"Bespoke problems" with "multi-variant solutions": The problem of knowledge and action in a profession performed in local contexts

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This paper explores the resources of experience that engineers build up in practice and draw from to 'frame' their contributions to two key processes of social leadership and professional method: 1) proposing new configurations of socio-material relations; and 2) formalising these through detailed design and delivery. The basis for this account is a set of ten semi-structured interviews with individuals involved in the planning, design and construction of a high-speed rail link connecting London and South-East England to continental Europe.

Between 1989 and 1991, the engineering and design consultancy Arup prepared and, through a process of public consultation, political lobbying and leadership, eventually secured an alternative alignment into London for the Channel Tunnel Rail Link (CTRL) contrary to the one proposed and under formalisation by the publically owned rail operator of the time. Subsequently Arup were also part of the successful consortium of contractors that bid for the detailed design and delivery of the railway between 1995 and 2007.

Interviews were conducted with a sample of individuals from Arup that were involved in the various stages of this process. These included civil, structural and geotechnical engineers, an environmental scientist, a planner and an economist from Arup. The interviews deliberately covered both key individuals from the high profile initial stages of debate and negotiation regarding the railway alignment and those involved in the more 'mundane' engineering processes of detailed design formalisation.

Emergent from the accounts of both of these key processes are two potentially problematic themes. On the one hand it is clear that individuals, through the course of their professional work, develop a background of experience that either validates for falsifies the application of certain approaches to consideration of certain socio-technical parameters in the proposal and formalisation of possible worlds. On the other hand interviewees and the wider literature emphasise the specificity and localised nature of each instance contributing to this corpus of experience from which individuals and collectives draw their professional validation. Interviewees did this with reference to the "bespoke" nature of engineering problems which were either implicitly or explicitly identified as socio-technical in nature. Some interviewees chose to explicitly stress the "multi-variant" nature of possible solutions to these.

The unavoidable variance and boundaries to the individual corpuses of experience raise interesting epistemological questions around how to know the correct approach in practice. To the extent to which they are identified by interviewees, we show that answers to this have developed and been institutionalised both professionally (e.g. formal design codes and reviews) and more locally (e.g. stakeholder consultation, close client relations, co-habitation of design teams etc). Local formulation of the correct approach to a new project or problem is particularly important in the context of an engineering consultancy with its commercial emphasis on meeting the needs of clients.