SURVEYORS AND STANDARDISATION

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ABSTRACT:

In a world of increasingly rapid political, economic, social and technological development, where global trade in surveyors' services is expected, standards have a vital facilitating role to play. This was recognised by FIG in the late 1990s, leading to the setting up of an FIG Task Force on Standardisation in 1998. The paper outlines the progress and plans of the Task Force, setting them in the wider context.

1. INTRODUCTION

Official standards have always been important in production operations, with many originating in military activity: the ISO 9000 series of standards on quality management is a prime example of this spreading of military standards to the civilian world. Many surveyors have come across ISO 9000 and other official standards. Other surveyors are very familiar with legal standards, for instance legislation on land registration and cadastral surveying. All of us are increasingly subject to *de facto* standards in all that we do – for instance Microsoft personal computer operating software, and international paper sizes (in this case, excluding those living in the United States!). Standards, in all of these manifestations, are therefore becoming increasingly important for surveyors. How should surveyors, and FIG as their international representative body, react to this?

2. THE MARKET IN WHICH WE OPERATE

Before examining how standards are impacting on the life and work of surveyors, and how we can influence to best effect the process of developing and using standards, we should first however stand back and reflect on the world in which we live and operate. What are the main developments underway? The classic management school approach to such a question is to undertake a PEST (or STEP, if you're American – again, the march of standards is as yet incomplete!) analysis. The themes summarised below draw heavily on such an analysis completed by the author a few years ago (Greenway 1997).

- Politically, trade is becoming increasingly global. This alters dramatically the pool of work and competition with which any survey firm is faced. It also draws into sharper relief the need for level playing fields to be maintained across national boundaries. In some parts of the world (for instance, Western Europe), such levelling is one of the most central purposes of the regional government (the

European Commission). Numerous other pieces of legislation are designed to maintain fair competition within and between nations, and the last completed round of world trade talks led to the creation of the World Trade Organisation (see section 3 for more information).

- Another political theme is a transformation in the very nature of public services (David Rhind's words from the 1996-2001 Ordnance Survey GB Strategic Plan). The public sector is now generally there to undertake activity that cannot appropriately be undertaken by the private sector. Such a shift of political emphasis has cross-party support in many parts of the world, and again leads to an increased need for fairness of competition between the private sector firms bidding for what historically had been public sector work.
- Economically, control is increasingly becoming centralised into the hands of a few mega-corporations (for instance, Microsoft, which has already been cited in this paper as an important source of *de facto* standards).
- Socially, our expectations as customers have changed radically. We all now expect a product or service which meets our requirements precisely, rather than making do with something standard. This change has been facilitated by developing technology, particularly in the computer field. We expect to specify exactly what we want – and then for it to be delivered, on time and at a fixed price. The service elements are being specified as closely as the product elements (indeed, it is very often hard to delineate where one starts and the other ends).
- Perhaps the most profound changes in much of the surveying community are technological. In the 1950s, the operation of a theodolite was the work of a professional, served by several porters and bookers. Compare that with the present day, where the push of a button will provide a position accurate to millimetres, where a theodolite will track a target and give continuous readings, where deformation monitoring equipment will transmit results down a telephone line without the presence of an operator being required at all. Such rapid change requires manufacturers, practitioners and standards to keep up with the developments, if they are to be used to best effect for clients and the economy.
- These technological developments are also resulting in industries becoming far more intertwined than they once were – in our own field, geographic information is now simply a small part of the much wider information market. This requires language and standardisation across industries that in the past might have seen themselves as independent.

In his 1997 paper, the author drew from this analysis the conclusion that the nature of a surveyor's work has changed fundamentally. In this more focussed paper, the globalising world, the rapid advance of technology, and increased customer expectations, point to the need to specify required results clearly across national boundaries. A common language of expectations is needed for this dialogue; a language which transcends national boundaries. This paper sets out how standards attempt to provide this language, and reaches the conclusion that surveyors ignore standards at their peril.

3. AN INTERNATIONAL FRAMEWORK

Taking this globalisation of the marketplace for all products and services as read, what has humankind done about it? A key development has been an increase in responsibilities placed at regional and international level. An increasing amount of national legislation in European Union countries, for instance, is the enacting of European legislation. In addition, national government are increasing their expectations of global non-governmental organisations such as the United Nations (again, with the notable exception of one very large developed nation). It is this growth in UN profile and responsibility which has led FIG over the last decade to put additional resource into building relations with the relevant UN institutions.

We are here primarily concerned with two institutions: the World Trade Organisation (WTO) and the International Organisation for Standardisation (ISO). This section therefore sets out the vision of the organisations, before the following sections of the paper turn to reviewing the gaps they leave, and how survey associations can work to plug them.

The WTO, based in Geneva, has more than 130 governments as members, between them accounting for over 90% of world trade. It is the only international organisation dealing with the global rules of trade between nations. Its main function is to ensure that trade flows as smoothly, predictably and freely as possible. It does this through the creation of trade agreements, which are ratified by members' parliaments. The result is assurance: consumers and producers know that they can enjoy secure supplies and greater choice of the finished products, components, raw materials and services that they use. Producers and exporters know that foreign markets will remain open to them. The result is, in theory, a more prosperous, peaceful and accountable economic world. Decisions of WTO are made by the members, at the highest level in a Ministerial Conference which meets at least once every two years; decisions are generally taken by consensus (the more cynical would also point to the role of horse-trading, as in the recent trade round in Seattle).

The ISO is also based in Geneva. Its members are national standards bodies (for instance, DIN from Germany, BSI from the UK, AFNOR from France, and ANSI from the USA). It also has about 130 members. ISO's mission is to promote the development of standardisation and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing co-operation in the spheres of intellectual, scientific, technological and economic activity. The ISO does this through the creation of standards – documented agreements containing specifications of precise criteria to be used consistently as rules, guidelines or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose. Some ISO standards have become very much part of our lives – those for film speeds, for instance. More recently, a standard has set the thickness of credit cards, smart cards and phone cards so that they can be used around the world. The production focus of the early days of the ISO can still be seen in its work – its Technical Committee No 1 covers screw threads, No 2 Fasteners and No 4 Rolling bearings. The

published standards range from the ISO 14000 series on environmental management to ISO 4074 part 2 which covers the measurement of the length of a rubber condom. The ISO standards also enshrine the SI system of measurement which is slowly being taken up the world over (it is no surprise to note the most laggardly of countries in this regard).

ISO and WTO are both important for FIG – the FIG Task Force on Mutual Recognition/ Reciprocity is working closely with WTO; and FIG has official liaison status to three ISO technical committees (those concerned with geographic information – TC211, building construction – TC59, and optics and optical instruments – TC172).

We should not discuss ISO without noting that a number of other standards bodies exist for certain parts of the world community, for instance the International Accounting Standards bodies, which have close links with the International Valuation Standards Committee which is important for valuers.

The missions of ISO and WTO point to their needing to co-operate – standards underpin free trade and they need to work together to achieve this. This is formalised in the Agreement on Technical Barriers to Trade (TBT), which sets out how international standards should be used by governments to facilitate trade. In practical terms, ISO and WTO jointly hold workshops such as those on standards in service industries in 1998. Held on four different continents, the sessions explored what standardisation efforts need to accompany the globalisation in the trade in services. Examples cited included the need for a four star hotel to mean the same around the world. ISO sees such an expansion of its sphere of activities as vital if the organisation is to continue to support national and international activity. As we will see below, this move also has profound implications for surveyors.

4. FILLING THE GAPS

The previous section painted the theoretical picture of how WTO and ISO together are working to facilitate international economic growth through international trade. It is important that we also recognise some of the shortcomings of the current operations, many of which are being addressed by WTO and ISO.

The political horse-trading process in WTO has already been mentioned; to this we should add the impact of the demonstrators in Seattle, which showed how a high profile international process could be derailed by pressure groups for certain interests.

The process of creating standards is a lengthy one – many of the standards in ISO TC211 on geographic information have already been under development for more than three years, and all have some way to go before being published as international standards. This time scale obviously has to be shortened in a world where technological developments are happening more and more frequently. (In passing, it should also be mentioned that the same difficulties can arise with legalisation – the cadastral survey

regulations of many countries set out methodologies which much be used, which disallow GPS methods). The main participants in the process of developing standards are academics and public servants – people whose organisations can afford for them to spend time on, and travel to, the necessary meetings. In general, practitioners are present in much more limited numbers.

The length of the process is in no small part due to the need for consensus to be reached. At each stage in the process, members of a technical committee can submit comments on draft documents. The ISO statutes require all of these comments to be discussed and resolved in editing committees. As an example, the developing standard on metadata produced over 1,000 comments when it reached Committee Draft stage. Even excluding simple textual and grammatical comments, such a body of comment requires a great deal of effort and time to resolve. The debate over the need for an international standard to cover the qualification and certification of geomaticians (another example of the ISO moving into services) is another case where practitioners feel that the use of official standards would fossilise the process, given that educational methods and technology are developing so rapidly. A further difficulty, given that the make up of many of the ISO committees excludes practitioners, is that members will have limited knowledge of other initiatives – they will assume a 'green field site' when in fact a good deal is already in hand.

Accepting these gaps and shortcomings, how can they be overcome? There is a growing recognition that professional bodies have an important part to play in this – they can bring the voice and experience of practitioners into play. Given that WTO and ISO are both international organisations, the professional bodies who can have a voice are the international ones. The ISO process allows this through Liaison status to ISO Technical Committees. ISO recognises over 500 organisations as liaisons; as mentioned above, FIG has liaison status on three ISO Technical Committees. On TC211 covering geographic information, there are approximately 20 liaisons, including all of the main international professional organisations – FIG, ICA, ISPRS, IAG etc – as well as the Open GIS Consortium representing the systems manufacturers and compilers. A liaison body has all of the rights of a national standardisation body, except the right to vote; FIG can therefore comment on documents, be involved in the groups developing standards, and propose activity. In practice, as all international activity, it is the informal process that is as important as the formal one – and, by attending relevant meetings and making the necessary contacts, FIG and other professional bodies can a substantial impact on the process (even though they can only influence and not vote).

The FIG Task Force on Standardisation feels that three are three roles for professionals in the standardisation process:

- Proposing material which can be transformed into international standards (indeed, in the future, it is possible that professionals should be initiating standards activity, rather than reacting to work begun by others);
- Gaining liaison status and appointing experts to Technical Committees, to assist in the creation of workable and current standards; and

- Creating explanatory material and guidance notes as to the implications of standards for practitioners.

The flow of debate in this paper has therefore reached the conclusion that standards are increasingly important for surveyors (as well as for every other professional grouping), and that practitioners can only effectively be represented in the process through their international professional bodies. Such representation therefore needs to be a key part of FIG's agenda, and the following section summarises what FIG has being doing in this regard.

5. THE FIG TASK FORCE

Following representations from, amongst others, the Advisory Committee of Commission Officers (ACCO), the FIG Bureau considered the issue of standards at its meeting in November 1997 and decided to establish a Task Force on Standardisation. A primary purpose of the task force set by the Bureau was to recommend priorities and budget for future FIG input to the work of ISO.

The Task Force started work in earnest at the FIG Congress in Brighton in 1998. That congress was marked by a greater number of papers referring to standards issues than previous FIG congresses, illustrating the increased recognition of the importance of the issue amongst FIG members (for instance, Knoop 1998, Slaboch 1998 and Ostensen 1998). The Task Force created a work plan which covered a wide range of activities. This has inevitably developed over time, as task force members have become more familiar with the issues. A key input was a questionnaire on standards, distributed to FIG member associations and others in early 1999. Over 50 responses were received, a very heartening result. The results were a useful pointer to the priorities of FIG members. In summary, the following points are worthy of note:

- The important geographical level for standard setting was seen to be international (ISO); two regional bodies were mentioned – CEN in Europe and PASC covering Asia and Australia – but these were seen as of declining important in surveying fields.
- The key ISO activities were seen as those in Technical Committees 59, 172, 211 (mentioned above) and TC204 on transport information and control systems.
- The ISO standards in greatest use amongst surveyors were the ISO 9000 series on quality management, those on modelling languages, and those defining entities such as codes, dates and time.
- The key relevant activities of national standards bodies reported in the questionnaire replies were data exchange standards, tolerances, digital maps, and GIS standards.
- In the arena of *de facto* standards, exchange formats such as DXF and RINEX were particularly mentioned.
- The focus proposed for the Task Force was to gain more influence in ISO TC211, to ensure that practitioners have more impact as standards are developed, and to make surveyors more aware of existing standards (so as to avoid duplication of effort).

In light of these findings, and within the thrust of FIG's aims, work completed by the Task Force to date includes:

- The creation of an area on the FIG website;
- Developing a relationship with the ISO Central Secretariat;
- Submitting the FIG Statement on the Cadastre, and Publication No 9 on the testing of electromagnetic distance measuring equipment, to ISO for consideration in connection with existing and possible future standards;
- Continuing to work as part of ISO TC211, making comments on documents, attending meetings, etc;
- Putting in place the necessary liaison links with other key ISO technical committees;
- Agreeing the chapter structure of a guide for FIG member associations on how best to influence the standardisation process;
- Starting to build relations with the International Valuation Standards Committee.

Key current issues for the task force are:

- The ISO TC211 work on the certification and qualifications of staff, where FIG has been playing an active part in the debate over the last two years, seeking to recognise the importance of clients having assurance of the standards that can be expected from practitioners, without ossifying the process. It is working closely with the FIG Task Force on mutual recognition/ reciprocity;
- Determining how flexible ISO is willing to be in accepting documents in new areas, such as the FIG Statement on the Cadastre, and fast-tracking them through to standards (at the time of writing, we are still awaiting a response from the ISO Central Secretariat);
- Finding FIG experts to Technical Committees who have the time and funding to be actively involved – our experiences to date have shown us that the postal review of documents is significantly less effective than having an expert who is able to attend the relevant meetings;
- Linking our work with that in the other international bodies representing 'surveyors' (ISPRS etc) – this is an issue which we have yet to pursue with any real effort, and may question again quite what the unique selling point of each of the many surveying NGOs is;
- Locking the work of the Task Force in with that of the FIG Commissions, who are producing the work that may be possible future standards or explanations of existing standards; we aim to do much work on this front in Prague;
- Producing a Guide for FIG and its member associations on how best in influence the standardisation process.

It is a fair summary that the Task Force has achieved a good deal to date, given its volunteer staffing, but that much remains to be done before surveyors are sufficiently briefed on standards activity, and before the other institutions within FIG automatically think of existing standards work before embarking on or continuing work (one example of this is the FIG Multi-Lingual Dictionary group, whose work may be of no relevance

once the International Standard on geographic information terminology – ISO19104 – is published).

6. THE FUTURE WORLD

The future is likely to see a continuation of the trends outlined in section 2 of this paper, making the issue of standardisation increasingly important for surveyors and other professionals. FIG will therefore have to continue to concern itself with its relationship with WTO, ISO and other international standards bodies. As mentioned in the previous section, this work must be structurally integrated within FIG, and not within a Task Force whose life, by definition, should be limited. This is an issue which the Task Force will continue to address over the coming months. It is the author's belief that the process of creating standards must continue to become more flexible if it is to retain relevance; and that FIG has a crucial role in ensuring that this comes about.

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Further information is available from the web sites of ISO (www.iso.ch), WTO (www.wto.org) and FIG (www.ddl.org/figtree)

Biographical Note:

After completing an M.A. in Engineering at Cambridge University and an M.Sc. in Land Survey at University College London, Iain Greenway joined Ordnance Survey in 1986. A variety of posts in geodetic and topographic survey followed, including a key role in implementing the GPS national control network for Great Britain, and short-term consultancies supporting land reform in Bulgaria and Russia.

Ordnance Survey sponsored Iain through an MBA at Cranfield University in 1994/95, which included a term studying at Macquarie University, Sydney. Back in Ordnance Survey, he worked in strategic planning, product management, sales, and strategic pricing. He is now on a year's secondment to Her Majesty's Treasury, working on the improvement of public sector productivity in the UK.

He has authored papers on the future of the land survey profession, a variety of technical matters, and managing change in Ordnance Survey, as well as completing a number of management consultancy inputs in Swaziland and Lesotho.

Iain is a Chartered Surveyor (ARICS) and a member of the Chartered Institute of Marketing (MCIM). He is the RICS delegate to FIG Commission 1, Chair of the FIG Task Force on Standardisation and of Working Group 1.2 (Business Practices). He is a member of the Management and Editorial Boards of the journal Survey Review.

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