

WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

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på Lillehammer

WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Scope of presentation:

- **Introduction to XYPEX Admix**
- **Field tests**
- **Laboratory tests**
- **Conclusions**

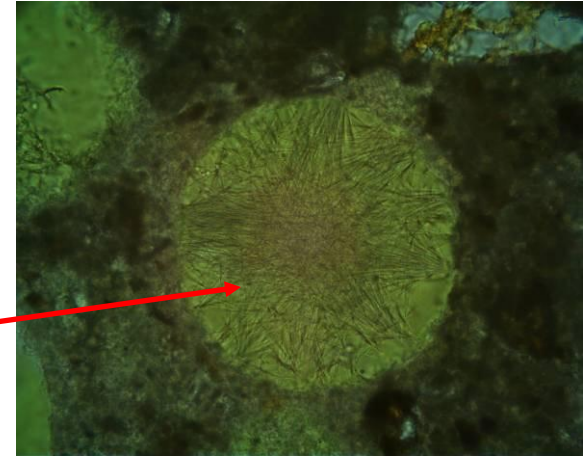
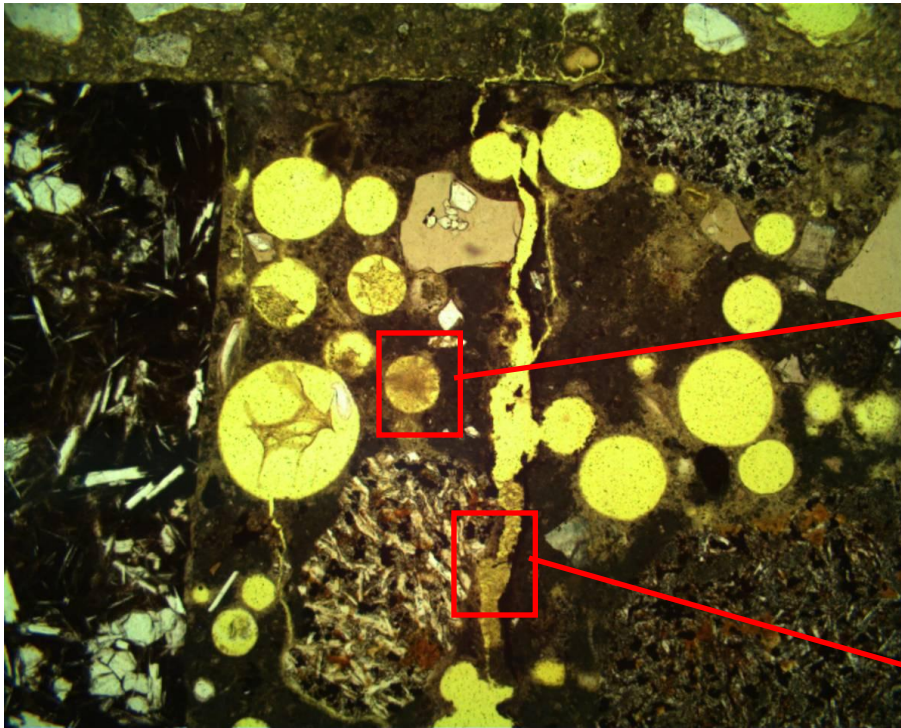
WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Introduction to XYPEX Admix:

XYPEX Admix is a crystalline system for concrete waterproofing, which is substantially different from traditional barrier products, like membranes and cementitious coatings.

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Introduction to XYPEX Admix:



WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

XYPEX Admix in Vuosaari Harbor Project



WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

XYPEX admix in shotcrete in combination with build-in drainage system is a very effective combination.

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Field tests:

XYPEX admix has been tested in shotcrete in two tunnels in Iceland:

Kjárhjúkar Headrace tunnel

Héðinsfjörður Road tunnel

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Kjárhjúkar Headrace tunnel

**XYPEX Admix with 1.0 and 1.5 % dosage
in relatively small areas.**

**Used in the 2nd shotcrete layer and
without any build-in drains.**

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Kjárhjúkar Headrace tunnel

With 1 % Xypex Admix and steel fibers – before shotcreting



WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Kjárhjúkar Headrace tunnel

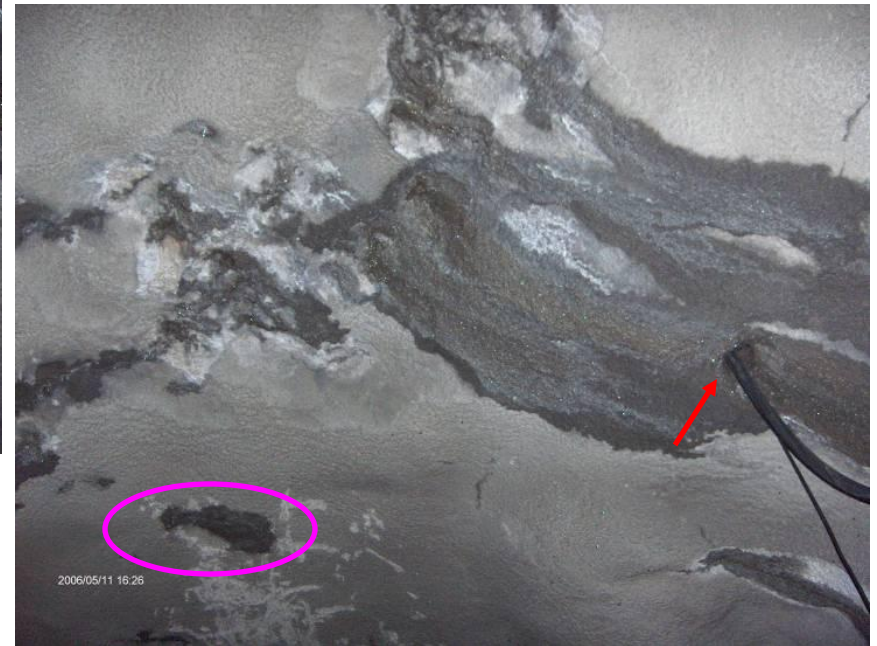
With 1 % Xypex Admix and steel fibers – shotcreting



WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Kjárhjúkar Headrace tunnel

With 1 % Xypex Admix and steel fibers – after 2 months



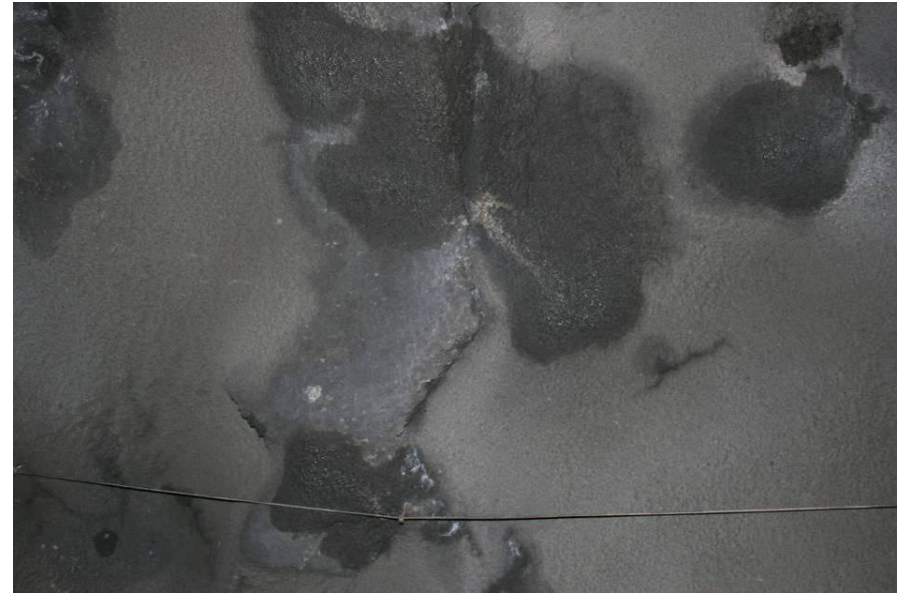
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Kjárhjúkar Headrace tunnel

With 1.5 % Xypex Admix – tested in 6 areas all with drippings



Area B

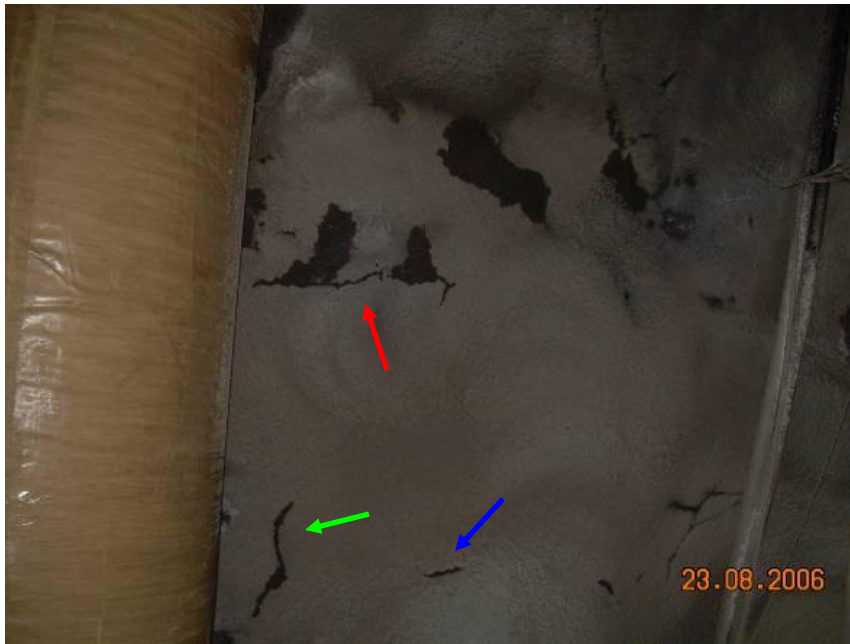


Area E

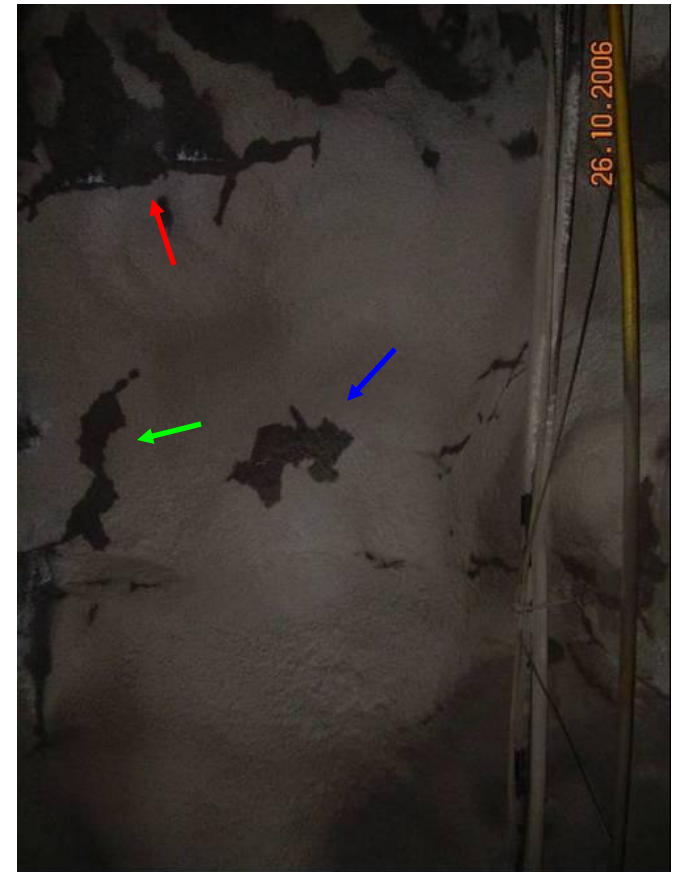
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Kjárhjúkar Headrace tunnel

With 1.5 % Xypex Admix – Area B



1 month



3 months

WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Kjárhjúkar Headrace tunnel

With 1.5 % Xypex Admix – Area A



Just after application



18 months

WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Kjárhjúkar Headrace tunnel

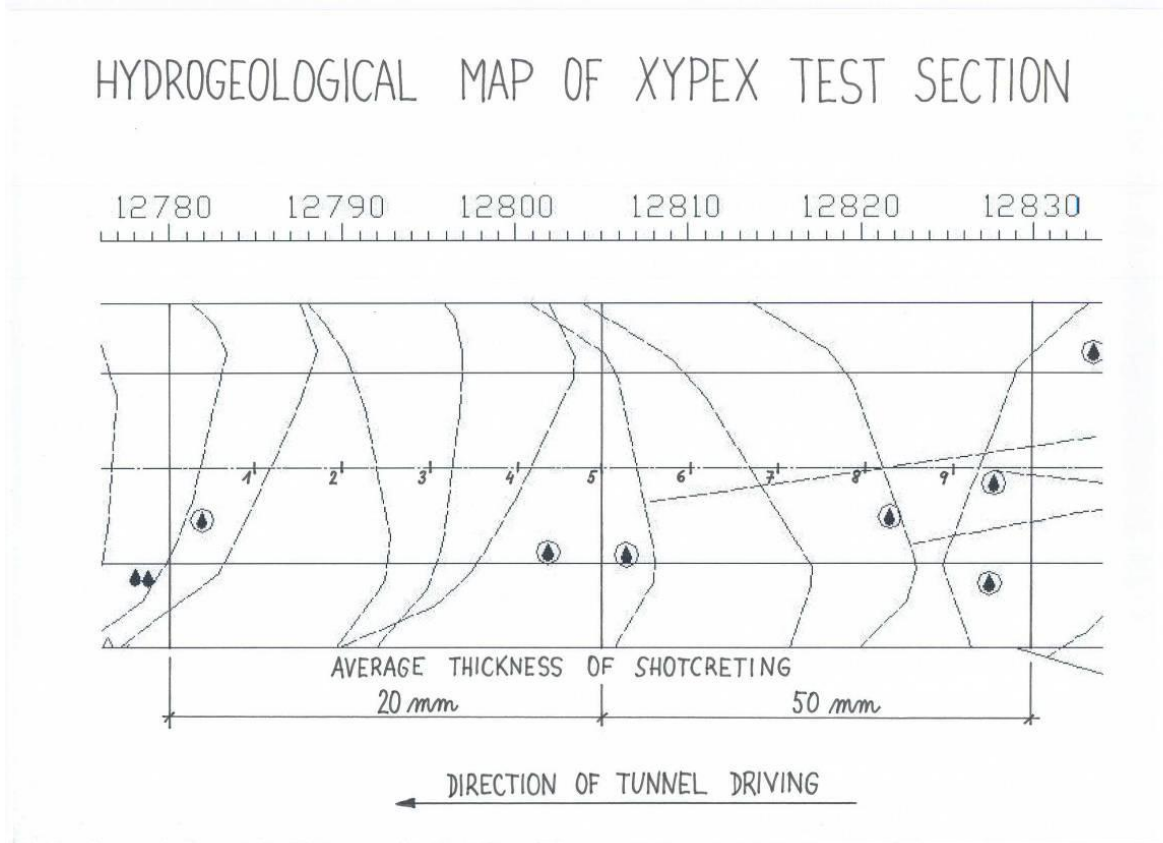
With 1.5 % Xypex Admix – All areas 18 months from application

**Difficult conditions for photography but great
improvements**

WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Héðinsfjörður Road tunnel

With 1.35 % Xypex Admix



**Total thickness of
XYPEX Admix
shotcrete:
10 – 12 cm
7 – 9 cm**

**Then all with
with about 1.5 to
2.5 cm XYPEX
Admix**

WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Héðinsfjörður Road tunnel

With 1.35 % Xypex Admix



31-05-2007



02-08-2007



19-03-2008

Point 1

WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Héðinsfjörður Road tunnel

With 1.35 % Xypex Admix



31-05-2007



02-08-2007



19-03-2008

Point 6

WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Héðinsfjörður Road tunnel

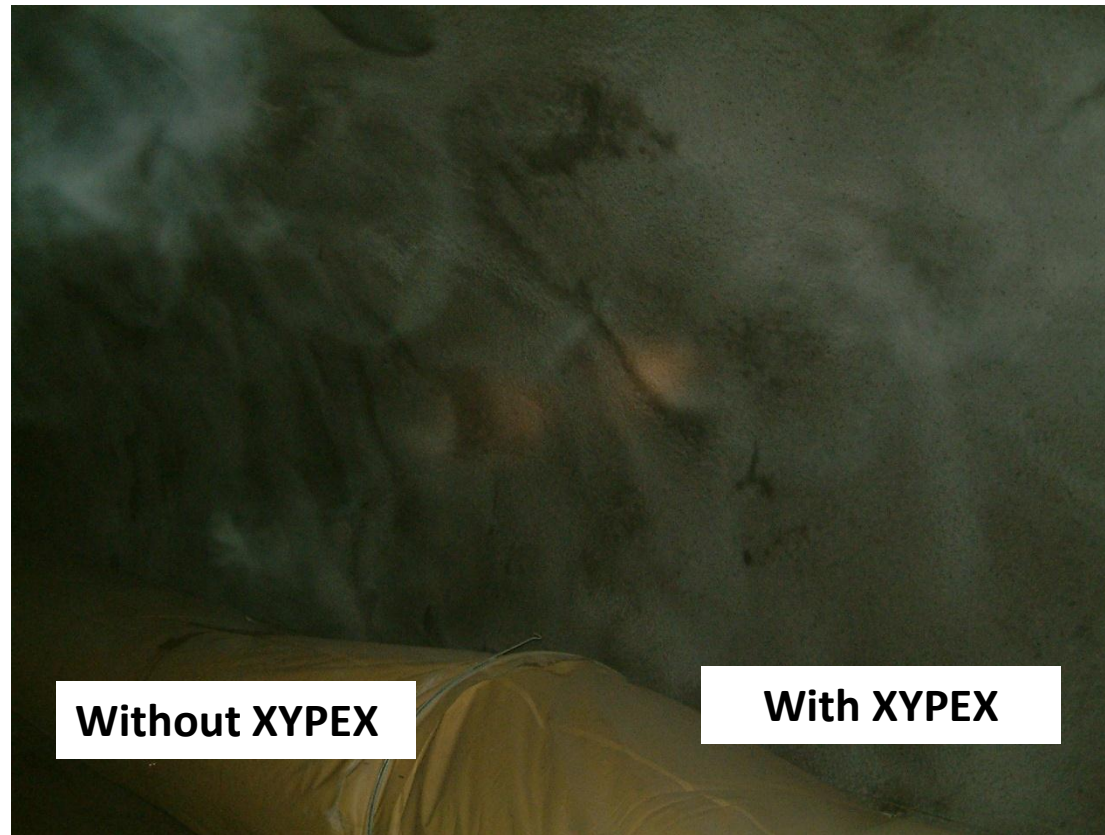
With 1.35 % Xypex Admix

**Great improvements in areas with XYPEX
Admix after about 13 months**

WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Héðinsfjörður Road tunnel

With 1.35 % Xypex Admix 13 months



WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Lab tests:

crack leak – home made test method

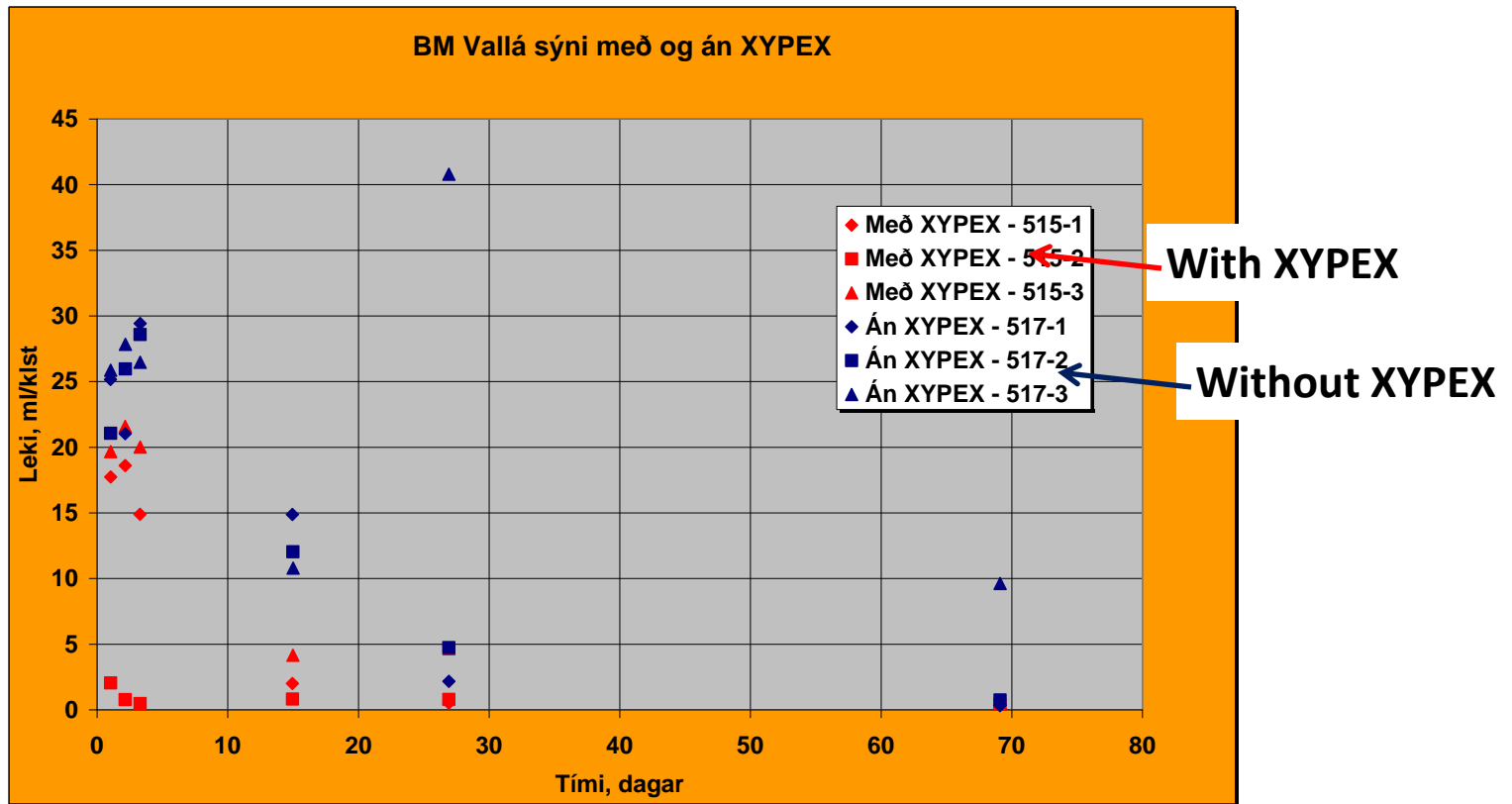


WATERPROOFING OF SHOTCRETE WITH XYPEX ADMIX

Lab tests:

crack leak – home made test method

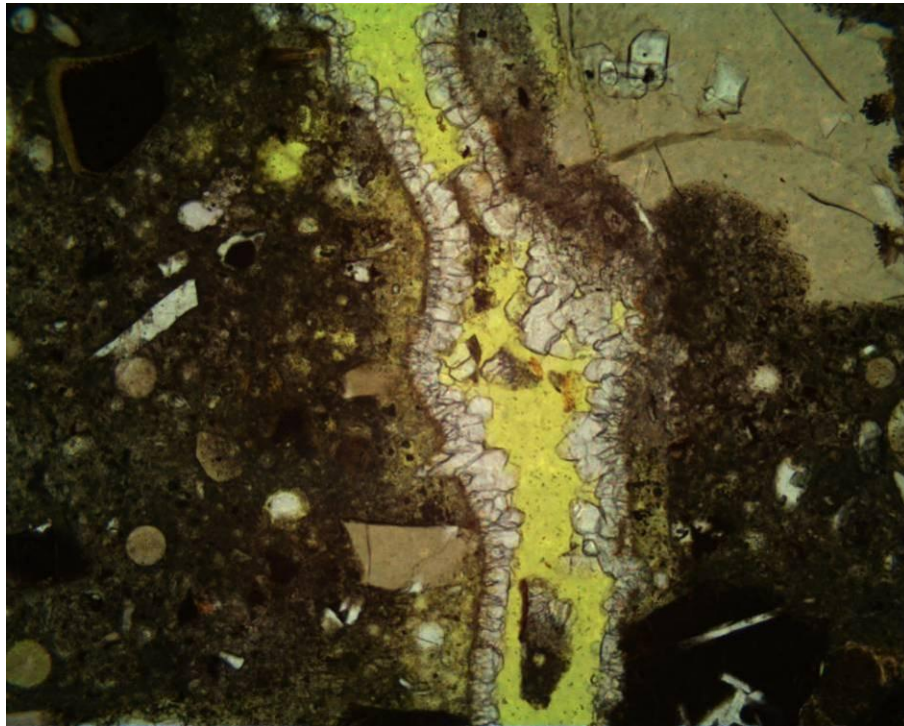
No reference shotcrete samples only normal concrete



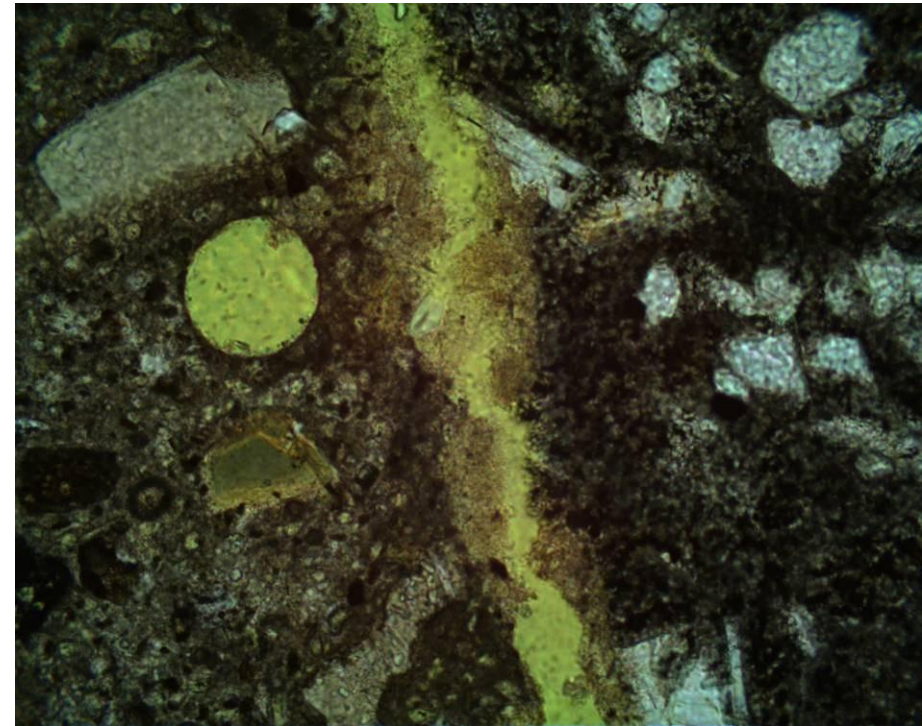
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Lab tests:

crack leak – Microscopy



Without XYPEX - calcite



With XYPEX – ettringite

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Lab tests:

Water permeability

ÍST EN 12390-8:2000

28 days old samples – test duration 3 days

**Water penetration the same with and without XYPEX –
water penetration 10 – 20 mm**

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Conclusions:

- 1. Effectiveness of confirmed with field tests**
- 2. In cold area (water temperatures $< 5\text{ }^{\circ}\text{C}$), still very effective, but chemical reactions are slow**
- 3. Lab test give misleading results**
- 4. Microcopy confirms the nature of the product**