

## Case Study:

# Limerick tunnel, Ireland

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## Limerick tunnel

### Overview

At a cost of over €500 million, the Limerick Tunnel is one of the largest projects undertaken in Ireland. The Limerick Tunnel Project is Phase II of the Limerick South Ring Road project connecting the Dublin Road (N7) to the Ennis Road (N18). Construction of the Limerick Tunnel began in August 2006 and the estimated completion date was 2010; the tunnel is now open and operating.



### Client profile

The National Road Authority (NRA) was established in Ireland as an independent statutory body under the Roads Act, 1993. Its primary function is to secure the provision of a safe and efficient network of roads. For this purpose it has overall responsibility for planning and supervision of the construction and maintenance works on Irish roads.

### Survey requirements

The NRA instructed us to ensure that everything is built as designed and that given tolerances are kept.

### Survey specifications

For the duration of the project (2006 -2010), Murphy Surveys has been carrying out a series of site control surveys and accompanied the whole survey and setting-out process for 12 bridges, 10km of road and the tunnel as a quality check for the accuracy of the as built.

- Assessing surveying systems and procedures proposed for adoption by the contractor(s) and quality systems operated in survey control, in addition to co-ordinate acquisition, setting-out and data storage.
- Monitoring the contractor's/contractors' compliance with the documented systems, procedures and methods, including periodic check of setting-out during construction and of survey control points for continued accuracy in the setting-out of the various elements of the works.
- Proof-checking of as-built drawings and other such information produced by contractor(s).



## Key Points

The Limerick Tunnel is not only a very well-known project in Ireland, but also represented a real challenge from a surveying point of view given the accuracy required by the construction specifications.

The tunnel is made of pre-cast sections that interlock perfectly through a system of steel frames and rubber sealers. The rubber is located between two steel frames that need to be smooth and perfectly even. These are then pressed against each other so that the rubber seals the conjunction. Part of the survey carried out in this instance involved checking the quality of the steel frames so avoid breakage and therefore ensure the safety of the tunnel.

The accuracy of the information played a major role within the surveying requirements with a tolerance of +/- 0.5mm. Not even the most innovative and technologically advanced pieces of electronic equipment can guarantee such level of accuracy. Here's the big challenge for Murphy Surveys !

In this instance – even if it may appear contradictory – Murphy Surveys suggested a different approach by going back to time and using manual angle measurement techniques and ancient geometry and mathematics principle to ensure the levels of accuracy required.

Murphy Surveys surveyed every single junction between the pre-cast sections to ensure the quality of the sealing procedure and safety of the tunnel. At the same time the use of statistic principle allowed us to develop a more general overview of the whole tunnel.

