Then

* The Roman Empire invested heavily in roads and they were able to build high quality long straight roads using survey instruments such as Groma and Dioptra, plus lots of labour.
* In 1839 William Smith Otis patented the first steam shovel and mechanical construction methods started to replace labour gangs. For many years theodolites were used with timber site rails and with timber travellers to ensure correct levels were being constructed on site.
* Around 1980 the first ‘total stations’ were used to deliver and map information electronically.

Now

* Today global positioning system units, referencing satellites, are mounted directly onto construction equipment. Automated machines can now undertake construction works without a driver on board to control them.

Tomorrow

* 3D printing or additive manufacturing has already been trialled for bridges and research is underway constructing roads using these techniques. In the future this has the potential to deliver huge saving in time, result in less disruption and minimise material wastage.

Roads have been successfully designed and built using similar methods for thousands of years. So, in today’s digital world, why should road designers care how their designs are being constructed or think about what they need change tomorrow?

The answer, obvious as it seems, is because what is designed will be exactly what will be built on site.

In the past, visual checks identified if mistakes or errors were present and there were usually opportunities to intervene before work was actually constructed.

With increasing off-site fabrication and automation, the opportunities for intervention, site modifications or changes are becoming less frequent. If these are required they are far more costly to change.

The presentation will provide some insights into issues that current construction technologies are presenting. It will discuss how our industry designer’s need to adapt to ensure the challenges presented by current and future construction methods are considered.