



## Slope Stabilization

### Reference Details:

**Owner** Diputación Foral de Vizcaya, Biscaya, Spain +++ **General Contractor** Eraiker, S.A., Biscaya, Spain +++ **Subcontractor** Miramar Gunitados, S.A., Biscaya, Spain +++ **Consulting Engineers** Euroestudios, Biscaya, Spain

#### DSI Services

Fabrication and supply of 1,500 DYWIDAG Permanent Single Bar Anchors with double corrosion protection in diameters of 26.5, 32 and 36 mm and in lengths of 12, 14, 16 and 18 mm in steel grades 835/1030 and 1080/1230; Rental of prestressing jack 110 Mp and technical support for the first stressing operations.



## Use of DYWIDAG Permanent Single Bar Anchors with double corrosion protection for slope stabilization

### New outer ring road between Ondarroa and the port of Biscaya, Basque Provinces, Spain

Ondarroa is a small fishing village in the Basque Provinces in the north of Spain with many narrow streets leading to the old port. Currently federal road BI-633 which largely handles the transport of heavy goods to and from the port still runs through the center of Ondarroa. Due to the narrowness of this road connection, considerable disturbances and traffic jams occur, particularly during rush hours.

In order to relieve the traffic congestion on the old road connection to the port, the local government decided on a set of measures, which included the construction of an outer ring road designed to reduce the traffic load on the old village center to a minimum.

Since the Basque Provinces are very mountainous, it was necessary to permanently stabilize the slopes created by the construction project.

For this project DYWIDAG-SISTEMAS CONSTRUCTIVOS S.A., Spain, fabricated and supplied over 1,500 DYWIDAG Permanent Single Bar Anchors with double corrosion protection in diameters of 26.5, 32 and 36 mm and in lengths of 12, 14, 16 and 18 mm.

The slope stabilization works were successfully completed in June 2002.