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SECTION 2. Applied mathematics. Mathematical modeling.

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SIMULATION MODELS OF CHAOTIC FLOW

Abstract: *This paper discusses options of modelling the dynamic characteristics of the process of the aerodynamic flow around the bed of the channel, in a flat non-steady model of turbulent flow. The obtained data about the pressure and speed of flow at various speeds and when the wind gusts up to 40 m/s.*

Key words: *wind, channel, flow, turbulence*

Language: *English*

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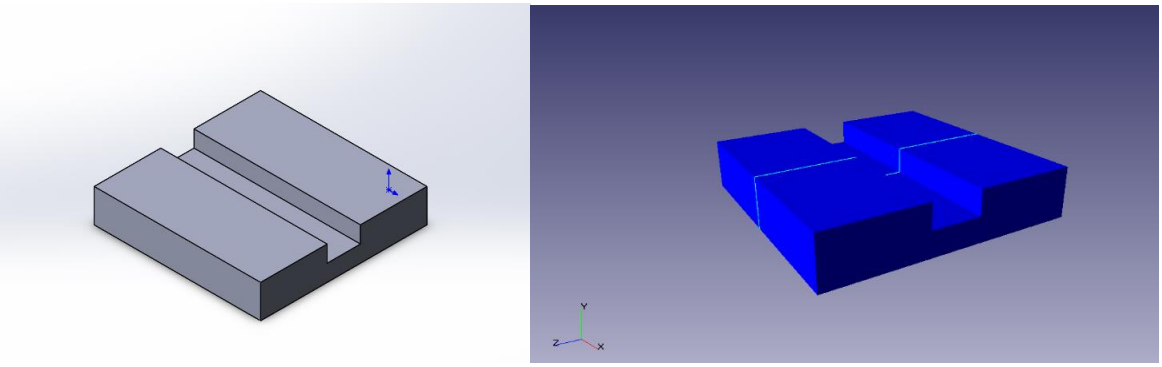
Introduction

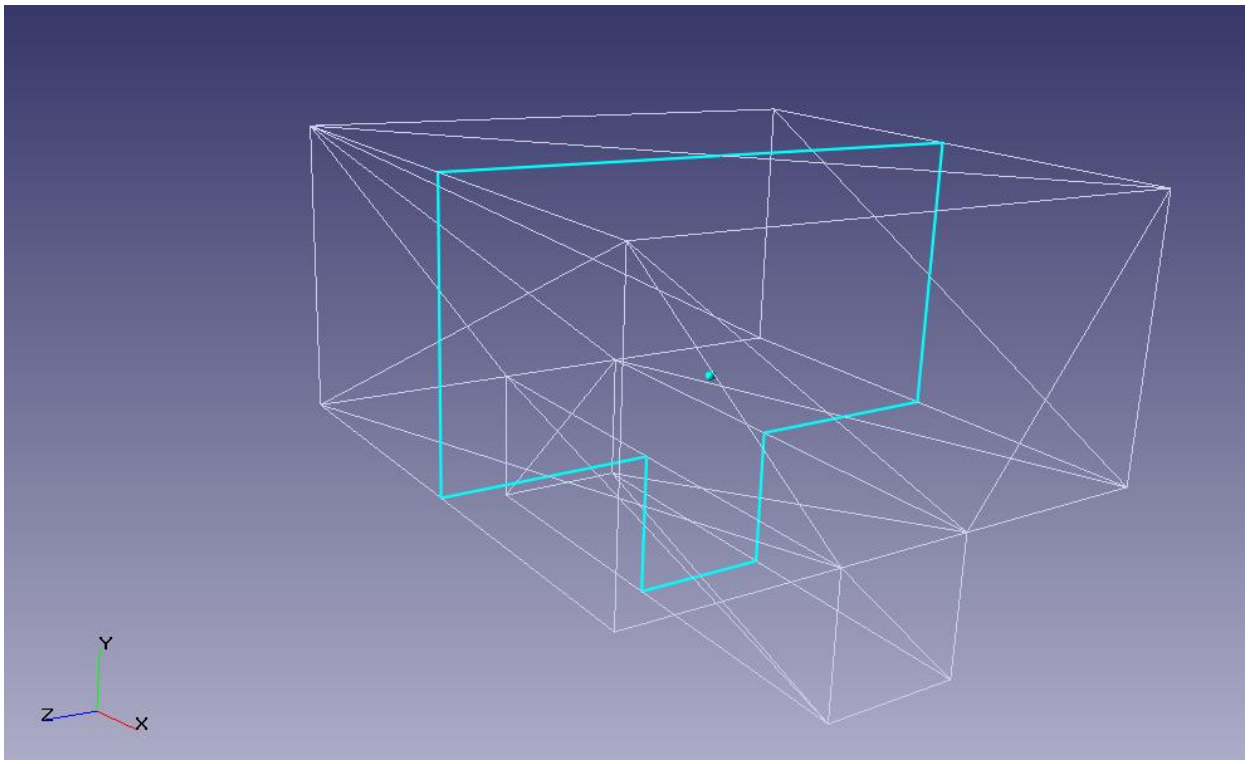
Most of the territory of Kazakhstan is exposed to high winds that cause snow and sand drifts. Water conveyance channels, operated in these conditions, reduce bandwidth up to a full stop. The reason for the drift are turbulent air streams arise in the mainstream channel. Consider a mathematical model simulating the flow of air, full of snow or sand particles impinging on the bed of the canal [1].

Materials and Methods

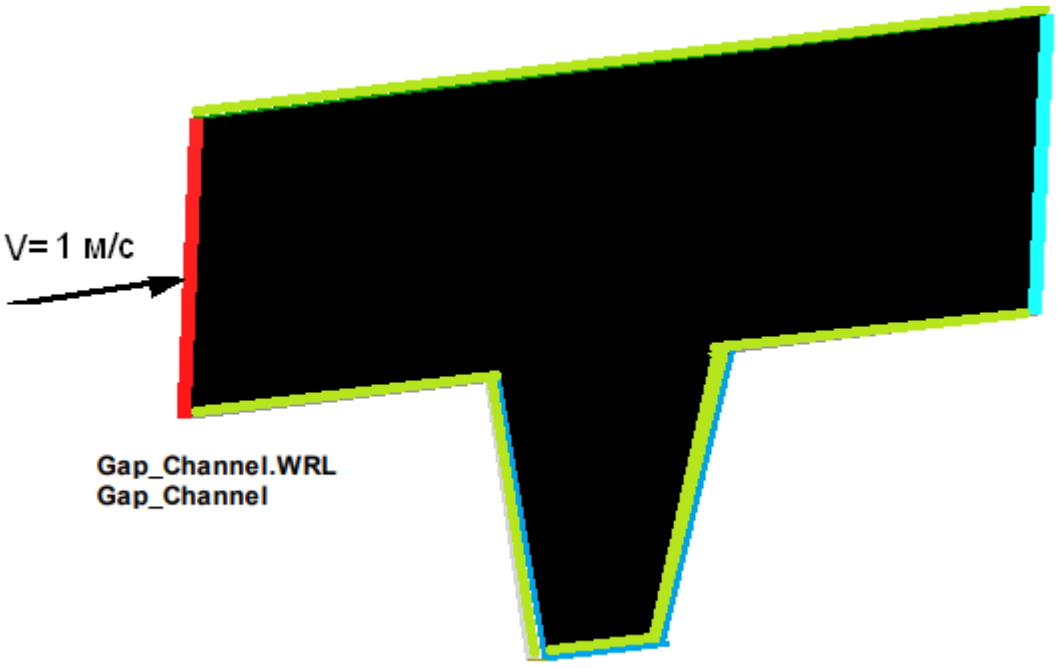
For the simulation of laminar and turbulent air flows with a mixture of different complexes is used: Comsol, Flowvision and others. For modeling laminar and turbulent flows of air mixed with particles of snow or sand using various complexes: Comsol, Flowvision and others.



Picture 1 – Geometry.



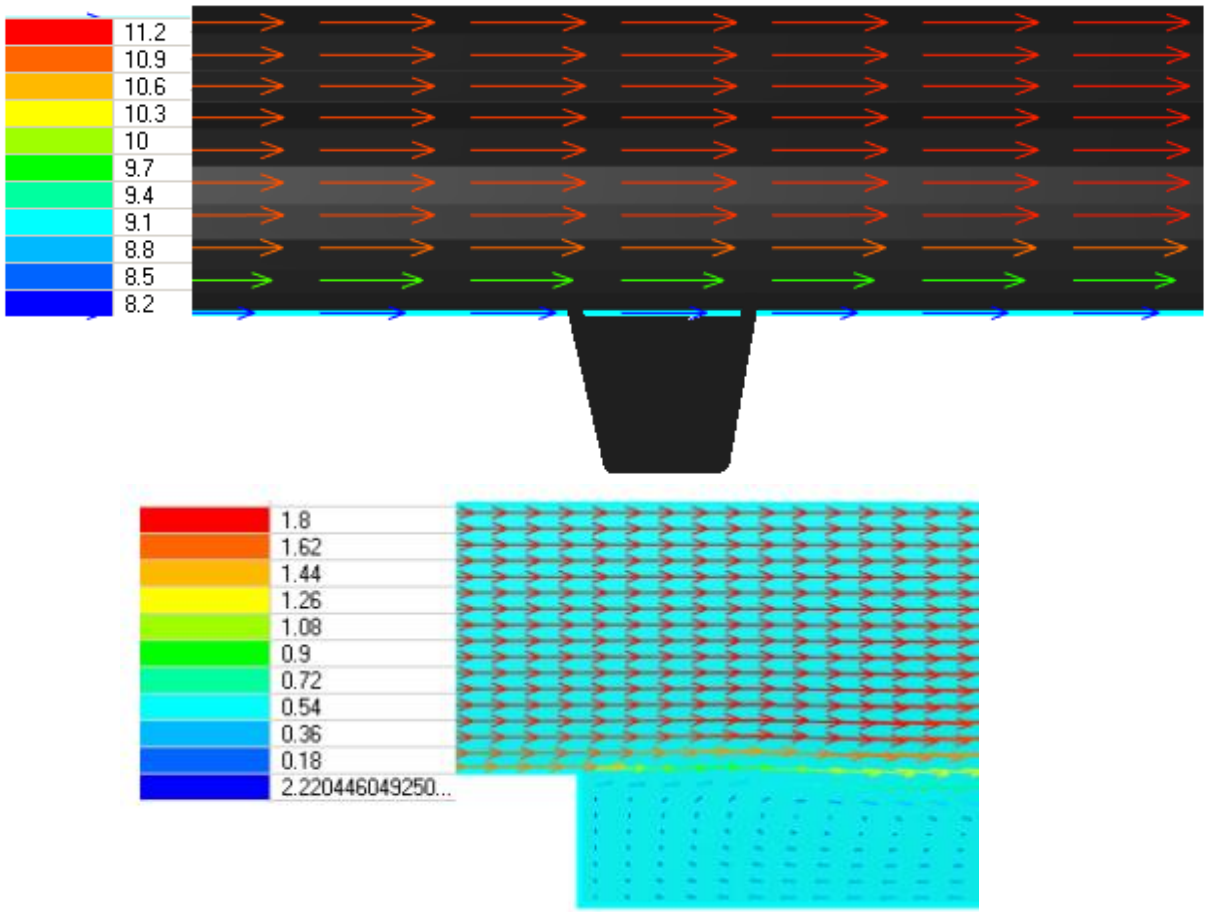
Picture 2 – Grid of model.



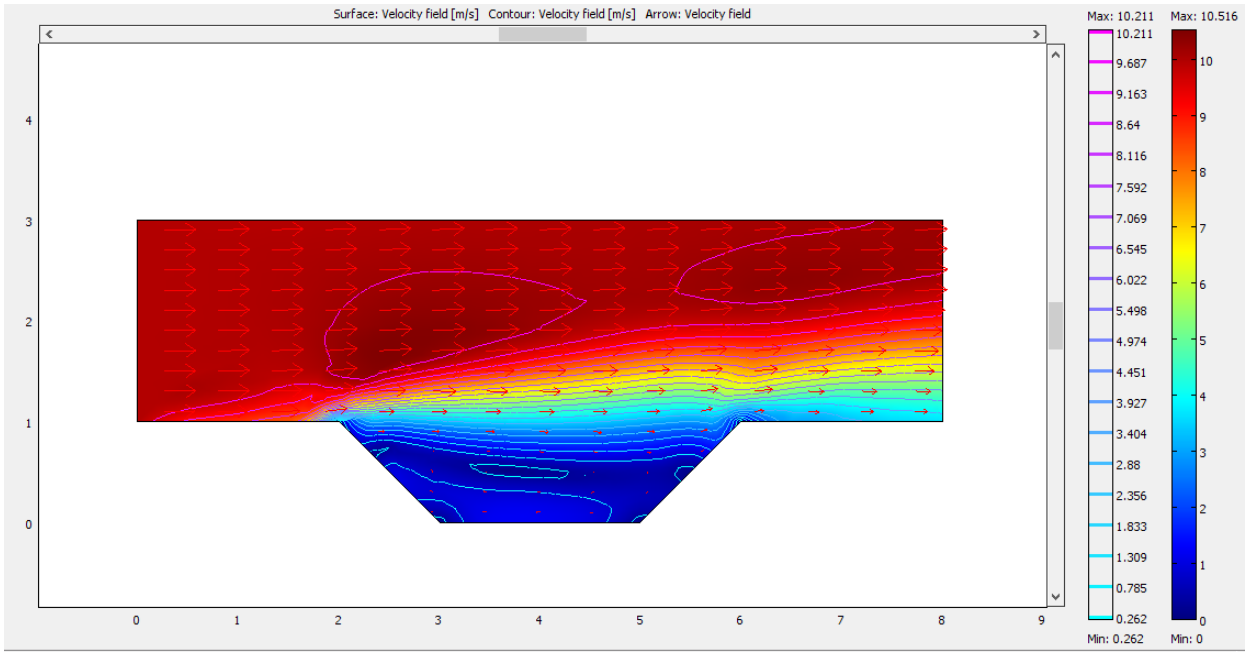
Picture 3 – The flow in the channel using a model of the gap.

In this model we consider the simulation of the flow in a narrow two-dimensional channel with using the model of the gap.

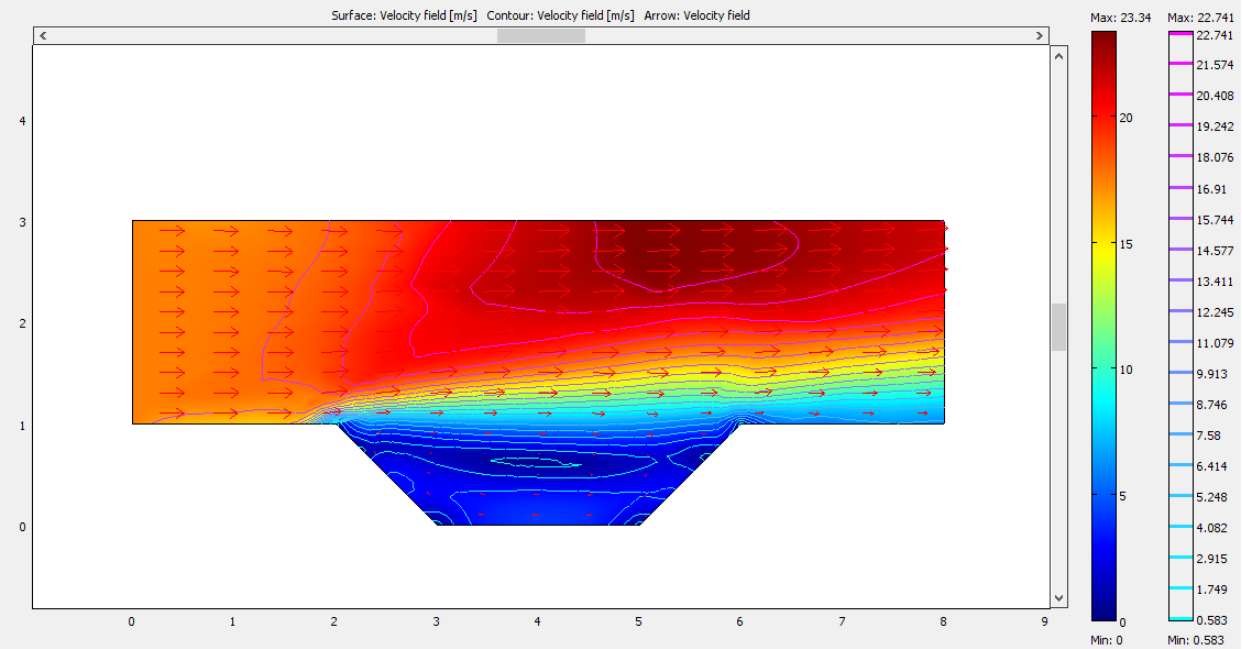
The gap model is used in conjunction with a given model of the flow and is designed to account for resistance created by a narrow channel. The gap model allows to avoid the resolution of narrow channel grid. The gap model is only used in cells of the gap. The cell gap of the cell, between the 2 the gap-forming surfaces. Surfaces are the gap-forming, if the distance between them does not exceed a predetermined maximum value gap. The cell gap is determined FlowVision automatically.



Picture 4 -Velocity distribution.



Picture 5 – The distribution of velocity and pressure in the wind to 10 m/s.



Picture 6 – The distribution of velocity and pressure in the wind to 20 m/s

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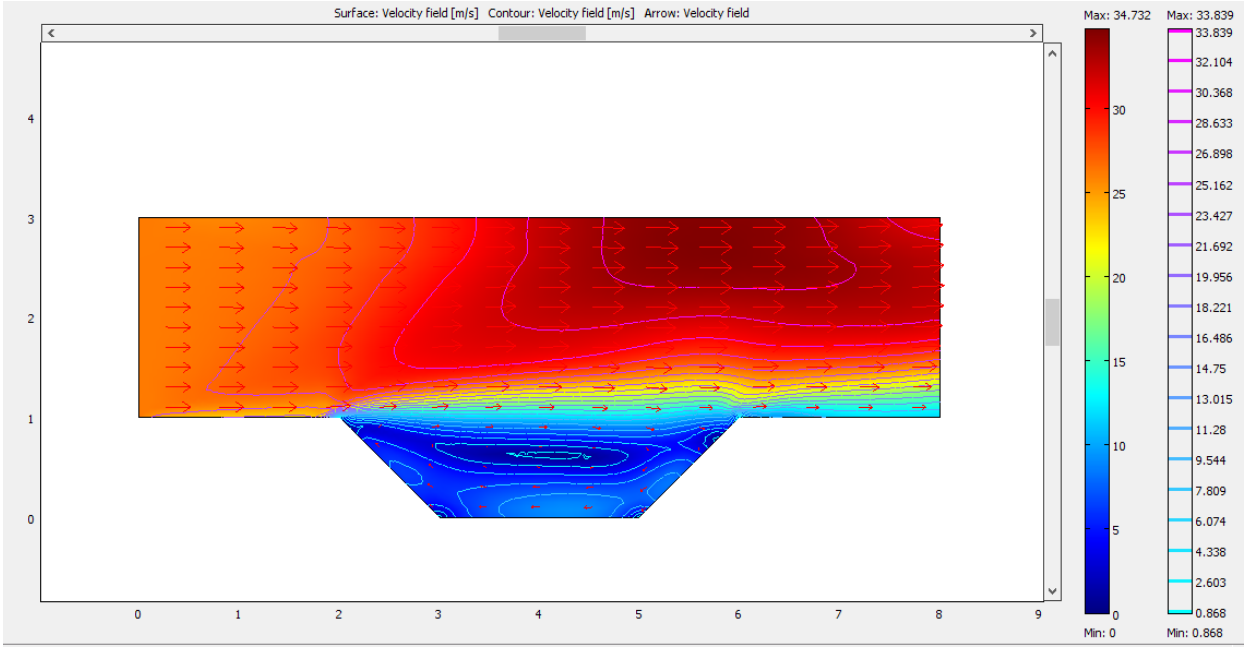

Picture 7 – The distribution of velocity and pressure in the wind to 30 m/s

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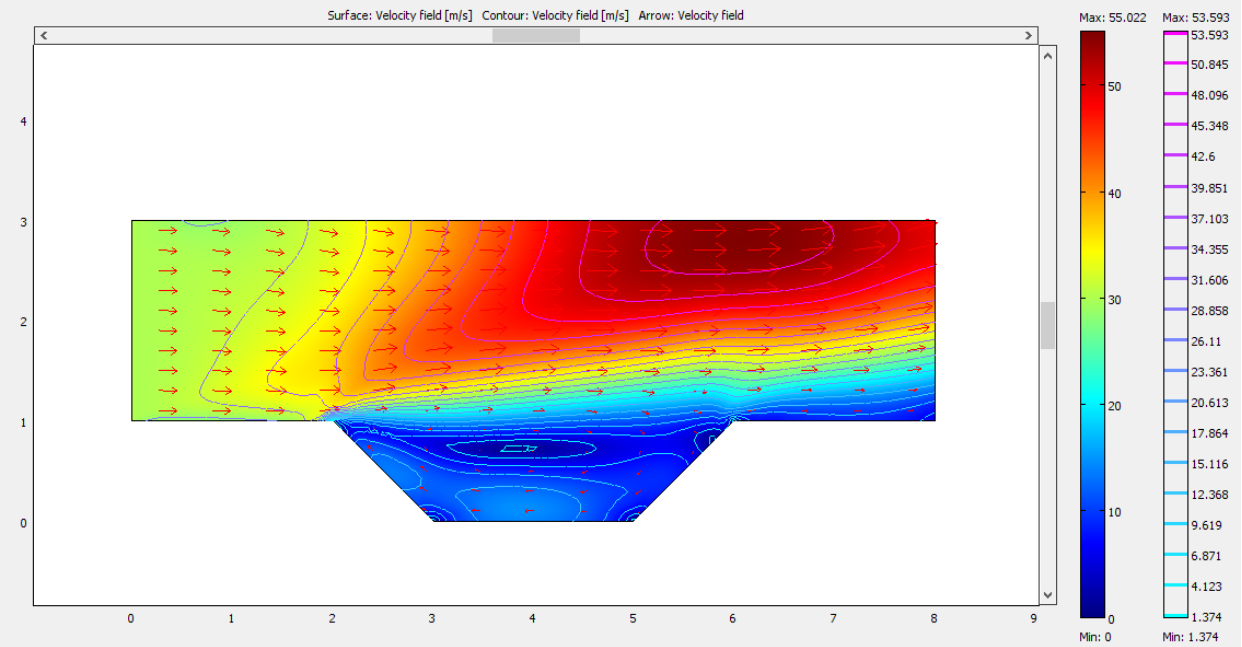

Picture 8 – The distribution of velocity and pressure in the wind to 40 m/s

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Conclusion

A mathematical model of the flow around an empty channel. The obtained aerodynamic characteristics of modeling process air flow with uniform wind and wind gusts from 10 to 40 m/s. the data Obtained can be used in the analysis and modeling of snow-sensimet and deflation of soils.

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