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MESSAGE FROM NEIL B. GODICK

It is really not news – but now it's official.

A new study by an international public health research team published in the British medical journal *The Lancet* documents the impact of alcohol abuse on Russia. The study shows that drinking caused 52% of the deaths among Russians aged 15 to 54 since the Soviet Union's collapse.

Elsewhere in the world the estimate is that less than 4 percent of deaths caused by alcohol abuse.

It is estimated that the increase in alcohol consumption since 1987, the year when then-Soviet leader Mikhail Gorbachev's restrictions on alcohol sales collapsed, cost the lives of 3 million Russians.

The study is part of a long-running debate among public health scientists as to the causes of an unprecedented spike in mortality among Russians in the post-Soviet era.

Russians currently consume almost twice the global average, the equivalent of 6.2 liters of pure ethanol alcohol per year, the global report found.

The link between life expectancy and alcohol in Russia has long been the subject of study. Mortality rates fell sharply in Russia from late 1985 to 1987, when then-Soviet leader Mikhail Gorbachev imposed strict limits on alcohol sales. During the period of political and social revolution that followed, death rates soared to levels unprecedented in modern industrialized nations.

Russians generally blame alcohol deaths on the consumption of adulterated or industrial alcohol. A previous study carried out by British and Russian researchers and published in *The Lancet* in 2007 estimated that drinking alcohol not meant for consumption like cologne and antiseptics was responsible for nearly half of all deaths among working-age Russian men. A recent government crackdown on the sale of alcohol not intended for human consumption appears to have significantly cut those deaths, experts say.

But there is relatively little recognition in Russia that excessive drinking of alcohol in any form, including beer and wine, can lead to serious health problems.

We do not intend for these reports to solve any need our readers may have. We do intend to keep everyone current on technology developments in Russia. If you would like any additional information on any of the developments reported – send us a note.

Navigation equipment

Siberian scientists have developed high-precision navigation equipment for river and ocean vessels. The new devices make it possible to clearly see a bank/coast line at a distance up to 13 kilometers. The new devices work at any time and in any weather. At a short distance they can navigate around small objects in the water. The new instrument system's resolution power is 5 times greater than known analogs. The equipment's service life is 20 times longer than similar devices. It can work both independently or in combination with GLONASS (Russian satellite communication system). The equipment is currently being tested in Siberian rivers. Shipping companies and the Ministry of Emergency Situations of the Russian Federation have already placed orders for this new navigation aid. Serial production for this equipment will begin in 2010.

Pipeline preventative maintenance

More than half of the world's pipelines are worn out: hydraulic shocks shorten their service life and lead to accidents. A Russian innovation borrowed from the Soviet missile program helps solve this problem.

Currently protection for pipeline systems from hydraulic shocks uses membrane pulse dampers and related equipment that try to soften the shock. These devices all have significant drawbacks:

- Many are activated by sensors making them dependent on a power supply.
- Pulse dampers' response time to hydraulic shocks is a half second or more. In this time the shock travels as much as a kilometer.

An alternative solution is: the *Ecowave* pressure stabilizer. Its cost is considerably lower, its operation does not lead to working substance loss, develops additional hydro resistance, and its response time is 0.005 seconds.

According to the developers' calculations, *Ecowave* pressure stabilizers extend the pipelines' service time by two to three times. *Ecowave* pressure stabilizers reduce accident rates five to seven times. The equipment's cost is less than 1% of the cost for the pipeline system being protected. Using these technologies even for piecemeal hole patching in a pipeline system prolongs the pipeline's life for eight to ten years.

One test case is the Baltic power station in Narva, Estonia. In this system there were ruptures in a feed water network. The hydraulic shock was so powerful that it uprooted the concrete piers holding the pipeline. The pipeline protected by the pressure stabilizer was not affected.

Ecowave's North America office is currently designing pressure stabilizer equipment for use US projects.

Eye disease medication

Scientists under Academician V.P. Skulachov's guidance have conducted research to prove that the antioxidant SkQ can treat eye diseases in rats and rabbits and restore lost sight to dogs, cats and horses. The antioxidant SkQ is intended to counteract the body's ageing processes.

It is known that with age people's and animals' sight deteriorates. Age related eye diseases include glaucoma, maculodystrophy, retinopathy, cataract, and age hyperopia. Science knows that these diseases are caused, at least in part, by accumulating oxygen free radicals in the body. The oxygen free radicals are toxic and are considered a possible cause for the organism's ageing.

During their research, scientific groups under Skulachov developed the *antioxidant SkQ*. The antioxidant SkQ is a compound that can inhibit the destructive action from oxygen free radicals. SkQ stops up to 20 body ageing signs. Tests regarding the SkQ molecule are ongoing. In 2008, tests showed SkQ's high efficiency in treating vision disturbances.

Cataract is the disease manifested in lenticular opacity. Retinopathy is a retinal lesion from a disorder in the retina blood supply. For experiments, the researchers chose prematurely senescent OXYS line rats bred at the Institute of Cytology and Genetics. The researchers daily dripped various SkQ1 doses into the rodents' food. They determined that small antioxidant doses (50 nanomoles per kilogram per day) prevented cataract and retinopathy development. When dosed with 250 nanomoles the researchers could completely cure these diseases in small animals aged 3 to 12 months.

Further research proved that by using SkQ it was possible to prevent uveitis and glaucoma. Uveitis appears as inflammation in the vascular eye layer and glaucoma is connected with higher intraocular pressure. To check the antioxidant efficiency against these diseases, the scientists conducted experiments on rabbits. Eye drops containing 250 nanomoles of SkQ1 were administered to six-month-old New Zealand white rabbits. This dosage prevented the rabbits from developing uveitis, while 5 micromoles of SkQ1 blocked the glaucoma development in small animals.

The scientists have used SkQ1 in veterinary practice to treat other animals. SkQ1 drops were given to 271 four-footed patients: dogs, cats and horses suffering from retinopathy, uveitis, conjunctivitis, and cornea diseases. In 242 cases a clearly expressed therapeutic effect was observed.

According to the authors, the eye retina is a tissue that suffers significant damage from free oxygen radicals. Its mitochondria contain significant polyunsaturated fatty acids and these are the principal target for oxidation. By decontaminating bad oxygen in mitochondria, SkQ effectively protects them from damage.

Air guns/pneumatic valves

Inventors from St. Petersburg have developed air guns that counteract loose materials bridging in hoppers having a capacity up to 60,000 tons.

The development began with a pneumatic valve developed in the late 1980's. Work started when Soviet Union aerospace companies placed an order with scientists from the Technical University. The scientists managed to develop a valve with extremely fast and efficient operation.

The guns turn air into a powerful shock wave extremely fast. The guns use the valve that operates in 1 millisecond or less. The scientists claim that it takes all the large cross-section valves 5 times longer to open. The instantly released air turns into a powerful shock wave, says one of the invention's authors.

The St. Petersburg scientists' know-how lies in the conical valve shape and its special design. Their priority to this fast-action valve is protected by patents.

The valve's innovative properties have served as the base for pneumatic devices intended for various industries and for emergency/rescue purposes. The new air gun solves the cleaning problem for small (capacity below 500 tons), large (500+ ton) and very large (from 1,000 to 60,000 tons) hoppers.

When the guns are placed correctly, a small pulse properly applied dislodges many tons of immovable bulk material residues that would not leave the hopper under the force of gravity. The inventors continue to keep improve their technologies.

The difference in the new system is a sensor being installed on each of the many guns in a hopper. The sensor blocks the gun if there is no bridging near it. Thereby only the guns within a heap of bridged loose material can fire. These guns consume less power. Compressed air can be fed to any number of guns from a single tank thus reducing the system's operating cost. These new systems are very advantageous on very large hoppers (from 1 000 tons up).

Recently the scientists obtained a Russian Federation patent for a new pneumatic crumbling system.

Ceramic bone implant material

Scientists from **Mendeleev Chemical Technology University** have developed an artificial ceramic bone from calcium hydroxyapatite. Calcium hydroxyapatite is a basic mineral component in human bone tissue. The material is nontoxic and does not cause rejection or allergies. The ceramic bone can be made in any configuration. On trauma or fracture the surgeon, with spokes or brackets, fastens together the natural bone and the ceramic fragment. Living osteal cells quickly sprout into the ceramic implant and gradually and

completely replace the artificial tissue. The implant, while being dissolved, simultaneously serves as a phosphorus and calcium source for the body.

In Russia use of this new material has been approved and the ceramic bone is in practice.