and data safety even in the fault case. When loading, the memory self-testing, during which the system of memory error checking and correction (ECC) allows improving the data integrity, should be referred to the reliability augmentation means.

In the wireless local area network media the reliability is influenced, as a rule, by the quality of connection with the remote computer connected in the Internet with the hot spot. There appears a problem in the configuration of connection with the Wide-Area Network in the hot DHCP and NAT spots and in the correctness of binding IP-addresses to the devices, and also the correctness of their conversion into an integrated IP-address used for the connection to the network and for the outlet to the interface of the wire-connected network. Finally the networks aim to achieve the reliability of 99,999%.

The article is admitted to the International Scientific Conference "Technical sciences and modern production", China (Beijing), 26 November - 4 December, 2007, came to the editorial office on 09.11.07.

RESEARCH OF AN OPPORTUNITY OF USE POLYMERIC MATERIALS IN DISPOSABLE CONSTRUCTION OF VARIOUS PROTECTIVE BARRIERS

Mironov V.V., Yakimova I.V.
The state architecturally-building university, The state oil-and-gas university, Tyumen, Russia

Annyally in this or that part of the world, including Russia, flooding and forest fires suddenly occur, caused by the various reasons, which cause huge damage the natural and the population. Existing ways of protection against these acts of nature not always lead to desirable result. First of all, it is caused by imperfection of means on struggle against elements. One of major factors of successful struggle against sudden flooding and duly localization of forest fires is time of a construction of protective barriers, such as temporary water-retaining dams and fire-prevention protective contours. Existing technical decisions of similar purpose are expensive enough and labour-consuming at their realization besides demand significant time for a construction of protective designs in extreme situations.

We have investigated an opportunity of use of a light, inexpensive polymeric packing material, which is serially let out by the domestic industry practically in each large city of Russia, in disposable designs of an extreme construction of protective barriers from sudden flooding and for localization of local forest fires, and also emergency spreading burning liquid hydrocarbons. Ways of a construction of various purpose protective barriers which are used in designs of the water-filled polymeric casings are patented in the Russian Federation. Realization of these ways in practice will allow to reduce considerably expenses and time of a construction of protective barriers in extreme situations, it will essentially raise efficiency of struggle against acts of nature, such as sudden flooding and forest fires, and also will raise efficiency of liquidation consequences of technogenic failures.

Working capacity of temporary water-retaining dam constructions made of water-filled polymeric casings and contours of protective barriers for localization local forest fires, and also emergency spreading burning liquid hydrocarbons, made of the permeable water-filled polymeric casings has been checked up experimentally on full-scale fragments and has yielded encouraging results.

The article is admitted to the International Scientific Conference "Development prospects of higher school science", Sochi (Dagomys), 20-23th September, 2007, came to the editorial office on 09.11.07.

TRIFOCAL DIFFRACTIVE-REFRACTIVE INTRAOCULAR LENS – FIRST RESULTS

[1]Cherednick V.I., [2]Treushnikov V.M.
[1]State University, [2]"Reper-NN" enterprise, Nizhny Novgorod, Russia

The natural human eye-lens makes possible to see sharply at any distance within the diapason from the infinity to 20-25 cm on account of accommodation – that is the curvature change of its refractors. An artificial crystalline humor (intraocular lens), implanted instead of the one lost its transparence because of the natural eye-lens's cataract, cannot provide such a possibility so far. In an elementary variant an intraocular lens represents a monofocal lens performing a sharp image of objects located in a certain fixed distance in the retina. It is usually either at a short distance (book reading) or far – electively. For seeing at other distances the eyeglass correction is needed. For partial compensation of this disadvantage nowadays more constructively complex (and, naturally, more expensive) bifocal intraocular lenses, making possible to see sharply at all distances, are produced and implanted. Both refractive lenses, forming the image in accordance to the laws of geometric optics, and diffractive-refractive ones, in which the focusing with the help of a diffractive relief in one of the lens's surfaces in combination with the refraction in the other one is used for the image formation, can be bifocal. In the first instance the bifocality is achieved either on account of various curvature of the refractive surfaces or on account of the refraction factors' diversity at various radial distances from the lens's center. In the second instance the bifocality is achieved on account of the fact that there can be several diffraction maximums promoting a sharp image. The sample of the bifocal refractive intraocular lens is the "Gradiol" lens

produced by the "Reper-NN" Research and Development Enterprise (Nizhny Novgorod, the co-design with the SE IMTC "Eye Microsurgery" named after the Academician S.N.Fyodorov, Moscow). There is one more lens of a less diameter with another refraction factor, with another curvature of the refractive surfaces and with another (less) thickness index inside the central part of this lens. The samples of a bifocal diffractive-refractive lens are the ReSTOR lens of the firm "Alcon", the "Accord" lens produced by the "Reper-NN" Research and Development Enterprise (the co-design with the Institute of Automation and Electrometry SB RAS, Novosibirsk) and the "Record-2" lens also produced by the "Reper-NN" Research and Development Enterprise (the co-design with the Nizhny Novgorod State University named after N.I. Lobachevsky). The main difference of refractive and diffractive-refractive lenses lies in the fact that in the first instance at bright lighting and, respectively, at a small diameter of the pupil the peripheral part of the lens can happen to be fully closed and the corresponding focus will not be realized – the lens will become a monofocal one. In the second instance the lens remains bifocal at any papillary diameter.

There is a ring diffractive relief, providing the diffraction maximums performing the images in the retina, in one of the surfaces (usually plane) of the diffractive-refractive lenses. The second surface (usually spherical) remains smooth and provides an extra refracting power, enabling an opportunity to run out at a considerably less number of diffractive rings, than if the second surface were also plane (retarder). The diffractive relief profile can be rectangular (binary construction), triangular or of any other, more complex form, for example, sinusoidal. The diffractive-refractive lenses produced nowadays all over the world have got the triangular profile. The triangular profile preferability is conditioned by the fact that at such a form of the profile the intensity of light energy in the diffraction maximums is close to its theoretical limit. The abovementioned ReSTOR and "Accord" lenses are the ones with the triangular profile. In the ReSTOR lenses the relief depth apodization is applied – the relief depth reduces with the removal from the lens center along its radius. The light energy distribution between the diffraction maximums (foci) depends on the relief depth. The less the depth - the less energy falls on the maximum of the first order corresponding to the near sight, and the more energy falls on the maximum of the zero order corresponding to the distant sight. At bright day lighting and small papillary diameter the ReSTOR lens provides an approximately equal distribution of the light energy between both maximums, and in conditions of poor lighting almost all the energy falls on the maximum of the zero order, i.e. at poor lighting this lens transforms actually into a monofocal one corresponding to a distant sight. In the opinion of the authors of this working there is no necessity to see the near located objects in the twilight.

The bifocal lenses of any design afford an opportunity to see equally well both at a distance (from about 12-15 m and farther) and near (25-40 cm). But the image of the objects disposed at the between distances remains misfocused. We don't speak about the total sight or orientation ability loss, but one has to watch TV, for example, in glasses. To provide the sharp sight at the between distances a third focus is necessary. The corresponding trifocal lenses can be refractive and diffractive-refractive as well. In the first instance a further technology complication and, respectively, cost increase are inevitable. In the second instance the technology doesn't complicate, but even simplifies. As it was noted earlier, all the world's producers of diffractive-refractive lenses use a diffractive relief with a triangular profile. Such profile gage making requires a rather complex technology and high precision modern equipment, that conditions an extremely high cost of such lenses (up to thousands of dollars). A diffractive relief with a rectangular profile is considerably easier to make. Only a ring gage, which can easily be made on an electron-beam lithography installation, is necessary. As it was already noted, the intensity of diffractive maximums for a triangular profile is impossible to excel. The corresponding intensity for a rectangular profile can be lower by 20-40%. It is unlikely that such intensity reduction will represent a serious impediment for anybody. It is common knowledge that the human eye retina easily accustoms to the illumination intensity changes from 10^{-6} to 10^{5} lx. The intensity variation by tens of per cent and even many times against such a diapason represents an insignificant value. A person will take no notice of such a change, but will notice the artificial eye-lens cost variation many times.

There is one more highly serious circumstance saying for a rectangular profile. The computer modeling shows that a diffractive relief with a rectangular (and sinusoidal) profile gives three diffraction maximums suited for the image formation – minus one, zero and plus one orders. The rest maximums of higher orders have got a negligible intensity and are useless for practical application. Thus, a diffractive-refractive lens with a rectangular profile refractive relief can be used both as a bifocal intraocular lens and as a trifocal one without any structural and technological changes. In the bifocal variant only two maximums of the three available ones are simply used, and in the trifocal variant all the three maximums are in use. Both variants differ only in ring diameters and groove depth. The computer modeling also shows that the diffractive relief with a triangular profile gives only two diffractive maximums suited for the image formation – zero and plus one orders. The third maximum is principally impossible to obtain with the help of a triangular profile construction; the lenses with such a profile cannot be trifocal by all means. For the illumination intensity increase in the rest two maximums one has to pay with the third one loss – the

energy conservation law is impossible to avoid. The intensity variation can be compensated by an adequate sensitivity shift of the retina, and the third maximum loss cannot be compensated at all.

At the present time, the "Reper-NN" Research and Development Enterprise – is the only one of the kind, which produces trifocal difracrive-refractive intraocular lenses "Record-3" with a rectangular profile diffractive relief (the lenses "Record-2" are a bifocal variant of the same design). These lenses are a co-design of the Nizhny Novgorod State University named after N.I. Lobachevsky (computer modeling and concrete construction calculation) and the "Reper-NN" Research and Development Enterprise (fabrication method and production). The first clinical trials of the "Record-2" lenses and the world's first successful clinical trials of trifocal lenses ("Record-3") have been carried out in the Cheboksary Branch of the FSU IMTC "Eye Microsurgery" named after the Academician S.N.Fyodorov [1]. The results of these trials (about a hundred patients) testify that the patients with a bifocal eye-lens "Record-2" see equally well both nearby and distantly, and the patients with a trifocal eye-lens "Record-3" see equally well nearby, distantly and in between intervals. The area of the distances corresponding to a poor image focus has significantly decreased. The questionnaire survey of the patients has proved their satisfaction with the surgery results – a person with a trifocal intraocular lens has got an opportunity to see well distantly (to drive a car), read a book and watch TV without glasses on.

Therefore, a trifocal intraocular lens, principally exceeding all the existing bifocal lenses in its functional characteristics, has been calculated, designed and for the first time in the world manufactured on the "Reper-NN" shop floor in collaboration with the Nizhny Novgorod State University named after N.I. Lobachevsky. There is no trifocal lens efficient analogue in the world for the time being. The lens has successfully passed the first clinical trials.

References

1. Pashtayev N.P., Pozdeyeva N.A., Russkov K.N., Yelakov Yu.N. "The first attempt of rectangular profile refractive-diffractive intraocular lens "MIOL-RECORD" implantation", works of the Conference "New Technologies in Ophthalmology', Cheboksary, September, 2007, pp. 52-55.

The article is admitted to the International Scientific Conference "Technical sciences and modern production", China (Beijing), 26 November - 4 December, 2007, came to the editorial office on 09.11.07.

PEA PLANTS' SUBSTRATE HEAVY METALS CUMULATION RESISTANCE PROMOTION BY MEANS OF SEEDS TREATMENT WITH SUPER-LOW DOSAGE OF SALICYLIC ACID

Shalimova O.A., Shtakhova T.A.
Orel State Agrarian University, Orel, Russia

The investigations of heavy metals content (Pb, Ni, Cd) in pea plants with the pre-treatment of the seeds with salicylic acid has been carried out. The induced plants' growth in the media rich in heavy metals has been investigated. It has been established that the treated plants accumulate toxic compounds in a less degree compared to the control and retain the ability to healthy growth in polluted media. It is offered to treat the seeds with salicylic acid in the concentration of $2 \cdot 10^{-8}$ M before planting.

Table 1. Heavy metals content in plants and MCL for their vegetable forages.

Substance	HM content in plants, mg/kg				MCL in vegetable forages of natural humidity, mg/kg
	Non-treated with SA		Treated with SA		
	смесь Кнопа	Knop's mixture + Pb, Hg, Cd	Knop's mixture	Knop's mixture + Pb, Hg, Cd	
Cadmium	<0,004	0,42	<0,004	0,10	0,3
Lead	<0,012	8,52	<0,012	2,26	5,0
Nickel	0,058	12,32	0,058	1,17	3,0

Cultivated plants intensively absorb special substances form the soil solution. The pea family plants can accumulate a considerable amount of metals, the dangerous for animal bodies heavy metals (HM) (with the density of 5 g/cm^3) among them. Taking into account a regular increase of not used in the metabolic process substances' concentration, a health hazard for people or animals making use of such contaminated products can emerge in the following food links [2].

In connection with the abovementioned the laboratory research on the study of physiological growth and the ability to toxic metals accumulation by the pea plants' organs at the pre-sowing treatment of the seeds with salicylic acid (SA) with the concentration of $2 \cdot 10^{-8}$ M [1] was carried out. The investigations of heavy metals'- Pb, Ni, Cd - content were carried out in the accredited by the scientific research testing laboratory of the Orel State Agrarian University according to standard practice [3]. The valuation of the physiological state of the plants was performed visually. For the heavy metal standard the limits of their concentrations promoting normal regulation of functions in plants are taken.