



Case Study

Frost heave control
beneath highway & railway

Project:

Kashagan Oil Field
Karabatan, Kazakhstan

Oil field Operator:
Consultants (*highway*):

Aqip KCO
Parson E&C

Consultants (*railway*):
Supervisors:

ABE Corporation
KDPC

Contractors (*highway*):
Consultants (*railway*):

Atyrau Kurylis
Temirzhol Kurylys-Atyrau

Product:

TERRAM™ Frost Blanket



In the wetlands of western Kazakhstan the weather is characterised by very low temperatures in the winter (down to -40°C) and high temperatures in the summer (up to $+40^{\circ}\text{C}$). The nature of the wetlands is such that the water table is high and the geology is generally desert in character but with cohesive sub-soils in common with other great river deltas in the world. As with most deserts the water is saline. In the winter the combination of the very low temperature, high water table and cohesive soils creates the ideal conditions for frost heave of the ground by classic capillary rise of the ground water. Roads are destroyed in single winters. In the summer the high temperature draws up the salt laden water to the surface and concrete and steel structures are quickly damaged by corrosion. Railways are vulnerable to such phenomena as are many other civil engineering structures.

Terram Frost Blanket is a purpose-designed composite for mitigating the effects of frost heave. Installed horizontally, it forms a capillary break to prevent the rise of groundwater into the frost zone thereby reducing the potential for damage as a result of the freeze/thaw cycle (frost heave).

The composite comprises a drainage net with a geotextile filter bonded to both sides. The geotextiles' fibres are treated with a hydrophobic compound.

TERRAM Frost Barrier was installed on the main access road and railway to the oil production area for a new Kashagan Oil Field in Kazakhstan in the summer of 2003. It has now performed its function perfectly as anticipated for two summers and two winters thus demonstrating its unique ability to deal with these challenging problems in this harsh environment.



Completed road after 2 very cold winters



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