JPRS: 3038

9 March 1960

EXPLOSION RECORDS--EXPLOSION SPECIALISTS
USSR
/Translation/

Distributed by:

OFFICE OF TECHNICAL SERVICES
U. S. DEPARTMENT OF COMMERCE
WASHINGTON 25, D. C.
(Price $0.50)

U. S. JOINT PUBLICATIONS RESEARCH SERVICE
205 EAST 42ND STREET, SUITE 300
NEW YORK 17, N. Y.

F O R E W O R D

This publication was prepared under contract by the UNITED STATES JOINT PUBLICATIONS RESEARCH SERVICE, a federal government organization established to service the translation and research needs of the various government departments.

JPRS: 3038
CSO: 3387-D

EXPLOSION RECORDS--EXPLOSION SPECIALISTS
(USSR)

/Translation/

Tekhnika Molodezhi
/Technology for Youth/
No 10, Moscow, October 1959,
Pages 5-6,
Russian, per

A. Ivolgin
Engineer

In order to comprehend all the grandeur of the projects and accomplishments of the seven-year plan, obviously, some space, more correctly-timed, is required. Only it (time) permits, comparing the past with the present, the grasping of the vast panorama of great construction in our land.

The gigantic development of the national economy of the USSR is directly connected with technical progress and demands, in part, that all recent and new sources of energy be concentrated in minimum size. This energy concentration must be so transportable that one may project it thither, and quickly employ it there, where the unfolding battle of creation demands it. Various explosives, numbering more than a 1,000 designations, are among such maneuverable sources of energy.

The economic factors of this source of energy are very diverse. There are expensive explosives, used daily which in construction objectives are unprofitable, but no less than those which by their own cost approximate the cost of stopping of production. According to a rich range of technical characteristics explosives may be compared with the piano keyboard: here are all the "musical" nuances--from "the delicate," sensitive, bursting from the slightest friction by a pen point to the very coarse, stable, which may (but it is not recommended) be splintered by a crowbar or hammer. Another important technical characteristic of explosives is their ability to give a controllable burst; that is any according to strength and direction. And finally, the chief characteristic--the freeing of colossal energetic power in insignificantly small periods of time.

Here it is necessary to note the fact, that for the development of all modern energetics the construction, in line with other sources of energy, of such engines, which, possessing small dimensions, are able to generate unprecedented power, though they operate a short time, is characteristic. The engines of a cosmic rocket, which sometimes develop power exceeding the power of the world's greatest hydrostation, may serve as an example.

At the present time we have a multitude of engines of the same distinct type. And there at one of the ends of the series of engines are explosives, capable of generating titanic power. If from this it results that the gases of the burst work as an original ball piston, immediately moving apart to all sides, then for such a burst, which was produced in China on 31 December 1956 and is described further in this article, the power of about four billion kilowatts is obtained, i.e. the power of almost two thousand times that of the greatest hydroelectric station in the world, namely, Lenin on the Volga.

These technical-economic factors of explosives are causing the ever increasing scale of their use and penetration in all new fields. You drink aromatic tea, speed along a beautiful mountain road, eat sun-ripened grapes, burn gas in the kitchen and do not even suspect that explosives participated in the creation of these and a multitude of other material blessings.

In the USSR they have started to conduct the initial explosion works in the metallurgical industry, where they use "Kozlov" blasting for crushing scrap in the blast furnaces, splitting apart the hot massive slag mould-boards (Kerchensk, Dnepropetrovsk, Dneprodzerzhinsk, and other factories).

In almost every new building effort an explosive was employed to excavate foundations, for open pit mining, for the production of construction materials. Explosives were especially widely employed in the construction of Volkhovsk, Zemo-Avchal'sk, Dneprovsk, Rionsk, Svirsk and other hydroelectric stations, highways and railroads, such as the Turksib, Chimkent-Tashkent, Moscow-Donbass and others; canals: the Belomorsk-Baltiysk, the Moscow, and the Sverdlovsk.

During the expeditions in the Arctic Ocean explosives were employed for the battle with the ice. They played a major role in the mastering of the Northern Sea Route.

Explosives are finding application in the assimilation of virgin and waste lands, in meliorative and irrigation work, in the draining of swamps, rooting out of stumps and shrubs, the felling of a tree, terracing of soil. Great works were carried out with the aid of blasting in the state farms, Abrau, Dyurso, "Chay-Gruziya," in the

state farms of the Transcaucasus and Northern Caucasus, the combine "Ararat." To provide navigation of the Tsimlyansk Sea, in the building of the Volga-Don Canal 150 thousand stumps with a diameter to 3 meters, which did not yield to rooting by the most powerful tractors, were uprooted with the aid of explosives. Explosives are also widely used in the fight against forest and other fires, for the straightening of river channels, dredging work, for the defense of bridges in face of ice flows, in rafting (of timber) works. In boring in the oil industry they torpedo drill holes by blasting. They are employed even in the construction of subways and in many other areas. In the insert (opposite page 5 of original) is shown a chart, by far incomplete, of the diverse polytechnical applications of explosion-specialists.

Explosives have attained great importance in the development and opening of strata of useful minerals. Exactly in this area the tendency of the growth of charges and the drawing near of their size to the record has begun to show. In January 1931, the explosion of two charges with a total weight of 21.7 tons was carried out at the Arshanskiy deposit of andesite (Kazbek), and provided the factory with ore an entire half year. This explosion was then considered one of the largest in our country. And already in 1935 near Podolsk the explosion of a charge weighing 94 tons was carried out to hasten work on the mining of raw materials necessary for cement factories. Shortly after, the Korkinsk explosion carried out under the direction of engineers Paporotsk and Selevtsev in 1936 became the record in the world practice of explosive works according to the quantity of placed explosives. Here in April, 400 tons and in June, 1,800 tons of ammonite was exploded. With this explosion, which uncovered strata of chelyabinsk ore, 1,250,000 cubic meters of rock was thrown out from a depth of 25-30 meters.

Of course this world record was attained not for the sake of the record itself but ensued from technical economical expediency and necessity. Thus for example, one explosion of 570 tons of ammonite, which took place on 18 March 1946 at the construction of the Farkhadsk GES (hydroelectric power station), replaced human labor at the rate of 27 thousand man days.

In August 1948, 1860 tons of ammonite was exploded in four successive series at the construction of the Irsha-Borodinsk coal pit, 160 kilometers east of Krasnoyarsk. This was a record directed mass explosion from a depth beyond 20 meters. Soviet specialists also accomplished the world record of a single-chamber explosion on 30 April 1953 at the opening of the Altyn-Topkansk lead deposit, when in one chamber 1,640 tons of explosives were set off.

The largest explosions were carried out by the agreement of Soviet and Chinese specialists north of Lan'-chzhou at the opening of the Bayinchansk copper ore deposit. Here in July 1956, 1,640 tons of

explosives were set off at once, in November--4 thousand tons! There on 31 December 1956 at 1400 Peiping time a gigantic isochronous explosion of 9,200 tons of explosives was accomplished. By the explosion 2 million cubic meters were thrown out, 7 million cubic meters of rock was crushed and a vast pit for the open mining of copper-sulfur ores was formed.

But the explosions differ not only by their own instantaneousness and strength. They, if it may thus be expressed, may be "wise," "exact," "careful." On 25 March 1958, close to the village Pokrovsk-Uralsk at 1400 from the ground a vast black column broke away, it quickly began to grow, turned into a wall having shut off by itself part of the horizon, and at this moment having brought forth a powerful rumbling. Within fractions of a second the explosion accomplished a gigantic work, having constructed a lead off canal for the Kolonga river 1,150 meters long, to 100 meters wide and 25 meters deep. This was the most powerful industrial explosion for a blow out in the USSR. The total weight of the instantaneously blown up explosives constituted 3,100 tons.

At the beginning of the current year a unique explosion was carried out at the construction of the Tersko-Kumsk Irrigation Canal. This explosion was unusual not because of the size of the charges with a total weight of 160 tons. The singularity was in the quite jewel-like, technical calculation and execution of the burst. Moreover the explosion did not build the way of the canal, but raised up a dam. The first directed explosion of 48 tons of ammonite threw 20 thousand cubic meters of earth from the bank. For several instants the bottom of the swift river was uncovered, as two waves were formed: one met the current and stopped it, and the second drove off the cut off water. And now, when the lower wave appeared to be in line with the future dam, a second explosion crashed out, which brought down into the river bed 40 thousand cubic meters of bank rock. To strengthen the victory, a third explosion thundered, which added 10 thousand cubic meters of ground bottom to the dam. Three explosions tamed the wild Terek and its water flowed along the canal to irrigate the fields.

The year 1959 was marked by a unique explosion beyond the borders of our land. Ripple rock in the Pacific Ocean was the cause of the destruction of many ships. From an explosion of 1,200 tons of explosives, accomplished by Canadian demolition men, the terrible rock flew into the air.

The fate of the famous Shaman-Kamnya on the Angara was decided in fierce scientific, technical and literary discussions. Now public opinion was inclined to save its life and not touch the ancient waters of the Baykal. But the very project of the blowing up of the Shaman-Kamnya is extraordinarily interesting. According to the first variant

it was proposed to create a 7-kilometer tunnel and pack an unprecedented to this time charge of 30 thousand tons of explosives. The second variant proposed a 5-kilometer tunnel and the placing of 22 thousand tons of explosives, on whose explosion a cut /37 (proran) would be formed to a depth of 25 meters with the lower mark at the level of the yearly fluctuation of the water surface in the Baykal.

The project of the opening of the gigantic deposit of coking ore with a strata width to 60 meters, found close to the Tayshetsk Metallurgical Combine in southern Yakutsk, is a daring one. It has been calculated that eight years are necessary to open this deposit with the aid of most perfect excavation technique. With the aid of explosives this opening may occur in two years. The outlay of explosives will make up ten kilotons. Finally the size of the charge will be determined after comparing the computed data and the selection of the optimum variant.

Thus far such charge sizes have never figured in projects. They may be compared by their own strength only with atomic and thermonuclear bursts. The projects of "moving" the great Amur is a thrilling picture. The hand of man will move its mouth to the south and will make it wider and deeper.

It is impossible to enumerate all the military zones, where creative explosions will thunder. Even the Soviet dynamiters will fulfill their love of their own profession. That is such people as G. A. Vasil'yev, after 30 years of practice, passed the journey from dynamiter-private to leading engineer in a trust, as N. N. Borogodskiy, who carried out his first explosion in 1926, and now is chief engineer of one of the directorates; as brigadier of dynamiters V. V. Belostenov, who prepared 60 thousand cubic meters for covering the bulkhead to the Bratskoy GES.

These people love their work, they live with the romance of their profession. The romance of explosive works lies in their complexity and versatility. The explosive business is not only a scientific-technical discipline, it is even an art. Still in the XVII century the famous French Marshal Boban was one of the first who attempted to give the basis of the scientific computations of explosive action, in order to make it obedient to the will of man. We know hundreds of various formulas of the computation of explosive charges and in this number is the outstanding formula by its own universality of M. M. Boriskov.

Now one may resolve any explosive task with the aid of electronic computing machines. But this is not sufficient. Still demanded in the explosives business is the skill, hearing, visual observation, in order to catch those characteristics which do not yield to mathematical analysis, which relate to regions where only art rules.

The romance of the explosive business consists in the fact that there never are according to the conditions of the situation even two really identical problems, which must be solved, and in the fact that they are decided at the very forward edge of the front of creation. It is the profession of strong and daring people, whose work range is unusually wide, from microscopic to astronomic scales, and whose theatre of actions extends from the pole to the subtropics. These people have learned to faultlessly control the powerful force of the explosion and have put it to work for peaceful construction.

5810 - END -