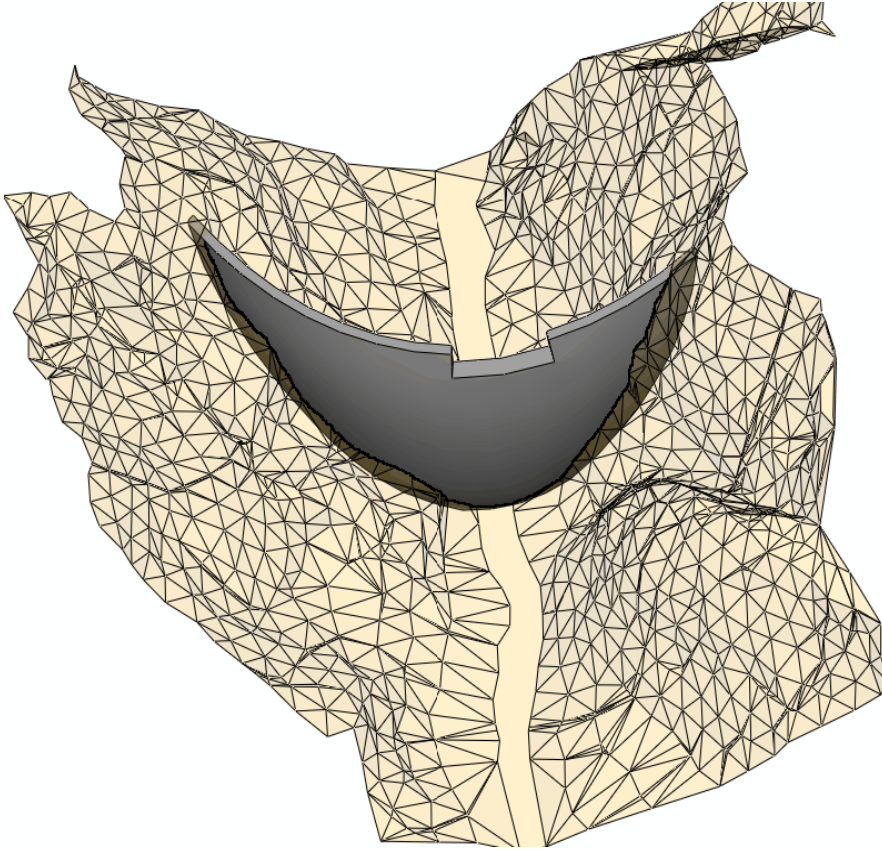


## PÖYRY PROJECT SUMMARY

# Yusufely Dam: Dam Structural Calculation Turkey



### Client

Dolsar Engineering Ltd.  
Kennedy Cadesi 43, 6660 Ankara,  
Turkey

### Project

Dam Analysis. Optimization of Dam  
Geometry for a Double Curved Arch  
Dam.

### Services

Optimization of dam geometry,  
using 3D Finite Element Method,  
including:

- Material properties for concrete and rock foundation
- Definition of loads and their combination
- Methodology of the analysis
- Optimization process for the dam geometry definition

### Execution Period

2009

### Project Description

The dam analysis of the Yusufely Double Curved Arch Dam has been based on preliminary models submitted by Dolsar Engineering Ltd. The optimization process has been divided to 12 consecutive steps, starting with Original geometry and topography, coarse mesh, quadratic elements (1), Scripted geometry with simplified topography (2), Finer mesh, linear elements (3), Change of location, parabolas in horizontal section (4), Improved location with new curve of centers, ellipses varying over dam high, with improved curve of centers

(5,6), Modification of main sections (7), Elliptic variation, geometric changes, grouting temperatures (8,9), Grouting in 3 stages, lowered grouting temperature, Further modifications of main sections (10, 11), and finally the Final optimized version (12).

This optimization is an intermediate step to the final design of the Yusufely Dam. The final optimization will be carried out when more detailed geology is available. In addition the dynamic and unusual load cases will be examined, when the earthquake load is determined.

### Key Data Dam

Type double curved arch dam  
Height above lowest foundation 220 m  
Crest length 490 m  
Elevation of top of dam 715 m.a.s.l.  
Volume of dam 2'244'500 m<sup>3</sup>  
Thickness 8.0 m at crest, 50.2 m max.  
Surface 79'920 m<sup>2</sup>

### Spillway

Type cut from the crest  
Measurements 80 m wide, 20 m high



Location of the future arch dam Yusufely