Open joint-stock company
Engineering and manufacturing association
"PROGRESS"

Ref. No. 22/19 from 17.04.2003

REPORT
on testing waterproofing compound "Penetron".

According to the request from 23.09.2002 the work for determination of the influence of waterproofing compound "Penetron" **on water resistance of radiologically loaded concrete** has been executed in the laboratory of building materials of the Open joint-stock company PTO "Progress".

The samples of concrete of the grade M-300 with flowability 8 cm in the form of cylinders of the diameter 15 cm and of the height 4 have been made for the tests. Initial water resistance is W-0 (concrete with higher filtration).

Actual material consumption per 1 cubic meter of concrete is:

Portland cement of the grade 400	430 kg,
crushed sand from the Kurmansky open-cast mine	690 kg,
Granite crushed stone of the fraction 5-20 mm of the Kurmansky open-cast mine	1010 kg,
W/C	0,52

All the samples which have been made were divided into two groups:

Group A (control) has not been exposed to additional processing;
Group B (with "Penetron") has been processed with waterproofing compound "Penetron".

The compound "Penetron" has been mixed up at the ratio 3:1 (P:W) and applied on humidified surface of the hardened concrete at the rate of 1 kg of dry mixture per 1 square meter of the surface. Six hours after application of the coating the samples were placed in water for 2 days. The subsequent hardening was done in the normal storage chamber.

Both groups of samples have been sent to the Federal Nuclear Centre of the city Snezhinsk (RFNC-VNIIEF) where they have **been exposed to gamma radiation of the dose 500 Mrad** at the installation "Gammatok-100M" with the source of radiation of Co^{60}.

After the irradiation all the samples have been returned to OJSC PTO "Progress" and have passed the tests for water resistance determination **according to GOST 12730.5-84**. The results averaged for each group are given in the following table.

Water resistance Group A (control)	*Water resistance Group B (with "Penetron")*
W-0	**W-2**

CONCLUSIONS:

After gamma-irradiation by the dose 500 Mrad, water resistance of the concrete which have been processed with waterproofing compound "Penetron" was better than water resistance of control concrete by one order.

Production manager G.A. Arhipova

The engineer G.V. Fomenko

Open joint-stock company
Engineering and manufacturing association (PTO)
"PROGRESS"

Ref. No. 22/25 from 06.05.2003

REPORT
on testing waterproofing compound "Penetron".

According to the request from 23.09.2002, the work for determination of the influence of waterproofing compound "Penetron" **on water resistance of radiologically loaded concrete** has been executed in the laboratory of building materials of the Open joint-stock company PTO "Progress".

The samples of concrete of the grade M-300 with flowability 8 cm in the form of cylinders of the diameter 15 cm and of the height 4 have been made for the tests. Initial water resistance is W-0 (concrete with higher filtration).

Actual material consumption per 1 cubic meter of concrete is:

Portland cement of the grade 400	430 kg,
crushed sand from the Kurmansky open-cast mine	690 kg,
Granite crushed stone of the fraction 5-20 mm of the Kurmansky open-cast mine	1010 kg,
W/C	0,52

All the samples which have been made were divided into two groups:

Group A (control) has not been exposed to additional processing;
Group B (with "Penetron") has been processed with waterproofing compound "Penetron".

The compound "Penetron" has been mixed up at the ratio 3:1 (P:W) and applied on humidified surface of the hardened concrete at the rate of 1 kg of dry mixture per 1 square meter of the surface. Six hours after application of the coating the samples were placed into the water for 2 days. The subsequent hardening was done in the normal storage chamber.

Both groups of samples have been sent to the Federal Nuclear Centre of the city Snezhinsk (RFNC-VNIIEF) where they have **been exposed to gamma radiation of the dose 1000 Mrad** at the installation "Gammatok-100M" with the source of radiation of Co^{60}.

After the irradiation all the samples have been returned to OJSC PTO "Progress" and have passed the tests for water resistance determination **according to GOST 12730.5-84**. The results averaged for each group are given in the following table.

Water resistance Group A (control)	*Water resistance Group B (with "Penetron")*
W-0	**W-2**

CONCLUSIONS:

After gamma-irradiation by the dose 1000 Mrad, water resistance of the concrete which have been processed with waterproofing compound "Penetron" was better than water resistance of control concrete by one order.

Production manager G.A. Arhipova

The engineer G.V. Fomenko

Open joint-stock company
Engineering and manufacturing association (PTO)
"PROGRESS"

Ref. No. 22/20 from 17.04.2003

REPORT
on testing waterproofing compound "Penetron".

According to the request from 23.09.2002 the work for determination of the influence of waterproofing compound "Penetron" **on compressive strength of radiologically loaded concrete** has been executed in the laboratory of building materials of the Open joint-stock company PTO "Progress".

The samples of concrete of the grade M-300 with flowability 8 cm of the size 10 × 10 ×10 cm have been made for the tests.

Actual material consumption per 1 cubic meter of concrete is:

Portland cement of the grade 400	430 kg,
crushed sand from the Kurmansky open-cast mine	690 kg,
Granite crushed stone of the fraction 5-20 mm of the Kurmansky open-cast mine	1010 kg,
W/C	0,52

All the samples which have been made were divided into two groups:

Group A (control) has not been exposed to additional processing;
Group B (with "Penetron") has been processed with waterproofing compound "Penetron".

The compound "Penetron" has been mixed up at the ratio 3:1 (P:W) and applied on humidified surface of the hardened concrete at the rate of 1 kg of dry mixture per 1 square meter of the surface. Six hours after application of the coating the samples were placed in water for 2 days. The subsequent hardening was done in the normal storage chamber.

Both groups of samples have been sent to the Federal Nuclear Centre of the city Snezhinsk (RFNC-VNIIEF) where they have **been exposed to gamma radiation of the dose 500 Mrad** at the installation "Gammatok-100M" with the source of radiation of Co^{60}.

After the irradiation all the samples have been returned to OJSC PTO "Progress" and have passed the tests for compressive strength determination **according to GOST 10180**. The results averaged for each group are given in the following table.

Compressive strength, MPa *Group A (control)*	*Compressive strength, MPa* *Group B (with "Penetron")*
38	**43,2**

CONCLUSIONS:

After gamma-irradiation by the dose 1000 Mrad, compressive strength of the concrete which have been processed with waterproofing compound "Penetron" was better than compressive strength of control concrete by 5,2 MPa (14%).

Production manager G.A. Arhipova

The engineer G.V. Fomenko

Open joint-stock company
Engineering and manufacturing association (PTO)
"PROGRESS"

Ref. No. 22/26 from 06.05.2003

REPORT
on testing waterproofing compound "Penetron".

According to the request from 23.09.2002 the work for determination of the influence of waterproofing compound "Penetron" **on compressive strength of radiologically loaded concrete** has been executed in the laboratory of building materials of the Open joint-stock company PTO "Progress".

The samples of concrete of the grade M-300 with flowability 8 cm of the size 10 × 10 ×10 cm have been made for the tests.

Actual material consumption per 1 cubic meter of concrete is:

Portland cement of the grade 400	430 kg,
crushed sand from the Kurmansky open-cast mine	690 kg,
Granite crushed stone of the fraction 5-20 mm of the Kurmansky open-cast mine	1010 kg,
W/C	0,52

All the samples which have been made were divided into two groups:

Group A (control) has not been exposed to additional processing;
Group B (with "Penetron") has been processed with waterproofing compound "Penetron".

The compound "Penetron" has been mixed up at the ratio 3:1 (P:W) and applied on humidified surface of the hardened concrete at the rate of 1 kg of dry mixture per 1 square meter of the surface. Six hours after application of the coating the samples were placed in water for 2 days. The subsequent hardening was done in the normal storage chamber.

Both groups of samples have been sent to the Federal Nuclear Centre of the city Snezhinsk (RFNC-VNIIEF) where they have **been exposed to gamma radiation of the dose 1000 Mrad** at the installation "Gammatok-100M" with the source of radiation of Co^{60}.

After the irradiation all the samples have been returned to OJSC PTO "Progress" and have passed the tests for compressive strength determination **according to GOST 10180**. The results averaged for each group are given in the following table.

Compressive strength, MPa Group A (control)	*Compressive strength, MPa Group B (with "Penetron")*
37,8	**46,3**

CONCLUSIONS:

After gamma-irradiation by the dose 1000 Mrad, compressive strength of the concrete which have been processed with waterproofing compound "Penetron" was better than compressive strength of control concrete by 8,5 MPa (22%).

Production manager G.A. Arhipova

The engineer G.V. Fomenko