ran in the factory named after Dzerzhinskiy; actuators to these pumps and machine tools – rotary balanced jacks of domestic construction ran in the “Bakinskiy rabochiy” factory. Auto-remedial factory named after Lenin and the “Oktyabrskoy

revolyutsii” factory ran in discharge of tractor hoists for the underground repair of wells.

During this period almost all refineries in the USSR were furnished by returbends and other machinery produced in Baku, in the factory named after P.Montin. In accordance with magnification of the wells' depth, the processes of their development and exploitation became more complicated. So, large formation pressures combined with magnification of depths required a high-pressure production tree for well ostium equipment. There was a problem in creation of a high-pressure production tree of 75 and 125 atmospheres to replace 40-atmosphere production tree operating at that time. The factory named after Lieutenant Schmidt successfully resolved this problem.

Considerable successes were reached by the Azerbaijan machine-builders, especially the labor collective of the factory named after P.Montin, in the matter of redemption from import of foreign equipment. Implementation by the Azerbaijan oil-workers of the first five-year-plan in 2,5 years led to further growth of the boring and mining with sharp magnification of production of the oil machinery and systematic improvement of service performance by our oil industry specialists.

The appreciable magnification of drilling rates was promoted by considerable reinforcing of a bit facilities for the period of 1932-1935: the new constructions of bits were run in, the discharge of bits of a crushing type, has begun to be applied domestic hard alloys to a building-up welding of bits and first quality steels for their fabrication etc. The second pre-war five-year-plan period was characterized by completing of large operations on creation of major types of high-performance machinery and instrument of domestic constructions which were resulting in a native born variations in a drilling technique and exploitations of wells. The operations on the creation of a hydraulic motor (bit - turbodrill) have been kept as well.

As a result of fissile creative activity of a group of the Baku engineers and oil workers in Azerbaijani and world oil industry had got a direct-drive many-staged turbodrill.

The maiden prototypes of this turbodrill were run in one of the Baku oil machinery factories in 1935, and in 1936 their serial production was initiated. Later the production of a considerably more effective bit of a crushing type – three-roller bits were constructed by a group of Baku practical engineers together with the AzINMASH was run in.

In this period the Baku oil machinery plants were delivering machinery not only for oil industry of Azerbaijan, but also for other oil regions of the USSR. Alongside with discharge of the new machinery and instrument on the Baku machine industry factories, there was organized in broad plotting scales the big repair of the operative equipment and production of spares. The machine works named of May 1, named after Stalin and named after Budenniy were toggled to production of a big repair of the basic aspects of chisel and oil-field machinery.

It is expedient, here, to return to some facts from the history of development of the oil industry of Azerbaijan. For example, up to the last quarter of the XIX century the boring was carried on in the basic percussion method using the so-called “self-fallings”(pole-tool drilling). From the beginning of the XX century the engine driven boring method – steam engines was introduced. The electric motors in the Baku oil-fields became a turning point in the progressing of drilling all over the world, for have grown average depths of wells sharply: in the 1920s – 500 meters, and in the 1930s' already 1000-1500 meters.

In 1907 in the Baku fields an attempt was made to bore wells using an electric motor directly connected to a bit. But this invention didn't find a broad applying. In the beginning of the 1920s the Baku engineer Mikhail Kapelyushnikov cited an idea to apply a turbodrill for boring. This boring method by a turbodrill was used until 1934. The turbine boring was temporarily ceased because of low indexes of boring by this method.

In 1936-1940 a radical solution for the problem of an intrusion of a turbodrill in a petroleum industry was retrieved by the collective of experimental office of turbine boring of AZNEFT. The Baku engineers Enver Tagiyev(subsequently one of the world's most

well-known scientists in the field of oil sciences), P.Shumilov, M.Gusman and others had elaborated together with specialists of AzINMASH a construction of the maiden domestic roller bits on bearings of a rolling, which have resolved the problems of supply of a well bore with theoretical verticality in conditions of turbine boring. On the basis of these works in 1938-1940 in Baku were designed a fundamentals of the theory of boring with usage of whipstocks at a fixed string of boring pipes.

It's necessary to point out that in 1930-40-s the licenses on production of the Soviet turbodrills were bought from All-Union research and development institute of turbine boring (VNIITB) by the following foreign corporations: "DRESSOR" (USA), "GANNEL LUG" and "ZALTZGITOR" (Germany); French corporations "NERPIQUE" and "TURBOEUROPA", and also Austrian "TRAUTZL" came to produce duplicates of our turbodrills.

Within the pre-war five-year-plans' period the work on creation, development and intrusion of new oil machinery and instrument was simultaneously conducted. So, only in 1939 the new constructions of roller bits - "FD" with hard facing two and three-paired, individual actuator to a rotary table PIR 2-4, spiders for case pipes, die hydraulic blowout preventer, cappers on 250 and 150 atmospheres, clues for boring pipes of the Orlov system ; a 50 MT trade inserted journal, automotive drill-ring AVB-100, 150 MT inserted journal ShV 4-150 M, electro-differential automatic machine by Ostrovskiy and Ratman were put in serial production. In the same period the fabrication of the following items was run in: a semi-roving drilling unit PRA-1200, automatic elevator for case pipes, rotary table 460-Sh3, inserted journal PV-5-75, an automotive machine for bore-hole surveying with a deep hoist, and also other machines and instruments.

From the beginning of the Great Patriotic War of the Soviet people (1941-1945) the Azerbaijan machine works were switch to producing for the needs of the Soviet armed forces for victory over the aggressor.

A part of the Baku oil mechanical engineering factories [such as the factory named after Stalin, "Krasniy proletariy", named after

Myasnikov and the metal constructions factory named after Petrov (*all naming of factories here, as well as a whole in a paper are given on their former, those time titles - F.R, R.R.*)] were completely moved, with their equipment, casing hardware, engineering specifications, the specialists (as engineering employees, so managers and workers), to the Ural and Volga regions.

The bit shop and part of the pump shop of the factory named after Dzerzhinskiy, part of machinery latch shops of the factory named after Kirov, were also moved to the East.

The severe state and composite problems on supply of the front for the arms and ammunition were set before the factories' work force, which stayed in Baku. For solving these problems a board of cooperation was organized. The Azerbaijan machine-building industry's labor force were aimed at unconditional implementation and even over-fulfillment of the jobs for the State Defense Committee (GKO) on output for the acting army - for front.

It is necessary to point out, that the modification of the mechanical engineering of Azerbaijan in a military way was executed in the shortest period. Alongside it, in Baku were systematically determined the new capacities for up-grow of a military commodity production.

At the same time, the deficiency in the specialists and in a manpower aroused by the call-up in the armed forces of a working personnel, was filled in by inflow on a factories of the women and adolescents, for which there was organized an accelerated and effective manufacturing training. By end of 1941 the women compounded 34 percent of the total number of the workers in the factories. It is necessary specially to mark that to a production activity on factories voluntarily have come back a large number of the invalids and retirees, experienced specialists of the mechanical engineering.

At this time a large-scale works were held on overcoming the difficulties, connected with technological features of production of defense commodity of a heightened absolute consistency. For substitution of missing materials, being delivered in due course from

other cities and locales of the USSR, they began to obtain and widely utilize domestic resources.

In the buildings and floor spaces of the factories and shops moved to the East, new plants and industrial productions were organized. For example, instead of the former factory named after P.Montin a specialized tool factory was created.

From this perspective it is necessary to point out, that Baku and its machine works were a genuine arsenal of the Soviet armed forces during the Great Patriotic war (1941-1945).

The heroic actions of the Azerbaijan mechanical-engineering workers was repeatedly marked by the government awards. For an ethalon implementation of the jobs for GKO the labor collectives, workers, the engineering employees and specialists of many factories and industrial plants of Baku were awarded with the orders and medals of the USSR. So, in 1942 the factory named after Lieutenant Schmidt was awarded with the Lenin Order for merits in organization of ammunition production. So, during the War the labor collective of the factory named after Lieutenant Schmidt more than 25 times were handed the challenge banner of GKO, and after the War it was kept in the factory on perpetual possession.

The GKO banners were repeatedly taken by collectives of the factories named after Dzerzhinskiy, named after Budyonniy, and the labor collectives of factories named after Kirov, named after Lenin, the factory of roving aggregates and others came first in All-Union socialist competition.

The transition to peace-time production after the end of the World War II created new enormous problems for the mechanical engineering in Azerbaijan.

The main problem in the first post-war period consisted of the sharp extension of operations on basic repair of the acting technological and transport equipment, and maximal magnification of the spares' production.

The remedial factories were put forward. The collective of factory named after Yusif Kasimov (previously - named after Budyonniy) managed to grow-up a volume of big repair of compressors three times more than in pre-war years. The factory

named after Bunyat Sardarov (previously - named after the 1st May), specializing on capital repairs of drilling equipment delivered from all regions of the USSR, also rapidly exceeded the pre-war volume of production.

On the manufacturing spaces of the factory named after Stalin, which was moved to the East, the big repair of mud pumps for boring was retrieved and considerably augmented in comparison with a pre-war period and the production of spares for them was organized. A new factory invoked to handle remedial needs of the oil exploration began to work in the manufacturing spaces of factory “Krasniy proletariy” under the same name.

Essential task – the capital repairs of tractors and tractor hoists was solved by the factory named after M.Azizbekov. The factory named after Lenin and the re-organized Baku auto remedial factory played a great role in the repair of trucks. Many were involved in the production of automobile and tractor spares.

The transition to the peace-time production required a gradual modification of working process, variation of proportions between procuring, processing and assembly facilities on some factories. But despite of all complications and difficulties, the pre-war volume of production in the machine industry was retrieved within one year.

To meet the increased demand for machinery the Kishly factory and former mechanical factory of the Azerbaijan Red-banner Oil Institute (AKNI) were transferred to oil machinery production. The basic commodity of the Kishly factory was compounded with spares for gas-motor compressors and deep pumps, production of which was necessary to double temporarily while the factory named after Dzerzhinskiy was growing-up its former power. The AKNI factory was turned into a factory of movable drilling machines.

In 1949 the building up of the Baku tractor-remedial factory was completed. For the first years of the operation BTRZ handled almost the whole oil industry of the USSR and played an important role in keeping up of work capacity of tractor fleet of the country. In the same year one more new factory - the Binagadi tube remedial factory was put in exploitation in Baku. The production of drilling

and exploration tubes with the welded test leads was organized in this factory.

If immediately after the war the main task was organization of a large-scale capital repairs and iterating of production of a former product mix, after some time there was a necessity for development of new aspects of articles and substitution of obsolete constructions of machinery. For example, in 1946 the labor collective of the factory named after Dzerzhinskiy ran in production of deep pumps of a plug-in type; collective of the "Bakinskiy rabochiy" factory started discharging of gear pumping units and tractor operation jacks LT2-M80; the labor collective of the factory named after lieutenant Schmidt substituted old types of hoists, rotary tables, inserted journals by a new, more modern ones. In Kishly factory the production of turbodrills was organized; in the factory named after Volodarskiy new types of clues and bitch, and on the factory named after Kasimov flushing aggregates were started.

Here it is opportunely to mark that the output of oil mechanical engineering factories of Azerbaijan in the post-war period within the fourth five-year-plan years of the USSR national economy's recovery accrued rapidly. It can be illustrated in following data (in a compared circle of factories):

<i>Years</i>	<i>in % by the previous year</i>	<i>in % by 1945</i>
1946	114,5	114,5
1947	121,8	140,0
1948	146,9	208,0
1949	132,5	276,0
1950	129,8	358,0

In 1950 the production volume of the former AzNEFTEMASh trust's factories exceeded the rate of 1940 by 4.3 times. This was promoted for the following reasons: in the factory named after Lieutenant Schmidt - the assembly shop, and in the factory named after Kirov - the bit shop were considerably

expanded; in the factory named after Dzerzhinskiy the series of new shops were build-up.

At the same time it is necessary to note that in connection with the new requirements for the development of the mechanical engineering after the end of the war it began to lose its oil-mechanical nature of production. In 1946 the construction of Baku electro-machine-building (BEMZ) started, and it was handed over for partial exploitation in 1947. At the beginning the basic commodity of the BEMZ was transformers, and then it started to produce electric motors, roving power stations, chisel magnetic stations and control blocks.

Specialized in production of electric motors with up to 100 and more than 100 kW power, BEMZ became one of the USSR's largest electric motor producing plants and the largest by outturn machine works of Azerbaijan.

Moreover, in 1946 the Baku electroremedial factory had been put into operation, which later passed onto production of high-voltage instruments, having transmitted repair of electrical equipment to another factory organized in Surakhany.

In 1947 in Baku a new bearing factory, specialized in production of large-sized cone bearings, intended primarily for oil equipment, was put in exploitation. Alongside with this well arranged plant, there was another factory – the factory named after Musabekov, producing equipment for cotton-refining factories.

After finishing the construction of the Mingechaur hydropower plant, the “Mingechaurselmash” factory with agricultural machine profile was organized on the basis of the former Mingechaurstroy's remedial factory. The vast, friend floor space, the large manufacturing bodies and developed supplementary facilities afforded all conditions for transformation of the factory in one of the largest plants of the mechanical engineering in Azerbaijan.

The launching of Baku radiofactory annually producing tens thousand of radio-gramophones was a considerable event of the year 1946 in Azerbaijan.

A large operation on halving productive capacities of the Azerbaijan machine-building complex was carried out in the

republic during the 1950-s. In 1956 the building of a new remedial-excavator factory called BREMZ was finished. And in the same year the “Bakinskiy gazoapparat” factory, producing gas ranges and waterheating pillars was created by means of reconstruction on the basis of the former remedial-mechanical factory of the “Azmor-nefterazvedka” trust. In a short time the labor collective of the “Bakgazoapparat” factory augmented discharge of manufactured products, developing a production process.

Certain conditions for progressing and perfecting of the Azerbaijan mechanical engineering were brought about by the reorganization of the republic’s industrial management and creation of the National Economy Council of the Azerbaijan (Soznarkhoz) in the second half of the 1950-s.

During this period new industrial plants mortgaging the basis of new modern industries in Azerbaijan were constructed. So, in these years the “Azerkabel” factory with a product mix including bare winding, customizing and hose wires, the radioactuators and armored cable were put into operation; “Azelektrosvet” factory, which has run in discharge of fluorescent lamps and lighting fitting, began its operations. And in Kazan-Bulag settlement (close to Ganja) a factory of low-voltage electroapparatus was established. On the free manufacturing floor spaces of the BEMZ the production of high-voltage apparatus was organized. At the same time the factory of home coolers started its production.

These factories compounded a ground for developing electromechanical industry of Azerbaijan.

Here are some more examples: Kishly machine works was aggregated with Baku tractor remedial factory, which was located on the neighboring territory. The factory of roving boring machines also was transferred bodily to the free manufacturing floor spaces of shops of this integrated factory. The confluence of these factories trusted to a ground for creation of the large plant specialized in production of automotive oil-field ambulances.

The basis for a new branch of the mechanical engineering (instrument making) in Azerbaijan was laid by the Baku instrument-making factory and factory named after Kalinin, created on the basis

of former factory on repair of motor engines of tractors and factory of movable drilling machines (PMB). The labor collective of this factory specialized in production of telemechanics instruments for oil and gas industry. In a short period the collective of this factory successfully mastered the fabrication of instruments of the automatic modular unitized monitoring system and regulations of productions (AUS), being basis of automation in oil refining, chemical and other industries.

At the end of the fifties, the aims of progressing and perfecting of the Azerbaijan mechanical engineering industry were achieved in a new way pursuant to scientific and technical progress. Research & development and designer base of a mechanical engineering was boosted much more. In the Azerbaijan Institute of Oil Machinery Industries (AzINMASH) new departments and labs were created. The new Azerbaijan Electromechanical Research and Development Institute – “NIPINEFTEKHIMAVTOMAT” and specialized office “NEFTEKHIMPRIBOR” were organized. A large special designer office in the factory named after Lieutenant Schmidt was created, and the measures on considerable beefing-up of designer and technological offices on all large factories were attempted.

During the last 2-3 years of 1950s considerable works on upgrading engineering were done. The product mix of the mechanical engineering was augmented and compounded 160 articles and about 1500 type sizes. For example, the mobile caravan for boring on 1200 meters URB-4B was upgraded. However, soon a new pattern of a mobile caravan 1UBSh, designed by the factory named after Lieutenant Schmidt, which considerably distinguished by its facilitated weight and heightened speeds came out.

Another example: Together with the Leningrad Production and Engineering Institute, the collective of factory named after Lieutenant Schmidt designed constructions of the facilitated production tree. Prolonging this operation, the designer office of the factory created constructions of a small-sized production even facilitated in weight, matching with emitted types.

At the same period, Kishly factory ran in more committed and productive ambulance URB-2A instead of aggregates for mapping boring AVBZ-100. The labor collective of KMZ adjusted discharge of UShBT boring aggregates, appropriated to requests of seismic prospecting in deserted waterless terrain. The AVBT drilling aggregates built-on on S-100 tractors were essentially retrofitted. The tractor operation jacks LTP-KM were displaced by aggregates for underground repair "BAKINETZ-3M"; the development of AK-50 aggregates for underground repair, supplying a high scale mechanization, and automation of tripping was finished.

The new types substituted also the movable machines made in the same years in the factory named after Kasimov. So, in 1959 the production of a more sophisticated type of the aggregate for bore-hole surveying - AzINMASH-8 began. In 1960 the experimental batch of flushing aggregates designed by AzINMASH was completed.

It is necessary to underline that in the same years on Kishly factory centralized production of reduction gearboxes for oil machinery was organized, which aimed at generating possibilities to stop delivery of reduction gearboxes from other economic regions of USSR to Azerbaijan and to reduce their cost. KMZ together with creative group of AzINMASH once again demonstrated a valuable initiative, having produced prototypes of reduction gearboxes for the machine tool of a rotary balanced jack with a tooting of the Novikov system.

In the second half of 1959, in connection with operations on advancing bits, in the factory named after Kirov production of water jet bits was organized, which showed magnification of efficiency at a rate of 30-50 % in conditions of Azerbaijan. The collective of this factory intensively accumulated discharge of these bits, applying an economical method of casting of cutting roller bits.

In 1959 the labor collective of factory named after Sardarov ran in production of hydroclone restoring plants of suspensoid from mud. The engineers of the factory improved considerably the production of automobile tipplers that gave an annual saving of 1500 tons of metal and abatement of expenditures on 5 million rubles.

And the collective of engineers – designers of Baku instrument-making factory substituted the automatic machine for screwing together and unscrewing of pump-compressor tubes of AD-25 type by a new, more committed construction APR-2 and ran in production of automatic clues for pump rods. In the same factory production of a series of actuators pneumo-hydroautomatics was organized.

In Baku machine works the variations in a construction of the majority of articles, emitted by the factory were injected. The collective realized transferring to new series of electric motors, and the winding with new aspects of insulation were introduced. In the factory the serial production of KRN-10 and URE-6 high-voltage switching centers was organized. Within a native born retrofit engineering indexes of chisel magnetic stations considerably were improved at a simultaneous abatement almost twice of their overall dimensions and weight. By the way, the transfer to movable power stations of the improved construction and transfer to a new type of the oily disconnecting switch were implemented in 1960.

At the end of this period of development and perfecting of the Azerbaijan mechanical engineering, as one of the basic branches of industry and economics of Azerbaijan as a whole, the production technology was pushed up on a new, higher level. It was influenced by a lot of the measures held, augmenting capacity of existing steel-making and iron shops, and also series of measures encouraging to hoisting up to the highest level indexes of casting pick up per unit area and per worker. In the large shops the mechanization of cooking and feeding of forming mixtures was held. For example, in the steel shop of the factory named after Lieutenant Schmidt good results were achieved by applying quick-hardening forming compositions. For serial mean shallow pig-iron castings the coquille casting became the basic method of production: only in a field of coquille casting of factory named after Montin over 100 thousand parts were produced monthly. In communal discharge of pig-iron casting only in 1959 the coquille casting compounded 1,2 %, centrifugal casting - 7,7 %. In communal discharge of steel and pig-iron casting the specific weight of engine molding reached 30 %. It is necessary to

note that cast iron fusion in large shops already was fractionally transferred to gaseous fuel. The works on development of the high-strength magnum pig-iron casting production was completed at the majority of industrial plants. And in the forge shops a free ductile method was day-to-day displaced by drop forging. The new stamping rammers and press were installed. The specific weight of drop forging already compounded 60 % at the end of the 50-s. So, in the Baku machine works treating of the basic parts of electric motors up to 100 kW was transferred to automatic transfer lines for treating benches and arbors of motor engines. The press - automatic machine "BAKINETS" for drop forging of fissile Ferric lactas of motor engines, diminishing in 10 time complexity of this operation was designed and manufactured by the engineers – designers of BEMZ. The rationalizers of BEMZ collective introduced a pipeline coloring of motor engines in the electrostatic field and drying with invisible heat.

Alongside the above-stated, the engineering thought and the technical progress achievements in close union with forward experience of the specialists in a machinery-producing industry of Azerbaijan gave remarkable results. For example, in long production runs the general-purpose machine tools were displaced by special machinery, automatic machines and semi-automatic machines (first in the factories named after Kirov and Dzerzhinskiy and the bearing factory). The fast-acting clamping devices, hydrocopying slides and systems of fissile check were widely implanted on factories.

There was a rapid advance in the field of welding know-how. The automatic and semiautomatic welding, the welding in environment of carbon dioxide, contact and point welding were applied in large volumes. The heat treatment was perfected too. On the majority of factories the high-quality quenching was applied. In the previous years users often had expressed complaints on quality of the deep pumps' drill rods, therefore at the end of the 50-s technological measures on their reinforcing were accepted. So, the automatic machine installed on the factory named after Lieutenant Schmidt made a face hardening of eight-meter drill rods that elongated a period of their service. In the factory named after

Dzerzhinskiy and Kishly factory nitriding of steel parts that attached surfaces high hardness and wearing qualities was applied.

A major factor of output magnification in the Azerbaijan mechanical engineering was the growth of outputs of transactions at its plants. And a final large role in perfecting the production technologies played the workers' creativity - invention activity. So, only in 1959 in machine works of the republic 4385 offers were proposed by the inventors and rationalizers, the conditional annual saving from which compounded an amount of 12600 thousand rubles.

The production of domestic appliances also differed by its modern features and high perfection. For example, the hi-tech beautiful design had a home refrigerator "Baku", produced at the factory of electrodomestic instruments (with annual production up to 5000 units).

The serial production of high-quality radio receivers ARAZ-58 with keyboard control was unrolled in 1958 by the collective of Baku radiofactory. Through a series of domestic factories the labor collective of BRZ started a discharge of the upgraded TV set "Record" in 1960. And the collective of "Bakinskiy gazoapparat" factory started to produce home gas ranges of a new construction in the same year.

One more example: in the "Mingechaurselmash" factory serial production of a hole diggers for trees fitting of a reinforced construction KPYa-100 was run in 1959, and in 1960 the same factory finished a tentative consignment of automotive general-purpose loaders D-451 with kit of changeable gadgets and passed on discharge of improved and considerably light-weighted constructions of drive piston pumps for artesian wells.

It is necessary to point out that the mechanical engineering of Azerbaijan had not only republican value at that time. In production of oil machinery it occupied a good place in economy of the former USSR. The Baku oil equipment factories were the sole suppliers of the capital equipment not only for the Azerbaijan oil industry, but also for the plants of the petroleum enterprises located both in the other regions of the USSR, and in the different countries of the

world. 70 % of the oil-field machinery manufactured in USSR was produced Baku oil-mechanical factories. The Baku factories effected more than 500 items of the oil field chisel exploratory machinery. About 75 % of the mechanical engineering output of Azerbaijan was exported.

In this respect, it is important to mark the share of the oil equipment industry of Azerbaijan in the foreign economic relations of the USSR: more than 80 articles produced in Azerbaijan were exported to 35 countries of the world.

It is difficult to underestimate that large role, which the Azerbaijan centers of science have played in the formation of domestic and global oil science. Alongside with them it is impossible also to imagine the progressing of oil and gas complexes of the USSR without the products of the Baku mechanical named after Lieutenant Schmidt, Kirov, Ordzhonikidze, Dzerzhinskiy, "Krasniy proletariy", and "Bakinskiy rabochiy", the instrument-making factories and others.

Unfortunately, even a visual review of the Azerbaijan mechanical engineering's status today demonstrates that the destabilizing factor of its progressing today was the collapse of the Soviet Union, which resulted in the failure of widely developed specialization and cooperation system and cut off the inter-republican economical relations. This process has negatively affected the production volume of oil mechanical equipment plants of Azerbaijan.

As it is widely known, in connection with the geopolitical position of Azerbaijan many multinational corporations show a great interest in the Azerbaijani oil. In this regard and as though for analysis of the world experience there became a tradition to hold oil and gas exhibitions in Baku, where many industrial and service companies and corporations from different countries participate. A large horizons for a traditionally profiling branch of economics of Azerbaijan – oil mechanical engineering – in the market relations have opened so called "Contract of the Century", and other oil contracts signed after October, 1994. The signing of these contracts

has constructed an economical base for the development of not only of oil and gas industry of Azerbaijan, but also other related branches. Among the first Azerbaijani factories received the Certificate on Conformity to the National Standards was Sabunci machine works (six basic production items). Its commodity was highly estimated by the foreign specialists, because the orders of their corporations have been executed at a quality level.

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Х ц л а с я

20-50-ъи иллярдъа Азърбайъанда нефт машынгайырмасынын йаранмасы въ инкишафы

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Мягаладъа Азърбайъан нефт машынгайырма сянайесинин йарым ясрлик уурлу йолу эюстярилмиш, онун юлкянин нефт сянайесинин инкишафында ойнадыъы бюйцк ролу ачыгланмышдыр. Мцяллиф XX ясрин яввялляриндъан башлайараг Азърбайъанда нефт секторунун тяркиб щиссяси олан машынгайырманын галдырылмасыны въ онун мцасир, инкишаф етмиш бир сянайе сащясиня чеврилмясини диггятля изляйирляр. Мягаладъа зянэин фактики материаллар ясасында Азърбайъан нефт машынгайырма сянайесинин наилиййятляри въ проблемляри тящлил олунмуш, айры-айры мярщялялярдъа йени заводларын тикилмяси въ онларын бурахдыъы йцксяк кейфиййятли аваданлыгларын сайынын въ нювляринин артмасы, азърбайъанлы алим, мцщяндислярин ахтарышлары въ йени технолозийаларын тятбиг олунмасы, йени кадрларын щазырланмасы въ с. мясяляляр юз яксини тапмышдыр.

XX ясрин яввялляриндя Азърбайъанда нефт сянайесинин инкишафы иля ялагядар олараг механики аваданлыъа вя онун тямириня ещтийаъ артмышды. О заман Бақыда 18 механики вя поладтюкмя мцяссисяси фяалийят эюстярирди. Онларын яксяриййяти Бақынын сянайе районларында йерляширди – Биби-Щейбятдя, Сабунчуда, Раманыда, Аъ вя Гара шыщярдя. Бунларын чоху йары-кустар кичик механики-тямир емалатханалары вя садя аваданлыг истецсал едян заводлар иди. Бақынын нефт мядянляриндя олан ясас аваданлыглар Русийанын башга реионларындан вя йахуд хариъдян эятирилирди.

20-ъи иллярин яввялляриндя башлайараг Азърбайъан нефт сянайесинин аваданлыъа олан тялябатыны юдямяк мягсядила йерли машынгайырма заводларынын йенидян гурулмасы гярара алынмышды. Бу дюврдя кечмиш Хатисовун заводу реконструкция олунмуш, онун ясасында мцасир аваданлыг вя мющкям яринтиляр бурахан завод тикилмишди (сонралар – лейтенант Шмидт адына завод); Сураханы емалатханалары айрыъа механики завода чеврилмишди (сонралар – Ф.Дзержински адына завод); ёБакински рабочийё, Пйотр Монтин адына, Киров адына нефт машынгайырма заводлары йенидян гурулмушду. Йени заводларын тикилмяси вя ишы бурахылмасы нятиъясиндя Азърбайъанын нефт сянайеси артыг Совет щакимиййятинин илк илляриндя о вахт цццн габагъыл сайылан аваданлыгла тямин олунмушду.

Йени истецсалын эцъляндирилмяси вя рягабятли аваданлыъын бурахылмасы елми ахтарышлар, мцщяндис кадрларынын йетишдирилмясини тяляб едирди. Хариъи аваданлыъын идхалындан азад олмаг цццн ССРИ-дя илк дяфя олараг 1931-ъи илдя Азърбайъанда нефт сянайесинин елми-техники базасы йарадылмышды (сонралар – АЗИНМАШ). 30-ъу иллярдя Бақынын елм вя тящсил оъагларында нефт елмляринин, щямчинин нефт машынгайырма сащясиндя апарылан елми ахтарышлар цццн мющкям техники база йарадылмышды. Азърбайъан алимляри щямин иллярдя бир сыра вьюцк ящямиййяти олан нязари вя тятбиги кящфляр етмишляр.

Мящз 20-30-ѳу иллярдя ялдя едилмиш наилийѳятляр Азѳрбайѳанын машынгайырма заводларынын Икинѳи Дѳнѳа Мѳщарибѳси илляриндя Совет силащлы гѳвѳяляринин ясли арсеналына дѳнмѳя имкан вермишди. Бу дѳврдя Бакынын нефт ѳ цмуми машынгайырма заводлары ордуну сурсат ѳ щярби аваѳанлыгла тѳѳщиз едир, цмуми гѳялѳяѳ юз фѳйдасыны ѳюстярирди.

Мѳщарибѳдѳн сонракы дѳврдя Азѳрбайѳанын нефт ѳ цмуми машынгайырма сянайеси сѳрятля инкишаф едирди. 40-50-ѳи иллярдя бир сыра ѳени заводлар истисмара верилмишди: Бакы електрик тѳмири заводу (1946), Бакы подшипник заводу (1947), Бакы радио заводу (1946), Бакы трактор тѳмири заводу (1949), Бинягѳди бору тѳмири заводу (1949), ѳАзѳрелектрикищѳгѳ заводу, Екскаватор тѳмири заводу (1956). ѳюрѳлмѳщ ишлярин нѳтиѳясиндя кечмиш ѳАзНЕФТМАШѳ трестинин нѳздиндя олан заводларын 1950-ѳи илдя бурахдыѳы мящсулун цмуми щѳѳми 1940-ѳы иля нисбѳтян 4,3 дѳѳя артмышды.

40-50-ѳи иллярдя Азѳрбайѳанда ѳени машынгайырма истещсалатлары ачылмыш, бу сянайесинин елми-техники базасы даща да мѳщкямляндирилмишди. Машынгайырманын ѳени будаѳы олан ѳищазгайырманын ясасыны Бакы ѳищазгайырма ѳ Калинин адына заводлар тѳщкил едирди. 50-ѳи иллярдя ѳени электротехника елми-техники институту – ѳНИПИНЕФТЕХИМАВТОМАТѳ ѳ ѳНЕФТЕХИМПРИБОРѳ ихтисаслащдырылмыш бѳросу ѳарадылмышды.

Тѳдгиг олунан дѳврѳн сонунда Азѳрбайѳанын нефт ѳ цмуми машынгайырма сянайеси юзѳнѳн инкишаф ѳ тѳкмилляшмяси нѳтиѳясиндя нѳинки республикамызын, щѳтта кечмиш ССРИ-нин дѳ габагѳыл истещсалат сащяляриндян биринѳ чѳврилмиш, ѳени истещсалат технолозѳясы сявийѳясинѳ галхмышды.

Мѳгалядя Азѳрбайѳанын нефт мяркѳзляринин юлкѳ ѳ дѳнѳа нефт елминин топланмасы ѳ инкишафында ойнадыглары рол хѳсусиля вурѳуланыр. Бунунла ѳанашы кечмиш ССРИ-нин нефт-газ комплексинин инкишафыны да Бакынын машынгайырма заводларынын – Лейтенант Шмидт адына, Киров адына, Орѳоникидзе адына, Ф.Дѳержински адына,

ёКрасный пролетарийё, ёБакинский рабочийё, тищазгайырма вя
с. заводларынын бурахдыы авадаылыгларсыз да тсяяввцр
етмяк мцмкцн дейил...