Pre-lecture handout for presentation on engineering proposals
for the
Language and Communication Centre,
Nanyang Technological University

Title: The information structure of engineering proposals
Date: Tuesday, 29 September 2009
Presenter: Dr Hazel E. Sales

Section 1: Preliminary reading (for those unfamiliar with engineering proposals)

There are many stories surrounding proposals. The extracts below are intended to provide a backdrop to the lecture, and reveal the human side of proposal writing.. They are not contiguous, but I hope they hang together without seeming disjointed.

Proposal writing

The actual consumption of financial resources across the sector by proposal writing is massive, as is the concentration of engineers' creativity, time and effort on proposal writing. It will be seen that engineers view proposals with some ambivalence, since they are uncertain whether or not they are wasting their time on them. They have to apply themselves to the task without knowing if it has been worthwhile until weeks or even years later.

Research Journal Entry - An expensive activity and a risky business

Proposal writing seems to be made up of bursts of expensive activity. Malcolm mentioned how a proposal can involve quite a few people, as for example, in Project Sunrise. He said there have been as many as 20 people at the company involved in it at any one time, over a prolonged period and at a cost of hundreds of thousands of pounds. He told me to imagine similar teams in other companies across the country, and across other countries [Italy, France, etc]. The cost of the project to these companies must run to millions of pounds. To get an idea of the sheer scale of it all, each company worked on a tiny bit of the ship, each part coming together to form a whole ship. Malcolm's team was designing the thermal imager for it.

At quite an advanced stage the politicians decided to pull the project, leaving all the companies with nearly-finished proposals but no one to propose to! Purely for political reasons it seems. The rumour goes that British politicians suspect that the Italians, who said they would buy c.6 ships, would back out of the deal and buy only two; and that the French were playing the same game. Britain was committed to buying 12 and was fearful of being lumbered. That's the gossip anyway.

Malcolm made the point that these companies have to get the money back somehow, and that governments probably pay high prices to keep engineers through 'dead' periods, since the companies recoup their losses when they win proposals. I'm not sure how the economics of that works out (and what about the companies that don't win? 'They go under', said someone, 'look at Ferranti, Marconi ...') but it made some sense at the time we were speaking.

Types of proposal

Anyone who has composed a document with the purpose of bidding for funds or competing for business will understand the intent underlying engineering proposals. An engineering proposal is a formal and complex document, written by a team of engineers, together with their commercial and marketing colleagues in highly confidential working conditions, as part of a tendering process. Usually, the proposal is competitive, and submitted to the customer with the aim of being short-listed, and, ultimately, selected as the winning proposal.

Occasionally, the proposal may be non-competitive, when the customer has a need for a product or service, and asks for suggestions from the company.

Design engineers have to write two key parts: the executive summary and the technical section of the proposal. If the two are submitted together, they are referred to as a single textual entity and called 'the proposal' or 'the technical proposal'. For smaller bids, the technical proposal may be submitted as a single complete proposal. At other times, the technical proposal may be sub-section of the whole proposal, as is shown in the next chapter, which lists the different sections to be found in larger proposal documents. So, the engineering (or technical) proposal may be submitted as a technical volume, to be one of a tripartite set of proposals, the other two parts of which are usually prepared by the commercial and legal departments of the company.

RFIs (Requests for Information) are examples of other documents produced in response to queries from potential customers. Engineers commonly refer to such responses as RFIs, although more logically they should be called RRFIs, that is, 'Responses to Requests For Information'. RFIs are usually shorter documents or may be in the form of a letter, but are written in the knowledge that they could lead to future business for the company if the potential customer is impressed enough, and persuaded, to invite a formal proposal as a result of reading it.

The bid team writes any proposal with the aim of persuading the customer to place it on a short-list, and, ultimately, to be the one selected for the prize, which, in this case, could be the winning of a business contract for the company. The 'business', so far as the engineer is concerned, relies upon the design, production, and delivery of an engineered product, which, put simply, could be hardware or software, or a combination of both. Proposals can be large or small, ranging from those with the potential to earn tens of thousands, for example, 'rehosting' an existing software product into a new aircraft, to those worth hundreds of millions of pounds, as in the more recent case of, for example, the Joint Strike Fighter.

Research Journal Entry - The tension of waiting for news

> Michael, Alex and Colin are finding the tension unbearable. They're still waiting for a decision about who has won the bid for the LAWD project. They went to London yesterday to answer yet more questions about through-life costs. The field has been narrowed to two, them and Ultram. They think they're in with a good chance, but won't know for another seven days because there has to be a cooling-off period. The stress is really getting to them. If they win, I'll get an invite to the party.
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> [A week later] Still no news about the LAWD proposal. They should have heard last Friday as it was the end of the cooling off period, apparently. I rang from Birmingham to find out, but in vain. The prime contractor is moving very cautiously. Michael reckons they have to clear it with the customer, as any sensible prime contractor would, but that it is difficult to get in touch with people if everyone's on holiday.
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> Then Diane came round with a sweep for us to guess the day and time they would get the news! A pound each. I chose 10.00 on Thursday. Joseph Sennet has chosen Friday. People drifted up during the day to place their guesses. Tension mounting. Dave Harris going around with a kind of rictus smile, telling me how he's finding the waiting hard to bear.

Economic and social impact of winning (or losing)

Since a proposal is written as part of the bid process, it has serious and formal connotations, and, as such, is no different from any other proposal, be it a proposal made at a meeting, for example, or a marriage proposal: after due consideration, it may be accepted or rejected. There is happiness and celebration for the proposal team, if it is the former, and a sense of failure and dejection, if the latter. As one bid leader put it:

You put everything in to it. It's like going for a job interview: you've got to psyche yourself into the job, so that you actually visualise yourself doing it. It's a hell of a let down, then, if you don't get it. It's a serial process: when you submit a proposal you can see the project taking off and start to look beyond it to other spin-off projects. If you win, you have a party. If you lose, it's dreadful, because other plans fall by the wayside.

I have observed proposals being written by individuals and teams, and, in the late stages, was working among engineers compiling a proposal for a gun system for the British Royal Navy. This was a particularly large proposal, in terms of the size of the actual document and the amount of time and effort expended on it. It was also a particularly important proposal, because, if successful, it would secure work for the engineers and those on the factory floor for a decade or more. If unsuccessful, the engineers knew that they would probably be disbanded, and that most of them could lose their jobs. The words quoted above were said by the leader of this bid team as they were about to make a team presentation to the customer, in the final stages of the bid process, after having worked on the proposal for over a year. In the event, they lost, and the dejection felt by the team was palpable. Soon after the news, they were steeling themselves for redeployment or redundancy; such are the human consequences of losing in the tendering process.

Research Journal Entry - Consequences of losing

> Charles came by again to talk about the consequences of them not winning the bid. Basically, this value chain is EO [electro-optical], so if they lose the bid, ALL of this value chain would go. That means all of the engineers I've been working with in this section, including Joe, Martin Aspel, and Jerry. It also means that part of the factory floor would go too. They are fast becoming a silicon gyro site.

Research Journal Entry - After losing, to review or not to review?

> If you lose the proposal, do you ever get together to review things to see where you went wrong? This is what I asked Harry. His answer was that they should, but they don't often do it. When I asked if it was because it was too painful for them, he didn't reply [engineers possibly find my language too emotional], but he smiled and repeated that they really should all get together to discuss it. Not just the engineers, but everyone involved in the bid. It strikes me that one of the problems with such a discussion is that it could lead to finger-pointing, fault finding and blaming people, which is not what the company is about these days. Espousing a team-working approach, they've long moved away from the blame culture of the 80s and early 90s. All the same he seemed to believe it was a good idea. I still think that with other proposals in the pipe-line, and the amount of time and effort yet to be invested, engineers don't have time to mope. They just lick their wounds and move on. He gave another reason for not reviewing afterwards. Sometimes the selection process drags on and on. With CREST for example, two years on from the start of the tendering process, they are still waiting for a final outcome. So it's difficult to do a 'wash-up' when waiting for the results. They work to such long time-scales.
> *Postscript:* The story of LAWD continues: the customer discovered that the company that won the bid could not actually deliver an effective system within budget, and so the proposal originally submitted by this company is being reconsidered. One engineer put it like this: 'the customer does not always tell you, at least not honestly, why he chose the other guy. Not all is fair in love and war'.

Observations

The contrast between the drama of the bid process (for that is what it is) and the cool formality of the objective language engineers wish to use is striking. Everyone in the bid team, including the technical authors, sales staff, commercial and legal experts, and people in the print room are caught up in the rush of events, experiencing along with the engineers the pitfalls and excitement that are part and parcel of producing a proposal document. Bid preparation consumes huge amounts of energy, expertise and time, to the exclusion of other work activity. All is focused on getting the proposal documents produced and delivered on time. These are big texts, and as is the way with such texts, they cause stress and bring drama to those who work on them. Engineers may be reluctant to use the expression, but others have no hesitation in describing it as being 'mayhem' at times.

More important, then, engineers would claim, to steer a steady path by upholding engineering values in the processes and procedures relating to textual matters. This inclination is deeply ingrained and it really matters to them that they should conform with the linguistic conventions of their discourse community. They are particular about how they describe their products, not only because they wish to be as accurate as possible, but because they are displaying their credentials, their knowledge and expertise through this text. The persuasive message is complex because the text is in fact 'selling' the engineers as well as the product . So the image the engineers wish to project of themselves to those they are targeting (engineers working for other companies) is portrayed, and substantiated, by the style of writing and informational substance of the description.

Thus, proposal documents provide an opportunity for engineers to convince readers of their expertise and high standards of professional practice. They are opportunities for 'giving face' to engineers, who wish to convey these qualities about themselves (and the company). They usually feel strongly about this, but find it hard to describe.

(Edited extracts, taken from Chapter 6 (Sales 2006): *The Bid Process and Persuasion*.)

Section 2: Extra, optional reading

Engineers are often exhorted to write unambiguously in a 'plain and simple' style. I include the extract below for those interested in Halliday's thoughts about scientific language and the 'plain and simple' myth. The examples at the bottom of this page will feature in my talk on 29 September.

Complex simplicity

This section discusses engineers' aims to write clearly, for it is common to hear them saying that their written expression should be 'clear, concise, correct (or accurate)'. This is the kind of advice that is often found in self-help books on technical communication and textbooks for engineers (Ellis 1997:161, Haslam 1988, Fear 1977:59, Houp and Pearsall 1980:161, for example) that is liked and often repeated by engineers themselves.

However, producing clear unambiguous language is no easy task. In his, albeit brief, reference to technical language (in his Introduction to Functional Grammar), Halliday mentions the 'often professed ideal of "plain, simple English" '. He remarks on the deceptiveness of this phrase, because 'the concept of "plain and simple" is very far from being plain and simple'. He explains that any kind of technical language tends to become even more complicated when attempts are made to simplify it (1994:350), and alludes to the fact that written language, and certainly technical language, has a tendency to be clausally simple.

For example, an examination of a collection of engineering specifications, a type of technical description, would typically show that sentences and clauses have ostensibly 'simple' structures, for example:

SUBJECT (S) +VERB (V) + SUBJECT COMPLEMENT (Cs) - an SVC structure

SUBJECT (S) +VERB (V) + OBJECT (O) - an SVO structure

SUBJECT (S) +VERB (V) + ADVERBIAL (A) - an SVA structure

The structures are ostensibly simple because the sentences have so-called simple structures, which nonetheless contain complexity. They follow SVC- or SVO-type clause structures of the kind shown in the sentences below, all three of which are taken from technical descriptions. They may be deemed 'simple' because, according to Quirk and Greenbaum (1973: 166), they do not have embedded clauses as constituents. However, such sentences may contain structurally complicated noun phrases at S, O and Cs positions, as the following sentences show:

Example 1: The combat system designer will incorporate a low risk electro-optical tracking system compatible with displays, weapons and a range of sensors via any ship's highway.

Example 2: More recent versions of the sensor use silicon, a material with a strength to weight ratio three times that of steel, as its vibrating element.

Example 3: The heart of any Coriolis gyroscope is the resonator itself with the device performance acutely dependent on the stability of material parameters.

In terms of sentence constituent structure, these may be categorised as 'simple', but the noun phrases comprise several nouns strung together in what Halliday describes as 'a pile-up of nouns'(2004:159):

- the noun phrases 'the combat system designer', 'more recent versions of the sensor', and 'the heart of any Coriolis gyroscope', functioning as Subjects.
- 'a low risk electro-optical tracking system, compatible with displays, weapons and other sensors via any ship's highway' and 'silicon, a material with a strength to weight ratio three times that of steel', functioning as Objects.
- 'the resonator itself with the device performance acutely dependent on the stability of material parameters', functioning as a Complement.

It is the density of the information compacted into, and conveyed by, these noun phrases that renders these sentences far from simple. Such structures (and ones containing even more complex noun phrases) are a distinctive feature of engineers' writing. This is probably because engineers attempt to be objective and concise within predetermined writing word limits, while at the same time including information about complex notions and mechanisms. Engineers are, after all, fundamentally scientists (or applied scientists) by training. The complexity of constructions, such as 'the device performance acutely dependent on the stability of material parameters', has been observed by Halliday as being typical of nominal constructions commonly found in scientific writing. They are familiar features in the disciplines of physics or mathematics. He also observes that it is such features that non-specialists find difficult to read (2004:171, 159). All things considered, it is unremarkable that the task of writing, and reading (Davies and Greene 1984:42), is a difficult one.

Halliday provides a detailed account of scientific language, explaining why non-specialists find scientific texts (and engineering texts would be included in this category) difficult to read and understand. He puts forward both the specialists' and non-specialists' points of view. On the one hand he expresses the oft-heard opinion of lay people that scientific writing is unnecessarily complicated and difficult and could be made much simpler and easy to understand, if only non-technical terms and more colloquial English were used (2004:160). On the other hand, however, he explains that many of the ideas in scientific writing are 'highly complex and often far removed, by many levels of abstraction, from everyday experience', and so it is understandable that scientists, and in our particular study, engineers, are unable to express complex notions using 'everyday' English. As Halliday writes: 'technical terms are not simply fancy equivalents for ordinary words' (ibid:161).

(Edited extract, taken from Chapter 4: *Engineering Texts*)

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