



... Making Green Business Worth It





Mr. Teplitsky A. A.
Chairman

Located in the geographical center of the old world, Coral GROUP is a unique organisation developing innovation technologies in various fields just over the edge of today's science. Formed in one of the most technologically advanced cities of Ukraine – Dnipropetrovs'k, Coral GROUP continues the long-proven, Soviet scientific school tradition of finding elegant and efficient industrial solutions.

Coral GROUP is a venture research and development scientific industrial holding, whose activities includes searching, analysing, modelling and capacity checking of innovation projects.

Being organised just under 5 years ago, the holding has considered over 150 different technological ideas, and began theoretical and practical development of 22 of them. 9 patents have been acquired and 4 projects are in the stage of practical realisation. In this time the holding has grown to more than 250 employees, most of whom carry honourable scientific titles.

Situated between the eastern and western Europe, Coral engages in research that is sited between the areas of ecology and energetics. The main goal of the company's research is a successful combination of these fields, and creation of technologies that are both ecologically friendly and economically viable.

The core of the holding is located in Dnipropetrovs'k, where its administration and main scientific personnel, is constantly searching for new and original ideas. The company has four offices, two of which are representing Coral GROUP on the international arena.

*Creativity, width and
Depth of scientific knowledge,
purposefulness in work organisation –
these are our means of achieving excellens.*

*Творчество, широта кругозора,
глубина научных знаний,
целенаправленность в организации работ –
наши составляющие достижения результата.*

Холдинг Коралл ГРУПП является организацией, занимающейся поиском технологических инноваций в самых различных областях. Основанная в Днепропетровске, одном из самых индустриальных городов Украины, Коралл ГРУПП продолжает блюсти лучшие традиции, хорошо зарекомендовавшей себя советской научной школы, непрерывно продолжая поиск изящных производственных решений.

Коралл ГРУПП находится в числе ведущих компаний, занимающихся исследованием, анализом, моделированием и внедрением самых передовых технологий.

Основанный всего лишь четыре года назад, наш холдинг успел рассмотреть более 150 различных технологических предложений, и начать теоретическую и практическую работу над 22 из них. 9 технологий запатентованы и 4 уже находятся в стадии практической реализации. За это время штат сотрудников вырос до 250 человек, из которых большая часть – это профессионалы высшей квалификации в самых различных областях.

Наиболее приоритетной задачей компаний Коралл ГРУПП является разработка экономически привлекательных технологий для решения существующих проблем в области экологии и энергетики.

Помимо главного филиала, расположенного в Днепропетровске, где в основном исследовательском центре ведётся непрекращающийся поиск новых идей, у Коралл ГРУПП есть четыре дополнительные офиса, два из которых представляют компанию на международной арене.

Top Personalities →



Mr. Lifshitz O. M.
Chief Production Officer



Mrs. Stupenko V. I.
Chief Analytics Officer



Mr. Berezin R. G.
International Affairs



Prof. Yushko V. L.
Chief Scientist of
Technological
Development Department



Mr. Milkov U. V.
Chief Mechanical Engineer



Mr. Simutin S. N.
Chief Technological
Designer



Dr. Madatov A. V.
Chief Scientific Officer

Any company begins and ends with its workforce, Coral Group is proud of the educational background and devotion of its staff. With above 30% of Coral's workforce having doctoral degrees, the holding's core is professionalism.

A significant part of the holding's human resources have formerly been employed by large universities and industrial bodies in Ukraine.

Любая компания это прежде всего её сотрудники. Коралл ГРУПП гордится научным и творческим потенциалом своего штата. Свыше 30% сотрудников Коралл ГРУПП имеют кандидатские и докторские степени.

Значительная часть сотрудников компании имеет большой опыт работы в крупнейших университетах, институтах и промышленных предприятиях страны.



Dr. Rusalin S. M.
Head of Technological
Development Department



Prof. Dzyura E. A.
Head of Scientific
Department



Mr. Hodak P. G.
Head of the Technology
Implementation
Department



Mr. Korobko V. V.
Chief Technician of Oil
Distillation



Mr. Antonenko A. A.
Group Chief
Anti-penetration materials



Dr. Solodovnikov V. V.
Chief Technician



The Recycling of Worn-Out Automobile Tires

Coral GROUP is glad to present one of its finest developments, an ecologically clean and financially beneficial method of recycling the worn-out automobile tires (WAT).

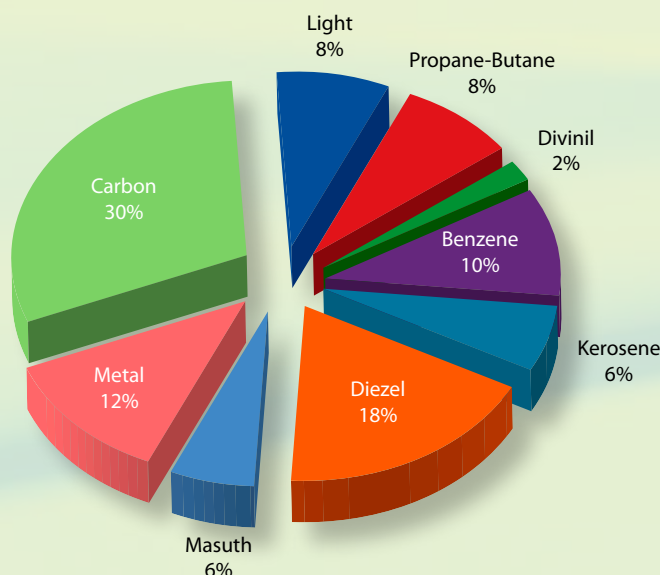
The soft pyrolysis method for WAT Recycling is an innovative technique that uses an electromagnetic field principle to ensure uniform heating of WAT, without access of oxygen.

Pyrolysis has been numerously used in WAT recycling before, however, most of the existing technologies use outside heating techniques, thus creating too high a temperature deferential. The method developed by the holding does not have this drawback.

In order to ensure maximum efficiency the WAT are cut prior to their entrance into the pyrolytic chamber, the technological process requires the pieces to be 10x10 cm; therefore a special cutting apparatus was developed.



Chart of Products



After the pyrolysis has been completed, the three fractions are separated: the gaseous fraction elevates, and moves through special tubes into a distillation station, while the solid fraction falls into the bottom part of the pyrolysis chamber. The gaseous fraction is then distilled and liquids are extracted. The leftover gasses are comprimanted and three typed of gasses are separated: light gas, Propane-Butane and Divinil (Butadiene).

The light gas is transported to a gas-power generator, which provided a part (up to 20%) of the power needed for the process, the other gasses are stored and are products to be sold.

The liquid fraction is further distilled, to produce kerosene, benzene, diesel fuel and black oil, all standardised products. The solid fraction consists of metallic wire, which can be sold as scrap metal and carbon. The carbon undergoes further purification processes and then is ready to be sold, as partial substitute for carbon black and absorbents.

The fractional composition of the liquid materials (oil), shows that up to 85% of them can be used in motor fuel production, which is more than twice as much as one can get from natural oil – Brent trademark.

The gas composition allows it to be compressed up to 50 atmospheres, like Propane - Butane, and can be used for home or for industrial facilities. The sulphur cleaning of the gas is preformed as part of the process. Oxygen content is as in natural gas. Caloric content is on the levels of Propane - Butane.

The holding Coral GROUP has constructed a mini-factory that uses the above stated technology, and demonstrates the entire recycling process and the process of manufacture of final, marketable materials.

The mini-factory produces all the primary materials: Artificial oil, Gas, Carbon, Metal and then reprocesses them into value-added product: fuels, marketable gasses, carbon black, absorbents and metal bricks.

The purpose of the mini-factory is to fine-tune the technological solution within a full complex of production. The capacity of the facility is one tone of WAT a day, however, excluding this parameter all the other parts of the technology are present in full scale.

Almost all the equipment present in the facility was designed by the Coral GROUP and is unique. Most of it was specifically designed for the purpose of WAT recycling and constructed by different factories in Ukraine.



The facility consists of a cutting station, pyrolysis chamber with automatic loading and unloading mechanisms, gas separation station, oil distillation facility, and carbon purification station. The mini-factory also contains a specifically constructed electrical system and a gas generator that utilises the light gas produced by the pyrolysis. The facility is fully automated with special testing computer system, which controls the process.

According to the feasibility study, and world oil, carbon, gas and metal prices for March 2008, a facility that recycles 10,000 tons of WAT a month will have monthly turnover of 8.5 million dollars. Economic prediction show that an investment into such a project will return, approximately in two years.

The presented project is ecologically friendly. The facility works as a closed system, so no process residue is present. All facilities are constructed according to European safety standards.

The complex for recycling of worn-out automobile tires not only allows us to solve a serious ecological problem, but also produces highly qualitative materials. Successful solution to the old problem of worn-out automobile tires is possible only through the complex approach to all the problems involved, and particular solutions to each and every one of the non-standard technical and engineering problems found in the production of useful materials from tires.



High Efficiency Drinking Water Purifier



In order to obtain water of high quality of purification, the specialists in our company have developed a liquid water purifier. The product is produced by the company "Coral Technology LTD." under the trademark "Electus". For home usage Electus™ is produced in plastic bottles of 0.5L and 0.25L volume. The purification process is simple, and does not require electrical power, can be performed in any jug, but for customer convenience the company produces 10L and 20L containers, specially designed for the use of the product.

For purification of tap water, the dosage of Electus™ is 1ml per 1L of water, which makes its storage and transportation very easy. Moreover, after use the water requires no further filtering, as the product cleans out both biological and chemical agents. The company also produces automated purification mechanisms for industrial usage.

For treatment of water in swimming pools, artificial ponds, reservoirs for fish cultivation and other pure water consumers, the company has developed the product "Electus-pool".



Because of the long lifetime of the product and its biological properties, one of its usages is as stock for emergency supply of water. The product has been recommended by the national ministry of emergencies.

The presence of polymeric hydroxychloride forms with big molecular weight is the favourable distinctive feature of effectiveness of the product. It differs from such traditional coagulants and flocculants used in water filtering as aluminium sulphate and ferric sulphate, polyacrylimide.

The activity of the produced polymer is provided by the purity of the technology and use of analytically selected and experimentally confirmed catalysers and stabilisation additives.



Technical advantages provide:

- Better coagulation that allows lessening the product dosage by 2-3 times in comparison with other coagulants and flocculants. It increases filtering effect by 1.5-3 times.
- Lessen the time of coagulation
- Effective water filtering at a wide range of temperatures
- Effective water filtering at a wide range of PH. The product does not lessen the level of PH, alkaline water solution being used for purification of weak-acid and alkaline waters
- Fewer water salification and reduction of acid corrosion in comparison with other coagulants.
- Decrease of suspended load. Even extra dosage of coagulant will not result in its increase.

- Effective water disinfection, as the product has good antibacterial qualities that allow not to use additional water chlorination or ozonation
- Electus™ has a set of features not characteristic of the other coagulants. It can be used in processes of quick, maximal effective and economic profitable physical and chemical water filtering.

It can be used for:

- Filtering drinking water.
- Cleaning of artificial water bodies, water pools.
- Partial filtering of industrial, agricultural and sanitary wastewater.
- Radioactive water filtering.
- Medical drugs production.
- Cosmetic goods production.
- Catalyst production.
- Water preparation in thermal electric stations, state district power plants, boiler rooms.
- In food, canning, meat and milk industries, etc.
- In porcelain, faience production durability of good is increased by 2-3 times.
- In other industries where clean water is essential

The correlation between quality of drinking water – it's chemical and biological composition and health conditions of the population and their longevity, has long been known. Thus the level of drinking water is of paramount importance.

The main use of the product developed by the company is purification of drinking water. Coagulant Electus™ is part of ecologically safe coagulants.

The process of coagulation has been known for some time. The difficulty is, to extract the contaminants from the water, by using the smallest possible dosage of coagulant. The main advantage of coagulant Electus™ is that by using ecologically clean components, and special production technology a highly effective non-organic polymer is created.

Water purified by Electus™ answers to all European standards for drinking water.

Coagulant Electus™ cleans the water from different contaminants:

- Poisonous chemical substances
- Mineral oil products
- Salts of heavy metals (iron, copper, lead, mercury, zinc, etc.)

- Harmful organic connections, such as dioxides (a result of contact of chlorinated water and organic connections)
- Radioactive connections
- Pesticides, poisonous chemicals, nitrates, nitrites, etc.
- Different types of bacteria
- Retroviruses
- Simple pathogens

The coagulant Electus™ has passed the National sanitation and epidemiological expertise, and has the necessary conclusions of the Ministry of health of Ukraine. A wide spectrum of tests on different types of waters was performed in Ukraine, Bulgaria, Israel, Egypt and Saudi Arabia.

The highest requirements to water purity are in pharmaceutical industry. A well known pharmaceutical concern Softpharma has given Electus™ the highest grade, by rating it as usable in the production of medicine.

Experience has shown that continuous use of coagulant Electus™ helps ease digestive tract illnesses.



Utilisation of Plastic and Polyethylene

Scientists estimate the world oil are currently on the level of 100 – 120 milliard tons, which will run out in about 70 years. In the same time the world stock of coals is more than 100 trillion tons. Due to the above, coals may be considered as the future of energetics, and the importance of technologies for transforming coals into liquid and gaseous fuels in now paramount.

In the beginning of the twentieth century the method of «gasification of coal», by an incomplete oxidation of coal by air in an isolated reactor with reception of so-called «generating gas» was developed. This gas consists of carbonic oxide and nitrogen, and has been industrially mastered. The method requires a process of periodical cleaning of the reactor from slag and still inherits the low thermal ability of the gas. In recent years it became possible to lift the temperature in the reactors up to 800C and to obtain slag in liquid form, which facilitates the unloading of the reactor, however there are difficulties with loading of coals into the reactor which is under 7000ATM of pressure. Now the majority of power stations in the USA, Canada and Europe burn preliminary gasificated coals – so that emissions to the atmosphere contain less ashes, and slag – less unburned coals. Nevertheless, gasification of coals does not solve the basic problem - manufacture of fuel.

The brightest direction in coal gasification is a method of heating young coals with donors of hydrogen to temperatures above 450C at atmospheric pressure. Using special solvents provides the needed conditions for the process and an output of the liquid products practically identical to natural oil. During in this process gas is produced, suitable for comprimation and use on transport. Moreover, this process produces coke. An output of coke from young coals is 50 - 55 %, oil of 35% and 10% - 15% of gas. A furnace of a unique design allows using bad quality – cheap coals, provides high efficiency, and most importantly – quality of products and profitability of manufacture. Coke is suitable for domain production.

On the other hand, in recent years the world has become flooded with polyethylene products, mainly plastic bags and bottles. This problem is currently being addressed in almost every country, and with little success. The main problem in polyethylene recycling is the inability of its burning. If one attempts to burn such products, numerous toxic gasses are released into the atmosphere.



Nowadays, governments force the coke manufacturers to use polyethylene in furnaces. This process partially allows to get rid of polyethylene products, but in the same time damages the quality of produced coke.

The above method of coal gasification uses a special solvent produced from polyethylene. This solvent, not only gets rid of the polyethylene products, but in the same time increases the percentage of young coals in coke production.

At this time an industrial scale prototype of the technology is operated by our company. The prototype produces small quantities of powder, which then are used in coke production of small scales.

Tests that were carried out in chemical laboratories show that the produced powered – solvent increases the level of produced coke by several percent. The powder may be produced from almost any type of plastic and polyethylene.

Conclusions based on the results of testing the polymer solvent, produced from polymer wastes, that were carrying out in the Ukrainian Institute of Coal Chemistry are as follows:

1. The polymeric solvents decrease the content of sulphur in coke by 0,17 - 0,19 absolute percent, which increases the price of coke.
2. 25% of solvent mass transform into coke, 75% - into volatile matter. Thus the application of the solvent to coal charge leads to production of additional quantity of coke per one ton of spent coal and an increase in liquid and gaseous products.
3. When adding up to 3% of solvent, there is no noticeable decrease in coke strength.

Rubber Devulcanisation

It is known that during the manufacture of mechanical rubber goods (MRG) the rubber compounds undergo an irreversible vulcanisation with the aid of sulphur. Sulphur vulcanisation chemically «sews» the long chains of the molecules of natural rubber into a three-dimensional «grid». Thus, vulcanised rubber, once and for all, retains the form it had prior to the vulcanisation process. For moulding of new products from worn rubber products returning its elastic properties is necessary.

There are known methods of chemical devulcanisation of scrap rubber. For example, devulcanisation of rubber by ozone. In this case sulphuric «bridges» are oxidised and rubber is partially devulcanised. However, ozone oxidises the natural rubber a well, worsening its ability to be vulcanised for the second time. Furthermore, the degree of devulcanisation is low, which makes it impossible to obtain rubber compound for moulding of new MRG. Ozonisation makes it possible to obtain only rubber powder, for later addition to regular rubber compounds in quantity of only several percent.

Coral GROUP has developed a process of devulcanisation, which includes impregnation of rubber with special solvent with additives of catalysts and reagents. In this process rubber is destructured, sulphuric «bridges» are torn up, sulphur chemically connects, and rubber becomes elastic, suitable for moulding. All that remains is to add 2-4% of sulphur, and new rubber products can be made. The quality of the obtained rubber compound isn't worse than the one obtained from the initial material, i.e. it is completely possible to make new automobile tires or other rubber products from the devulcanised rubber.

The technological solution developed by our company consists of chemical, mechanical and physical stages, performed on the used rubber which yield a «devulcanisate» – a mix that can be further used, with addition of standard vulcanisation compound in low percentage, to produce new rubber products.



Conclusions, based on results of technical and mechanical properties of the thread rubber devulcanisate by the techniques accepted in the rubber industry are as follows:

1. The technical possibility of production of new product formations from the thread rubber devulcanisate has been proved.
2. For achievement of toughness index of technical plate corresponding to GOST 6190 it is necessary to add new thread rubber mixture in the ratio of 4:1 by weight (20% - compound, 80% - devulcanisate).



Liquid Waste Burning

The problem of destruction of the liquid, mixed and moist wastes consists of the fact that they cannot be placed on the grates of regular furnaces for solid fuel as a result of the presence of liquids. The presence of solid particles, which immediately drive the sprayers, prevents the dispersion of wastes with the aid of the sprayers for combustion in suspension. Solid residue from the combustion is laid aside on the walls of the furnace and the fuel equipment, rapidly rendering them inoperable. Thus technically it is not possible to burn liquid, mixed and moist wastes without preliminary preparation, for example drying. Finely dispersed wastes, such as silt from sumps, or fatty production oil wastes, never dry to the point when they can be burned as solid.

Abattoirs wastewaters that contain blood constitute serious environmental threat when drained away. Recently the offers to use special bacterial cultures for decomposition of such sewage waters were made. However in the course of bacterial decomposition process toxic and evil-smelling gasses such as ammonia, sulphuretted hydrogen and RSH are exhaled. After the process there are leftover noxious substances: indole, skatole, cadaverine, putrescine and other substances that require utilisation.

The proposed technology of thermo-chemical utilisation of liquid, mixed and moist wastes works as follows: settling at elevated temperatures, separation, discharge of isolated water, dehydration of the remainder, pyrolysis of remainder, which obtains pyrolytic gas and solid residue, after burning of the solid residue and cleaning the waste gas.

Application of the proposed solution enables to solve the problem of utilisation of abattoirs wastewaters. Pyrolysis is the only reasonable method of disposal of abattoirs wastewaters, due to the fact that as a result of pyrolysis in special furnaces, decontaminated waters, clean gases and chark are formed. Combination of abattoirs wastewater with grease sewage waters enables to reduce fuel consumption for utilisation.

Coral GROUP has devolved an installation on the bases on the described technology, which can be personalised for the needs of each customer, depending on the chemical composition of the wastes to be recycled.



Performance characteristics of a sample device

- Productivity – 1 ton/hour.
- Fat containing in wastes for operation – no less than 15%.
- Exhaust into the atmosphere - 75 000 м3 /hour of CO₂, N₂ and H₂O mixture.
- Tar content in exhaust – no more than 0,001 mg/l.
- Sulfur oxides content in exhaust – not more 0,001 mg/l.
- Discharge of disinfected at 100 CO water into sewerage system - no more than 750l/hour.
- Residual fat content in overflow water - no more than 2000 mg/l.
- Suspended particles content in overflow water - no more than 2000 mg/l
- Chemical oxygen demand in overflow water - no more than 1000 mg/l.
- Fixed residue from waste burning-gasification- no more than 10 kg/hour. It can be used as a fertilizer.
- Overall dimensions of the device - not more than 10 X 2 X 3m.
- Fully loaded mass of the device no more than 10 tons.
- Electric energy input - no more than 3 kW.
- Fuel consumption at start of the device (once) – 50 м3 of natural gas.
- Maintenance staff – 1 person.

Anti-Penetration Wrapping Material

In most today's airports a serious security problem is found. Usually the security procedures require the passenger and his luggage to pass through several stages of security checks. First the luggage, going into the baggage compartment, is checked, and then the passenger proceeds to the check-in. After that, the passenger's hand bags, and personal belongings are checked in an introscope, then the person follows into the waiting area, and can get onto the plane.

There are several problems present in this procedure line. First, the passenger himself is not checked when he enters the airport building, thus he can be carrying hazardous materials or explosives in his personal belongings. As the personal check commences only after the check-in – the point where the luggage is taken into the baggage compartment, one can place the explosive material in the luggage, after it has been checked, but before the personal check. For example, in the luggage check-in queue.

Another problem that is sometimes found in airports is theft. After the luggage has been checked in it follows the procedure without the owner's supervision and can be opened by the airport personnel.

The proposed technology has been developed for immediate uncovering of unsanctioned tampering of baggage on airliners, in every stage, from the security check up to its entry into the plane. Application of the proposed technology, does not change the procedures currently in use in the airports, and does not require additional workforce.

The core of the idea is to use a wrapping material that changes colour when cut, which allows us to prevent terrorist acts and theft, which occur in air transportation.



After the security check, the baggage is wrapped in a special material. If the passenger tries to place something into the wrapped bag and cuts or otherwise opens the bag, the wrapping material changes colour.

The passenger will now be stopped by the security personnel, and further movement of his bag, through the airport facilities, will be impossible.

Please note, that even if the passenger passes through an introscope, any transfer of material by the airport personal is now impossible. The effect of colour change may be adjoined by a special smell, which will be fixated electronically.

Wave-Electrical Energy Transducer

Coral GROUP proposes a project of organisation of the industrial release of wave - electrical transducers of energy of small power (WETP) of original construction. WETP has been used for more than 30 years, for the power supply of navigation buoys, scientific, radio-remote control equipment of low power (to 1 kW). Such converters "Masuda" are produced by Japan in quantities of several thousand units per year. Japanese WETP contain metallic details of high-precision production (air-driven turbine and valves); therefore their service period does not exceed 3 years, and their production is very expensive. In spite of high costs, there is constant demand for Japanese WETP, since they are irreplaceable as sources of autonomous electric power supply at sea.

Coral GROUP has developed and tested under real sea conditions a fundamentally new type of WETP. Our WETP does not contain expensive and complex production parts, which rapidly go out of order. Cheapness and ease of production of Coral's WETP is ensured by the production of plastic details on standard highly productive equipment. Plastic parts ensure the prolonged period of service in sea water without need for repairs, and if necessary can easily be substituted on the spot.

The expert opinion of the Experimental Department of Marine Hydrophysical Institute of National Academy of Sciences of Ukraine, on serviceability of experimental wave energy transducer by results of natural tests say: The Experimental Wave Energy Transducer is a rectangular construction made of steel pipes with dimensions of 8 x 2 x 1 meters and weighs approximately 1.5 tons. As load for the electrical generator incandescent lamps, with total power of 600W, were selected. There was an alkaline accumulator charging from generator and feeding clearance lamps and electrochemical anticorrosive protection system installed.

The Experimental Wave Energy Transducer was anchored at Black Sea Experimental Ground of Experimental Department of Marine Hydrophysical Institute in Blue Gulf at the distance of 200 m from the shore and at depth of approximately 7m. The anchor system with its chain being about 25m long was holding the Experimental Wave Energy Plant from one end and at the same time, the Experimental Wave Energy Plant was oriented by general wind direction towards prevailing surface waves practically all the time. The first Natural Tests of Experimental Wave Energy Plant were

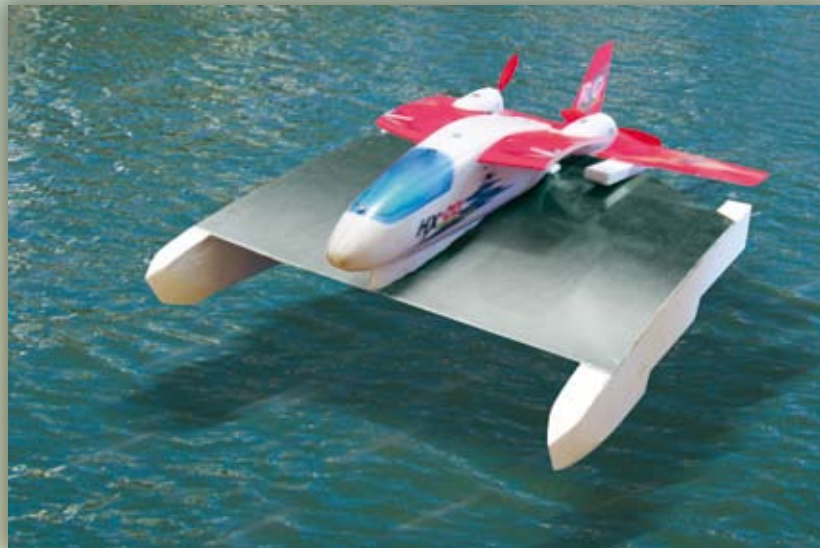


being carried out from September 1st to the end December 2006, during this period there were traces of neither corrosion nor failure.

The experiments showed that the WETP can be used as a power transducer for autonomous stations based at sea. With length from 8 to 14 meters the experimental transducer can produce electrical power for auton-

Improved Airfoil Boat

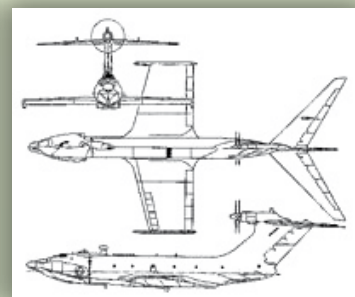
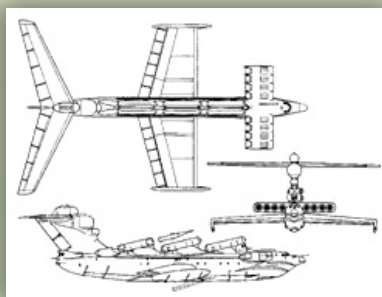
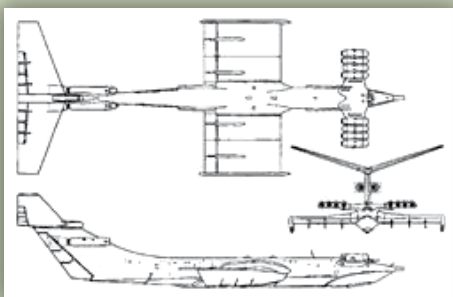
There is no definite answer to the question, what an airfoil boat is – whether it is a flying ship or a sailing plane. Even Rostislav Alekseyev, a well known Russian designer, the founder of the airfoil boat technology, does not know the answer himself. Vladimir Kirillov – the chairman of the Russian Central Design Bureau, believes that airfoil boats are the low-flying machines, which use the effect of a screen. A screen – a large reflecting surface – is necessary to make such a plane take off. A screen can be a water surface, a snow field or any other smooth ground surface.



The paradox is that the idea of such an aircraft was born during the Soviet era, but they were not developed for some unknown reason, though it seemed that they would have a bright future. Dmitry Ustinov, who was in charge of the defence industry in 1961, arrived to see the tests of the first airfoil boat SM-1. The senior official was so surprised with that project that he managed to convince the leadership of the country to launch the series production of the plane for army purposes. In 1962 the Central Design Bureau was working on a battle amphibian plane, weighing 450 tons. Two years after the scientists were working on another amphibian airfoil machine for commandos - T-1. A Caspian monster amphibian was ready in 1966. This machine was 100 meters long and could develop the speed of 520 kilometres per hour.

In spite of such a big size, an airfoil machine can fly very low above the water and can not be noticed by the radars or ABM systems of the enemy.

Coral is now constructing a new type of airfoil boat – for commercial use. It takes off from water and flies over the water surface at the altitude of 0.5 – 3m, and at speeds of 150 – 700 km/h, may be based in any bay, go out on the bank on its own. Airfoil boat has low fuel consumption and thus transportation cost ten times less than by regular planes. It is especially prospective for cargo and passenger transportation between oceanic islands.



Laboratory Stage Projects

The projects at Coral are classified according to their stage of development; those that are laboratory stage are presented here.

RECYCLING OF SOLID URBAN WASTE

Basic obstacles for economically effective processing of SUW on the urban dumps are: the mixed morphological and chemical composition, high humidity (to 70%), low bulk density (0.01-0.2 t/m³), the admixture of food and construction wastes, and tendency for spontaneous combustion.



Therefore, for the profitable utilisation of SUW, the use of the mechanised complex line of multistage processing, obtaining of secondary raw material and energy is proposed. The line must include: magnetic separation of ferrous metal, induction separation of nonferrous metal, air separation of paper-plastic fraction, wet separation of paper from plastic, and pyrolysis of plastic. The wastes of soft roofing and tires are to be utilised as well.

As a result SUW is separated into the following forms of secondary raw material: ferrous metal (5th class, 5-8%), nonferrous metal (aluminium 1-2%), paper-cardboard is wet (30-40%), plastic the mixed dirty (10-15%), and heavy fraction (food waste + construction rubbish -50%).

Scrap metal, paper can be sold, heavy fraction can be buried (density 1,0-1,5 t/m³), plastic, rubber, wastes of soft roofing can be processed in the pyrolytic appara-

tus, obtaining bitumen, asphalt, coke, scrap metal, artificial oil, liquid boiler propellant, diesel fuel, gasoline, combustible gas, electric power, thermal energy. Thus, the volume of burial SUW decreases 20 fold, the possibility of the combustion at a dump is excluded, and removal and utilisation of SUW becomes profitable.

LEAD FREE CAR BATTERY

The consumption of lead in automobile batteries production is on the level 1kg/A-h and has reached 10 million tons per year. The scarcity of lead, related with the exhaustion of the accessible deposits of polymetallic ores within the next few years is expected. Today large portions of used lead are exhibited into the environment. Personnel of battery factories constantly undergo lead intoxication.

We propose the development and production of automobile storage batteries without lead or zinc content, on the basis of redox-potentials of transition metals. Laboratory experiments have shown that chemical-battery power supply on this basis has high currents of discharge, small self-discharge and capacity 4 times higher than lead batteries, and does not contain toxic materials. Automobile storage battery with a capacity of 55 A-hr will have a mass of 10-15 kg, a period of service of approximately 3 years, and will not be sensitive to low temperatures. Because of the heavy stocks of transition metals ores, the cost of this storage battery will not exceed 15 dollars.



ROOFING TETP-BOTTLES

The consumption of polyethylene PETP in the production of water bottles in the world has reached 20 million tons per year. Sanitary regulations prohibit the reuse of PETP for production of new bottles. Utilisation PETP into technical fibres for production, for example, of textile fibre is prevented by the instability of polymer under repeated heating and the impossibility of colour sorting of the bottles.



Coral propose an utilisation of PETP into the roofing, whose colour is determined by the addition of mineral pigments. The one time heating of PETP during the production of materials ensures the retention of the mechanical properties of materials and low energy needs. The separation of labels, checking rings and glue occurs in the automatic regime. The technology of continuous moulding of sheet mouldings makes it possible for one line to produce up to 10 thousand square meters of roofing in a 24 hour period out of 30 tons of PETP by-products.

The produced material is steadfast to the sunlight and the sediments, the service period is about 25 years. Prime cost of the material is 2-3 dollars. (depending on the cost of electric power).

SULFURE EXTRACTION

It is known that in the Black sea the boundary of zone of the high concentration of hydrogen sulphide is located on depths of 150-300m, the concentration of hydrogen sulphide dissolved under pressure of 15-30 atm reaching 1,2 gl in sea water. In one thousand cubic meters there is about 1 ton of sulphur. Taking into ac-

count the accessibility of raw material, production of sulphur from sea water can become a super-profitable enterprise. Processing hydrogen sulphide into high-purity sulphur has long ago been mastered at the coke, gas- and oil-refineries (arsenic method), however, because of the ecological danger, unwieldiness of equipment and high capital and operational expenditures, it cannot be realised in the Black sea. Moreover the rise of hydrogen sulphide water to the surface will be accompanied by energetic isolation of hydrogen sulphide from the water with the pressure relief (similar to the «effervescence» of champagne when a bottle is opened). This can lead to poisoning of personnel and pollution of the air pond, and also to the explosion of hydrogen sulphide.



Coral GROUP proposes a technology of electrochemical oxidation of hydrogen sulphide to elementary sulphur of high cleanliness without the lift of hydrogen sulphide to the surface - directly at the depth of 150-300m. Further processing consists of washing out salts with fresh water, drying and packaging the final product.

Thus, processing hydrogen sulphide into high-purity sulphur occurs on depth, ensuring ecological and technological safety.



Theoretical Conjectures

Unit for blast-furnace blast with pulverized-coal fuel – Allows substituting 50% of coke with cheap coal.

New form of diamonds faceting – At the expense of improving dispersion of light provides more vivid shine of diamond (colour of glares) than after other forms of faceting.

Unit for laser faceting of diamonds – Allows to facet diamonds faster and more precisely than using applied manual technology. Outcome of ready diamonds from raw materials is twice larger than the one of manual technology.

Battle solid state laser with chemical pumping – The impulse energy reaches several megajoules and the mass of working unit is several dozen grams. It is possible to equip with battle parts of anti-aircraft missiles and micro satellites with laser assembling.

System for earthquakes prediction – Allows defining the location and time of subsequent earthquake shock with precision unreachable by other methods. Cost of project development, including production of serial sample of system is about \$450 000. Prospective selling price of one package of equipment and software for the system of earthquakes prediction is several million dollars.

Vibro-direct- ow jet engine – Jet engine for flights with subsonic and ultrasonic speeds. Intake and compression of air is reached by changing section of opening of direct-flow engine. The engine is notable for reliability, simplicity, cheapness, long lifetime, good specific impulse, manufacturability in production.

Hydroplane – Using air rotor of original construction apparatus with the same carrying capacity is twice more economic than helicopter. Apparatus has good steadiness, manoeuvrability, is notable for simplicity, cheapness, reliability.

Apparatus for ramming of building sites – Allows to quickly bring the apparent density of sites to maximal.

Device for economic cooling of large volumes – The device represents an original system for heat (cooling) energy accumulation at winter time. It allows to cool large volumes (products warehouses) or squares (ice stadiums) without energy consumption.

Electric drive for vehicle – Provides smooth change of wheels revolution speed of an automobile under maximal torque. Prevents from thrashing of wheels when braking as well as at getaway. Does not have friction node.

Two-component quick-hardening polymeric-concrete blends – Used in construction and mining works. Time of complete hardening makes up a couple of hours (conventional concrete – a couple of days), and produced out of wastes.

Thermal-electromagnetic generator – Allows production of electricity at the expense of fuel burning with coefficient of efficiency of more than 60%. Does not have moving parts, has a long lifetime. Allows reliably regulating and synchronizing along of alternate current, power from dozens of kilowatts to dozens of megawatts

Internal-combustion engine of rotor type without friction details – Has increased coefficient of efficiency, small size, long lifetime.



... Making Green Business Worth It

