MANAGING CHANGE AND FLEXIBILITY -

ATTITUDES AND ORGANISATIONAL CULTURE

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A dissertation submitted in partial fulfilment of requirements for the Master of Business Administration Degree, and the Diploma of Imperial College

THE MANAGEMENT SCHOOL
IMPERIAL COLLEGE London
(*where my course tutor Prof Dorothy Griffiths was Deputy Director of the school.)*

Original:
Dec 1991 - Submitted and awarded ***highest grade*** MBA Project Dissertation that year.

Later Editions:
Jun 1992 - Figures updated to capture all late survey results, no text changes.
Apr 1994 - Note and reference added to subsequent leadership analysis.
Feb 2002 - On-line HTML version prepared – Text complete / Figures incomplete.
Feb 2006 – Updated PDF with links fixed and scanned copies of questionnaires linked.

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SYNOPSIS

This dissertation includes consideration of attitudes and cultural aspects relevant to the management of change within an engineering contracting organisation. An outline of the existing organisation is presented, and a perceived history of difficulty in achieving change is noted. The dissertation includes discussion of literature on the subject of organisational change, in particular, recent literature emphasising the unpredictability of change in the 90's and beyond.

Also reported are the conduct and findings of a staff survey concerned with their perception of the organisation and the experience of change within it.

Analysis of the survey response concludes that the organisation possesses strengths in Total Quality Management and Project Management resources, but that there are weaknesses in the culture and leadership of the organisation, which inhibit change and flexibility.

Recommendations are presented which are intended to exploit the strengths in overcoming the weaknesses in the areas of corporate identity, wider measures of performance and the development of management style.

ACKNOWLEDGEMENTS

Firstly, acknowledgements go to Foster Wheeler in general for their sponsorship of the course; in particular to Jim Foley for his support of this project; to Kevin Tremlett and Peter deCourcy for assistance from personnel department; and to my long suffering managers, Peter Underwood, Doug Slawson and Dave Crease. Thanks also to all those Foster Wheeler staff who took the trouble to respond to the survey.

Special thanks are due in particular to Sandra Dawson for her assistance with the project in general and especially for the encouragement given when the going got tough.

Dedicated to Sylvia, Tom and Robbie .....

CHAPTER 1 - INTRODUCTION

THE SUBJECT

The subject of this dissertation is change and flexibility, specifically in connection with my employer, Foster Wheeler, a process industries engineering and construction contractor. The motivations behind looking at such a wide and complex issue within the company are threefold: -

Firstly, there is a perception within the company that there is a myriad of preserved errors and/or missed opportunities for innovation. For example, looking at much process plant hardware under construction, one would find many details unchanged since pre-war days. Similarly, reports on engineering and construction operations typically include recurring technical and interface difficulties. Individually, many such instances may be trivial. Individually, the existence of many may be rationally justifiable. Collectively, their number and apparent endurance represent a cause for concern.

Secondly, there is a perception that Information Technology, which pervades our operation and our deliverables, far from increasing flexibility, creates new constraints. There has been, and continues to be, major investment in IT and a shift from centralised mainframe systems to distributed Personal Computer and workstation based systems. Despite islands of success, and clear marketing benefits, there is disappointment and frustration that tangible benefits from such innovation are slow to materialise in the operation itself.

Thirdly, change and flexibility, as strategic issues for any firm in any industry, have become subjects for a mass of current press, learned texts and fashionable "airport bookstall" literature (37).

The questions prompted by these perceptions, and addressed in this dissertation, concern whether the first two issues are as a result of underlying problems with the management of change and flexibility, and whether the third offers an appropriate strategy or general solution for them.

As the opening paragraph suggests, this is a wide and complex subject. Many texts whose titles include some permutation of Change, Strategy and Management, read like general management texts, covering such subjects as : Planning, implementation and control; Decision making; Power and authority; Structure, systems, organisation and technology; People, attitudes and motivation; Rewards and performance measurement; and so on.

Even more so than Pettigrew and Whipp (50), authors of the latest UK research based text on this subject, I must include in this dissertation, their "caveat emptor”:

"There is no single best practice in managing change. No quick fix is being offered."

THE OBJECTIVE

Having noted that the subject is wide, and that the questions implied above are too complex to expect exhaustive answers, I must declare a more limited objective.

I have approached the subject with the belief that the underlying nature of the perceived problems concerns people, attitudes and the culture of the organisation. I have therefore

chosen to focus on these issues. In essence my objective is to answer the following question: -

"What are Foster Wheeler's strengths and weaknesses in the areas of people, attitudes and culture relevant to managing change? How might these be exploited or mitigated in order to improve our future flexibility?"

THE METHODOLOGY

The project on which this dissertation is based had two principal phases.

Firstly, there was a review of available literature on the subject of change management generally and following up secondary references on issues arising, in order to construct a model of change. Far from converging on key themes, this exercise led to ever broadening avenues of investigation on the widest range of management issues. One particular model of managed flexibility, the "Organisational Learning" model was chosen as a framework on which to hang a selection of relevant issues (5).

Secondly, in order to focus on the issues in the context of Foster Wheeler, a survey was conducted within the company. The survey was conducted using questionnaires based on checklists suggested by Carnall (17).

THE DISSERTATION

In addition to describing the above activities, this dissertation includes analysis of the survey responses, and discussion in the light of the literature, leading to recommendations for action and further investigation.

However, before describing the findings of these aspects of the project, I need to set the context, as indeed I needed to do before embarking on the project itself. With over thirteen years with the company, I was conscious that I had preconceptions at the start of the project, which were likely to be subjective. In order to establish a more objective picture of Foster Wheeler and its business I performed an analysis of reports and accounts from Foster Wheeler and a sample of competitors for the past decade. Much detail of this analysis is not relevant to this dissertation, and in any event might be considered commercially sensitive. The next chapter, however, draws on this analysis, as well as my personal experience, to paint a background picture of Foster Wheeler, its industry, its business performance and its organisation.

CHAPTER 2 - THE COMPANY AND ITS BUSINESS

GENERAL

The company under analysis is Foster Wheeler Energy Ltd (FWEL) and, if we are to look at change and future flexibility, we need a base case; a snapshot of what FWEL is now. This section provides such a description of the company, its business and its recent performance.

FWEL is a UK based Engineering and Construction (E&C) Contractor, which is wholly owned by Foster Wheeler Corporation (FWC), via Foster Wheeler Ltd (FWL), a UK holding company. FWC is a US Corporation listed on the New York Stock Exchange and 1991 represented a centenary since the original Wheeler Condenser and Engineering Company was formed. From the UK perspective, 1990 represented 70 years since its original formation in the Power Specialty Company Limited in London.

Two thirds of FWC's current operations are in E&C, serving energy and process industries, and most of the remaining third is concerned with related energy equipment and services. A significant and growing part of the business is in "own and operate" projects for waste to energy and flexible high efficiency power generation facilities. Foster Wheeler, including its UK based operations, has a long history in power generation, involving design and manufacture of fossil fired boilers for utility power stations and marine propulsion, and of nuclear power plant components. Though still involved in design of fired heaters for process plants, these power industry aspects no longer form a significant part of the UK operation.

FWEL is currently the largest of the five main subsidiaries within FWC's E&C group, which operate in the US, the UK, France, Italy and Spain. In 1990 FWEL contributed more than $250m to a corporation turnover of $1700m. Each of the five main E&C contractors operates internationally, historically in its own local region and typically in those areas where the home country had colonial interests and a common language. In recent years however, by agreement within the corporation, each tenders for contracts anywhere where its resources are better able to serve the client's project.

FWEL, based in Reading and Glasgow, therefore operates throughout the world. Recent and current project locations include mainly the UK, Europe, south east Asia, and Indonesia, as well as Scandinavia, and parts of Africa, the Indian subcontinent, the Middle East, South America, the Caribbean and Australasia.

As already noted, the E&C service is provided mainly in support of capital investment in the process industries. These include onshore and offshore oil and gas facilities, petroleum refineries, petrochemicals, general chemicals, fine chemicals and pharmaceuticals. Not surprisingly therefore, important clients include household names like BP, Exxon, Shell, ICI and Glaxo, and often these operators have significant interests in some of the less well known clients. Recent areas of diversification, serving a different client base, have included combined heat and power generation, waste treatment, water supply, factory automation, rail transport and even a cryogenic wind tunnel.

The E&C service includes any or all of project management, specialist engineering, purchasing, logistics, construction and commissioning, but can also include project appraisal, conceptual engineering, project financing, operator training and even plant operation. FWEL does not operate as a manufacturer of plant equipment and in the past decade, in common with all UK and most European competitors, has generally subcontracted construction services. There are however, fabrication affiliates, and FWEL has started a move back [since reversed] to direct labour construction, where a significant proportion of value is added to a typical project.

Because of the range of services involved and the range of industries served, it is very difficult to talk in terms of the total world market and market share vis-à-vis our competitors. Most of FWEL's competitors are also part of diversified groups and corporations who operate in overlapping vertical and horizontal segments of the market.

Horizontal diversification includes for some; E&C services to oil and gas exploration and production, mining and mineral extraction, metals processing, food processing, civil infrastructure and industrial and general building construction industries. Integration into vertical markets includes for some; operation of exploration, production and processing facilities, and manufacture or fabrication of plant or systems involved in any of the services or industries mentioned.

The extent of segment overlap amongst individual competitor operations is highly varied, and in the extreme a few of the holding corporations are highly diversified conglomerates. Domestically FWEL could consider some twenty E&C competitors. Internationally up to two hundred E&C companies could be identified competing in some or all of FWEL's markets.

THE OPERATION

The operation consists of a stream of concurrent and overlapping individual projects.

These are generally won by open competitive tendering, although in some cases existing cooperative agreements with clients or rolling "term" contracts reduce the competitive element in awarding some packages of work. On the other hand, sales and marketing effort in the competitive phase may include prequalification even before an invitation to bid is forthcoming. In any event, there is a significant proposals operation involved in bidding for most contracts.

As already inferred, an individual contract may be a simple study, or a full engineer, procure and construct project, or project management only, or any other combination of the services mentioned previously. The contract terms can also vary between lump sum and fully reimbursable, and more typically involve a hybrid of both, such as reimbursable costs plus fixed fee. As with contract management in other industries, the terms may be varied between phases of the project; e.g. reimbursable during uncertain conceptual or pre-engineering phases and lump sum during detailed phases after a definitive estimate. This can be further complicated when there is competitive rebidding between consecutive phases of a project, and there often is.

Typically a project might last fifteen to eighteen months but could range from a month or two for a conceptual or "front end" study to five years or more for a major project management contract. The scale of a project may therefore vary widely from a handful of people using a few hundred man-hours to produce a report, to a peak of as many as five hundred people consuming two million man-hours and procuring several hundred million [or a few billion] dollars worth of materials and services.

Almost invariably any project involving a significant number of people over a significant period is organised as a task force, with specialist staff physically relocated into designated task force areas or offices. Increasingly, such task forces place great emphasis on team building, particularly as it is also increasingly common for such teams to have client personnel integrated into them.

Naturally, where the contract scope includes construction and/or operating responsibilities teams need to be set up at plant fabrication and construction sites. During other phases it is not unusual for small teams to be established at the offices of

clients or other contractors. Sometimes it is necessary to set up complete project teams local to clients' offices or plants, and these can involve some form of joint venture or partnering with clients or local contractors.

So far, we have looked at FW's history and operation in the briefest possible terms, and later we will look at further aspects of the operation in describing the organisation. Staying on the historical theme however, it is appropriate that we now look at recent past performance of the operation as a starting point for future change. In looking at performance in relation to competitors, we will also be able to infer a number of features of the industry in competitive strategy terms characterised by Porter (53).

PERFORMANCE

The intent here is to look at performance from a recent historical perspective, in order to infer some relevant features of the industry and FW's position within it. For the management of change, we will see later that selection of measures of performance and mechanisms for monitoring them are important issues. For the limited intent here however, I need only concentrate on the bottom line. This supremely objective [sic] measure also satisfies the requirement that this background chapter be as objective as possible. [even accounts can be distorted for political ends]

An analysis was performed using a combination of published annual reports, statutory public accounts and ICC data cards covering FWC, FWL, FWEL and a sample of competitor operations over the past decade.

Although a wider range of accounts was analysed, the comparative data is based on FWEL and 18 other process industries E&C contractor operations in the UK, ignoring the accounts of the more diversified company groups. The data used covers the period 1983 to 1990. Detailed figures and graphs resulting from this analysis are not included in this dissertation, however the following draws on selected results.

As far as longer-term performance is concerned FW's history is witness to its success in satisfying customers and stockholders and in undergoing significant changes in the industries and client base served. Clearly, part of that change has involved acquisition, disposal and restructuring within FW and competitor organisations. This feature in itself gave some difficulty in comparing equivalent competitor operations at any given time, even during the past decade.

Longer term trends and fluctuation in the level of business for FW, and the E&C industry as a whole, tend to have reflected cycles of recession and growth affecting the energy industries and capital investment generally. Naturally, higher profitability has been associated with such periods of higher capital investment in these industries, where demand for E&C services has tended to outstrip supply. This was generally not the case during the 80's.

In the later 80's, since 1987, the figures for FWEC and FWEL show an encouraging 15% per annum revenue growth trend for both companies, with FWEL certain to improve on this for 1991. From the general picture however, it is apparent that, whilst contributing a healthy share of the turnover, FWEL has returned relatively small profits, but that these are generated from a very low asset base. In order to draw more specific conclusions, we can examine the comparative ratio analysis between FWEL and an E&C industry sample average.

FWEL pre-tax profit margins are indeed low and show a downward trend, but this is better than the industry average, which returns less than 1.4% in the long term, compared to 1.9% for FWEL. The perspective from inside FWEL's operation, comparing

operating and pre-tax margins, is even more striking. The bulk of profits, however small, have arisen largely from non-operating, investment and interest income. The long term operating profit margin is just over 0.5%. An aggregate statistic for the period 1983 to 1990 brings this point home. In that period FWEL turned over $1 billion of contracts, earned pre-tax profits of œ20 million (2%), of which $15 million (75% of the 2%) came from non-operating income. The picture is however entirely typical of the industry, with a long-term average operating margin barely over 0.5%.

Typical also of the industry is the low and erratic level of operating earnings per employee, with long-term average of around œ400 per employee.

Though still erratic, returns to capital employed (or net worth or net assets) look healthier, reflecting the low capital intensity of the industry, with instances reaching 10 and 20%, and a long term operating average around 4%. The after-tax return to net worth is an important corporate target set for the FWEL operation and is clearly aimed at satisfying stock investor's expectations, although it is not translated into direct measures of operating performance.

A measure of performance of interest to the operation, the investors and to competitors is the forward workload, expressed internally in man-hours and externally in turnover value. Published industry analyses typically include "boxscores" of the value of contracts won in a given period and the value of outstanding incomplete contracts at the start of the next period. Both measures are concerned with success in winning business, and future security or survival, but are not related to profitability directly. On such measures, FWEL is currently performing extremely well, with record levels of pre-booked contracts and forecast workload levels for 1991/2 reaching levels only previously associated with the early 70's.

The returns on net assets are again typical of the industry and are achieved despite low profitability because of the low asset requirements of the E&C service operation. The industry long term operating return on assets is just over 3% compared with nearer 4% for FWEL. The low assets are also reflected in the high asset turnovers achieved in the industry, with FWEL sweating its few assets significantly more than the average.

The preceding description of the performance of FWEL and the industry in general, reflects both the possibilities for change and, paradoxically, one of the difficulties in gaining advantage through change in this industry. These same features of the industry point to generic strategies adopted within it.

GENERIC STRATEGIES

An obvious route to improved performance, for an operation with very low margins, is to improve those margins through increased productivity or efficiency. Productivity here includes producing higher value added for the same costs, as well as producing the same value at reduced costs. Improving performance through increased volume is resource limited, skilled human resource limited in this case, and it is not a simple matter to rectify this by investment. On the other hand the numbers make productivity improving changes hugely attractive. When your operating margin is 0.5%, an improvement of 1% in productivity could treble your operating profits in a perfectly competitive market; but therein lies the rub.

Firstly, the market is oligopolistic in the sense that contract prices are set in competitive bidding and there can be only limited flexibility to relate prices to our costs, our capacity and our desired margins. Secondly, whilst contract pricing includes a reimbursable element, productivity improvements do not accrue to the contractor directly, and may materialise only through incentive bonus arrangements.

Related to both of these is the client power in this market, not just in defining the final product, whether plant or paper deliverable, but in defining the detailed scope of the service during the course of the project. To a large extent the content of the operation, and hence any change in it, is driven directly by client requirements. Productivity improvements that add additional value during a project may not result in additional earnings and as already noted those that save costs may not benefit the contractor. Even those that save schedule may not benefit the contractor directly.

This particular feature of client power in setting contract terms can be over emphasised, but it does mean that they tend to have a very detailed knowledge of contractors' operations and costs, a feature that can only limit price setting flexibility.

Another feature of the industry that greatly limits the ability to sustain operational competitive advantages is the high level of market intelligence. As already noted clients have intimate knowledge of our operations, as they do of all contractors they become involved with. The client organisations are therefore a channel for exchange of project operational ideas from project to project, from contractor to contractor. The industry also has a fairly cosmopolitan workforce, with a turnover of staff between contractors and between contractors and clients, and there is also a floating pool of agency and contract personnel. In general FWEL has had a lower level of such temporary staff than its competitors.

Another channel for exchange of intelligence is the market for hardware, systems and services sub-supplied to contractors on projects. In some particular segments, like for example, the supply of Computer Aided Design (CAD) systems, these suppliers can also have considerable monopoly power.

Despite focussing on some very narrow measures of performance, and not having performed a rigorous Porter analysis of industry structure, we are able to deduce that it is by nature a low profits industry.

We have high internal rivalry and high buyer power. Barriers to entry to the market as a whole or to new sectors are mainly experience, a name and a reputation. Once in, the barriers to providing new services or servicing new sectors are generally low, the principal resource limitation being the human resource. Despite this the operation itself does not benefit from economies of scale except in certain areas of marketing.

For reasons already noted strategies aimed at low costs and high productivity are difficult to exploit and difficult to sustain. Also, although buyers have good intelligence and high power, their incentive to drive down the costs of the E&C service are not as great as might first appear. The cost of this service may represent less than 10% of their capital investment in a project and they may be more concerned that the quality of this 10% does not put the other 90% at risk.

Conversely, a strategy focussing on particular segments may have marketing merits, but this focus must change as the market changes. There is little competitive advantage in focussing the operations capabilities on too narrow a product range.

The generic strategy adopted is one of differentiation on quality, but providing the widest range of services to the widest range of industry sectors. In fact a stated objective of FWEL is " To be in a position to command fees higher than the competition ", whilst continuing to be a process industries E&C contractor not limited to any particular sectors.

Before looking at the issue of change and flexibility in general, we have analysed very briefly the nature of the industry. Whilst we have drawn no conclusions concerning any

specific changes either necessary or possible, the objective has been to make the following two points :

It is an industry where a competitive advantage is very difficult to sustain once achieved. This means that is is essential to introduce improvements continuously just to keep half a step ahead of the competition, because they too must be introducing change continuously in order not to fall more than half a step behind. Everyone must run just to stand still.

If this is a depressing prospect in a low profit industry, then there is another side to the coin. Any change that creates significant additional added value or significantly reduced costs could in principle be turned to competitive advantage. As we have already noted, if such advantage could be exploited and sustained, the gains in profitability could be disproportionately great because existing margins are so low.

Even from this simple historical analysis of performance and existing competition, we can deduce that there is both necessity and attraction for change in our industry, notwithstanding the perceived need for change described in the introduction. But before we can talk about change at FW, we need to know a little more about the organisation itself.

THE ORGANISATION

In order to characterise the organisation it is appropriate to have an organisational model as a framework. Many writers have presented models of organisations and clearly these vary depending on the writer's original objectives. In the most abstract sense all represent the organisation as an "interactive open system". Interactive, in the sense that the constituent elements of the organisation interact with one another; open, in the sense that these elements also interact with the external environment; and systems, in the sense that the elements and interactions cannot be treated in isolation from one another.

The simplest descriptions, after Leavitt (37), involve four elements: - OBJECTIVES, PEOPLE, TECHNOLOGY, and STRUCTURE. As well as the external ENVIRONMENT, there is the more intangible aspect of the internal environment that we might call the CULTURE of the organisation, or what the Mckinsey model might call SHARED VALUES and STYLE (48).

To move from the abstract to the specific, it is necessary to describe some of these features explicitly in relation to FW.

OBJECTIVES OF THE FW ORGANISATION

In the preceding sections I have already described in broad terms the purpose of an E&C contractor and possible generic strategies for FW. We also noted a number of business objectives in discussing recent performance above. I do not intend to say anything more specific here, about FW's actual strategic objectives.

STRUCTURE OF THE FW ORGANISATION

Appendix B includes outline organisation charts for FW Corporation, the Engineering and Construction Group and FW Energy Limited. A management organisation chart is included for Process Plants Division, the process plants E&C contracting operation of FWEL. Also included is a typical project organisation chart.

With operations organised as projects the organisation structure is quite naturally a matrix form. Most individuals in the organisation find themselves reporting to a hierarchy of project management as well as line management. In fact the apparent hierarchy facing the individual can seem very complex. Within the project there may be Discipline Leaders, Area Engineers, Project Engineers, Project Engineering Manager, Project Manager and Project Director, as well as other functional coordinators. The line management hierarchy includes levels of seniority and status as well as Discipline Principals, Section Supervisors, Discipline Chiefs, Group Managers and Divisional Directors.

Delegation of recruitment, appraisal and technical management functions by line management can further confuse this picture, but in practice the real hierarchy (33), with hire, fire, reward and spending authority is rarely more than three levels.

In recent years there was an attempt to flatten the engineering line management hierarchy by removing a further level. This was however reversed due to problems with issues of status and career development paths, which had not been adequately addressed in the attempt.

The structure is in fact an extreme form of matrix, largely consisting as it does, of task forces, but where line management retains technical management and back-up responsibilities for staff on projects. The organisation therefore also experiences the normal matrix conflicts with competing claims for resources between one project and another and between projects and corporate aims. Other inconsistencies are apparent between project and corporate responsibility and authority. For example, as an authorised signatory on a project an individual may be authorising specifications and recommendations representing millions of dollars worth of work, whilst that individual's line manager may have negligible corporate spending authority.

PEOPLE IN THE FW ORGANISATION

FW's business is a "knowledge business" (26). It may be easy rhetoric to say so, but clearly the main assets of an E&C contractor are its personnel, their expertise, the systems and procedures they operate and the electronic and paper "deliverables" they are able to generate.

Appendix C contains a summary profile of the 1300 staff of FWEL Process Plants, the operating division of FWEL. An additional significant proportion of employees, typically around 30%, comprises temporary agency staff, particulary employed in "production" departments delivering designs and drawings.

The majority of staff in most departments have specific technical and professional qualifications or the equivalent in terms of experience. The majority therefore, whether formally affiliated to professional institutions or not, behave as professionals with much that that entails. Positive examples would include peer group influence on health and safety responsibilities or on contractual codes of ethics, but there can also be negative aspects concerning demarcations of responsibility, verging on restrictive practices.

TECHNOLOGY IN THE FW ORGANISATION

The technological resources of FWEL's operation fall into three broad areas.

- Process Technologies.
- Plant Design and Construction Technologies

- Project Management Technologies

PROCESS TECHNOLOGIES

This area of technology involves expertise in the chemical engineering and physics of the processes involved in the plants themselves. It is applied plant functional definition, to the original specification of energy and mass balances, pressures, temperatures, volumes and compositions of the processes, to their control philosophies and to the ultimate commissioning and operating procedures.

In certain sectors of the core business, eg specific oil refinery process units, such in house technology generates original process designs from basic concept. In other areas the expertise is needed to extract and interpret process designs from client/operators, process licensors and process package suppliers.

The products of this technology within the operation are information deliverables, paper or electronic, and in the commissioning phase can include direct supervision and hands-on services.

DESIGN AND CONSTRUCTION TECHNOLOGIES

These are the technologies associated with the methods and processes of design, engineering, construction and testing of process plant hardware and systems. This ranges from basic civil engineering works, through a whole spectrum of mechanical and electrical disciplines to control systems software engineering. Most of the physical and systems design employs Computer Aided Design and drafting technologies, and increasingly relies on three-dimensional (3D CAD) modelling techniques.

Again the bulk of the direct product of this technology within the operation is information, whether delivered in electronic or paper form.

A large part of the operation is concerned with coordination and interpretation of technical data exchanged between different engineering and design disciplines and between the project and specialist suppliers of equipment and systems.

The same range of technologies and expertise are also brought to bear on the surveillance, technical supervision, and inspection of manufacture, construction and testing of plant at suppliers works and construction sites.

PROJECT MANAGEMENT TECHNOLOGIES

As a contractor, as opposed to a manufacturer or operator of process plants, the key area of FWEL's technology is in project management. As in any other field of project management, this expertise is concerned with the planning, implementation and control of activities and resources with defined objectives of cost, time and quality.

This expertise is not confined to Project Managers, Project Engineers or others with specific project control functions, but is inextricably part of the technical coordination activities described above, and is bound up in other purchasing, sub-contracting and logistical functions.

As well as the aggregate experience and knowledge of individuals, such proprietary expertise and systems are captured in a significant body of "Contract Execution Procedures".

CULTURE OF THE FW ORGANISATION

Of the component parts of the organisation, its culture is one of the least tangible and most difficult to describe objectively. Culture is a measure of the style and personality of the organisation, which affect the natural patterns of behaviour within it, but in ways that are taken for granted.

Handy (30) categorises culture according to the predominant patterns of organisation in the operation; Power, Role, Task and Person cultures. On these axes, FWEL is predominantly a role culture, as witnessed by the range of functional titles in appendix C. Whilst, no doubt, few individuals refer to their job descriptions, there are few who do not recognise demarcations around their job function and many who would react defensively if others transgressed. I believe even new employees quickly sense such demarcations long before they appreciate their subtle details.

Such a role culture is moderated only on the smaller, more close knit, project task forces or proposal teams, who can develop a task culture, with all hands on deck to achieve specific milestones. A strong role culture is typical of large bureaucratic organisations and is ideal only in the most stable of environments.

Deal and Kennedy (22) characterise cultures according to the nature and potency of heroes, rituals and anecdotes that exemplify the culture and underpin its beliefs and values. In order for such informal symbolic features to represent an asset, it is argued that they need to be common across the organisation and consistent with formally stated aims.

Employees' perceptions of the company are also indicators of the strength and direction of its culture. Some aspects of this are revealed by the staff survey analysed later in chapter 4, but an earlier survey of corporate image by Paul Peters (45) indicated some important themes. For example:

The dominant perceptions of the company's personality, according to its staff were successful, good quality, reliable and traditional, but with low ratings of dynamism, innovation and flexibility. When asked openly to identify FW's good points, technical quality and reliability recur.

The great majority of staff also perceived that neither themselves nor the company as a whole had sufficient vision of its goals and direction. When invited to identify bad points, inflexibility, bureaucracy and lack of innovation recur, but so also do perceived internal problems with listening and communication. Again when invited to identify areas for improvement, most of the previous good and bad points recur, but so do issues of commitment, involvement, belonging and motivation.

Another later survey (65) of 80 staff members of one particular large department, was concerned with their perceptions of team leaders and managers within that department and with those leaders views of their own styles. Whilst there was clearly a large range of perceptions of individuals, the average ratings reflect the inherent leadership style or culture in the organisation. This yielded extremely low ratings concerning the extent to which management inspire any vision for the future or the extent to which they tend to question or effectively challenge the established practices and processes. The ratings were so low as to place them in the bottom 15 to 20% of any management population sampled.

In summary, there is a strong quality image, but with a traditional, reliable, bureaucratic theme running through FW's culture. The fact that there is no strong vision of direction

and goals means that we must assume that any informal heroes, rituals and anecdotes are unlikely to be common and consistent across the organisation, or consistent with any formal goals. Whilst the traditional quality culture is strong and could be considered positive in the appropriate circumstances, it is unlikely to be seen as positive when we consider future change and flexibility.

CHAPTER 3 - CHANGE AND FLEXIBILITY - A CURRENT FASHION?

THE FASHION

As well as an interest in the specific needs and opportunities for change within FW, the introduction also noted that there has been a recent fashionable focus on the issues of change and flexibility. The purpose of this section is to look at some of the issues in the headlines and to identify their relevance to FW, and also to identify the extent to which such issues are already established management themes.

The fashion for change and flexibility is apparent not only in the popular management literature, but also in a wide range of management texts, current business press and trade press. Several of the references in the bibliography, not listed here explicitly, serve to demonstrate this. The fashionable aspects have been linked particularly to an overriding perception that factors affecting business internally and environmentally are changing:

a. increasingly rapidly
b. in increasingly large steps
c. in disjointed and less predictable ways

The general implication is that such change will be a constant part of business life and that in order to handle it, organisations themselves must also change.

One only has to sample the language of the titles, subtitles and headings being used by recent popular management authors to get a flavour of current thinking:

"World turned upside-down" "Chaos" "Change is the only constant" to quote Peters (46).

"The age of unreason" "Change is not what it used to be" "Catastrophe theory" "Discontinuous upside-down thinking" to quote Handy (29).

"Riding the Whirlwind" to quote Benton (9).

"Cacophony" "Revolution" "Discord" "Creative destruction" to quote Kanter (35) quoting Marx and Schumpeter (60).

"Waves of change" "Turbulent world" "Fracture lines" "Outside-in management" to quote Morgan (42).

The language may seem out of place in business organisations, but can these, and a dozen other gurus, all be wrong? There is no suggestion that they are wrong, but the point is what is actually new ? It is after all, only a small mental leap;

from - Chaos, Discord, and Unreason,
to - Uncertainty, Paradox, and Irrationality.

In the context of business management and management in general, these are not new fashions, but established themes featured in a wealth of literature.

UNCERTAINTY

Uncertainty, is the reason why managers, or anyone else for that matter, need to make decisions. Without it, decisions would make themselves. Without uncertainty, much of the science of operations management and quantitative analysis is redundant.

PARADOX

Paradox, the fact that possible outcomes may not only be competing, but may also be mutually exclusive, is one reason why management decision making is much more than an analytical science. Many paradoxes arise in decisions which may have both long and short term outcomes, but there are many other classic examples:

Centralisation vs De-centralisation
Specialisation vs Integration
Control vs Discretion and Empowerment

The "competing values model" of organisational effectiveness presented by Quinn and Rohrbaugh (57) summarises a number of paradoxical issues which need to be balanced by Management. See figure 3.1.

Figure 3.1 - The Competing Values Model (57)

IRRATIONALITY

Irrationality, as an issue for management consideration, is one manifestation of paradox.

Brunsson's work on decision making (11)(12) links "Decision rationality" with "Action irrationality", the point being that decisions made by the most rational analysis of all available data are unlikely to be those executed most effectively. Which is not to say that human decision-making behaviour defies logic, more that individual actions depend on individually perceived logic.

The decision making process is an important determinant of how effectively a decision will be implemented. Furthermore, implementing a decision is by definition, making a change; the action taken changes the situation that would exist in the absence of the action. The issues of rationality, decision-making and the management of change are closely linked.

CONSTANT CHANGE

Another implication of the fashionable focus on change has been the fact that it will be ever present, but this constancy of change is not a new theme either. As interactive open systems, "business organisations are never static, something about them is always changing" (21). At any time, changes are occurring in the people, the technologies, the structure, the objectives and so on. Changes in culture perhaps occur most slowly, and changes in environment least predictably, but changes in any of these elements interact with one another and, in any event, include both planned and unexpected aspects.

To note that change is constant is not to suggest that it is continuous or uniform. Ever since Schumpeter (60) in 1911 and Kondratiev (36) in 1925, observed trends of recession and boom in macro-economic activity, the pace and direction of change has been seen to be cyclical. Schumpeter and others linked such cycles to underlying technology changes, and even now economists agree (7) that the growth phase of the business cycle is driven predominantly by advances in technology. Most recently, Freeman and Perez (27) have characterised these macro-cycles, or Kondratiev waves, as paradigm shifts from one "Techno-Economic Paradigm", or TEP, to another.

Whilst at this macro-economic level these cycles may appear long and gradual, it is quite reasonable to predict sudden transformations for individual industries and businesses. A firm may be experiencing incremental changes in some aspect of its operation which are part of the emergent TEP. When a critical mass of changes has occurred in the industry, the existing status quo and decision-making norms can be undermined to a point where the industry finds itself at a cusp in its development. Subsequent change can be particularly disruptive and unpredictable, as the whole structure of the industry is transformed into the new TEP. This ongoing cycle of change allows current gurus to predict the unpredictable, and draw on the language of catastrophe theory and the science of chaos.

The upswing of K5, the fifth Kondratiev wave, into the information and communications TEP, might in itself be enough to predict a period of uncertain change. However, as much of the current change literature reminds us, we are at the same time also experiencing several other unconnected, and potentially far-reaching, changes in our environment. For example, shifts in population demographics; globalisation of competition; economic union in the EC; social and political shifts in the disintegration of eastern bloc countries; a third world debt crisis; social and political pressures increasing the importance of ecological issues and alternative technologies. Unpredictable or not, a number of these factors are
worth discussing in relation to FW.

GLOBAL COMPETITION

Like many of our multinational clients, we operate and face competition globally. Currently FWEL are very active in Southeast Asia and Indonesia, but the possibility of counter competition is real. Already, for some years, the Japanese are the main competition in these local markets and in other markets such as the Middle East and Africa. How long will it be before the Japanese compete seriously in markets nearer to home? What significance should we attach to the Japanese contractor managing a construction site half a mile from Foster Wheeler House, our main office? How long before we must take seriously threats from players in Korea, Malaysia, India and other recently developed countries? Will these nations have the same human resource limitations (54)? Are our traditional clients not also facing similar competition in their own markets?

Like many industries before, the existing Far East competition has acquired a cut-price and ruthless image contractually. If we pursue the strategy of targetting higher price, higher added value, niches in the market, might we one day look back on an irretrievable sector retreat?

INFORMATION TECHNOLOGY

We have already noted that the human resource is the key resource and an important growth limiting resource for an E&C contractor. We have also noted that the business is information intensive, a "knowledge business" (26). Clearly information technology, in all its guises, has already made major inroads into our operation and those of our clients. The theoretical technical possibilities for IT to further increase efficiencies and add value are virtually boundless. Unfortunately, or perhaps fortunately, the limitations remain human, but solving them may keep us ahead of those players with less limited human resources.

For example, some of the possibilities could have a major integrative effect on the businesses of clients, contractor and suppliers. It is possible to envisage, if not yet

realise, major changes in the structure of the industry and the nature of our business operation. As information and communications technologies are central to the emergent TEP we might also expect IT changes quite unrelated to our existing value chain to impinge on our operating environment. Again it is not relevant to speculate on the detail of such possibilities here, merely to note them and their significant potential consequences.

GREEN ENVIRONMENTAL PRESSURES

In contrast to the march of hi-technologies, there is the march of alternative technologies to consider, not that they are mutually exclusive. There are fairly obvious opportunities for a process industries E&C contractor created by legislative and other pressures to reduce pollution or emissions and to recycle waste generally. We have benefitted already from such process requirements as the demand for unleaded gasoline, low sulphur fuels generally and the demand to make use of low-grade waste heat, or the demand to have environmental impact assessments performed and so on.

The other side of the story is the threat to various sectors of our clients' businesses from green pressures and alternative technologies. The alternatives may not be process industries.

CHANGE AND FLEXIBILITY AS A STRATEGY

Apart from having spawned new metaphors, clearly one new message in the rash of new literature on this subject is in the degree of unpredictability in the speed, magnitude and direction of changes in the 90's and beyond. It’s not difficult to see that if the future is unpredictable, then flexibility is a good strategy. The novelty is in the implied urgency.

Flexibility has passive connotations, the straw bending with the wind. Whilst going with the prevailing flow is a perfectly valid tactic in many an operational situation, it is definitely not the basis of a business strategy. Not much advantage being flexible, if the next gust of wind blows your field off the map. Here we are concerned with proactive flexibility, adaptability and learning. Morgan (42) talks of needing "proactive mindsets".

On the other hand, if the future is so unpredictable, why bother to prepare for it? Don't panic, it might never happen. Plus ca change, plus c'est la meme chose. Peters (46) describes this hurdle as "facing up to the need for a revolution". Handy's boiling frog metaphor (29) is already hard-boiled. As Handy himself says, the more accurate metaphor concerns Spanish invaders as seen by South American Indians. It is not a matter of not noticing the change arriving, more a matter of not recognising the potential in its arrival, whilst you still have time to take appropriate action. The boiled frog simply fails to notice a very gradual change that is taking place.

The potential in an externally triggered change can be either negative or positive; threat or opportunity. If the future of change is so unpredictable and disjointed as to be chaotic, hinging on catastrophes and fracture lines, then being in a position to handle it is not simply a defensive posture against the potential threat. It is being in a position to exploit the opportunities arising. "Thriving on chaos" as Peters put it (46).

Taken to its logical extreme, if you can thrive on chaos, you may be able to create further advantage by creating a little chaos in the first place. Others (47) have cited examples of chaos created in stock markets by the introduction of "junk bonds". Another high risk example which comes to mind is Malcolm MaClaren, new wave music impresario who operated under the slogan "Cash from chaos" during 1977.

Both examples might appear equally irrelevant to a process industries engineering contractor. No self-respecting major existing player in a mature industry with powerful buyers and risk-averse stockholders could contemplate anything so radical as even admitting the existence of chaos, let alone a strategy to deliberately engineer it. The significance of health and safety issues in this industry further reinforces this risk-aversion.

But it brings me, however, to a final point in this section on the need for, and opportunities inherent in, preparing for future change.

Even if future change turns out not to be as chaotic as the pundits would have us believe, we must be open to unexpected and unconventional possibilities for changing the shape of the industry; daring to be different. Like many writers before me on the subject of the management of change, it seems fitting to quote some words from George Bernard Shaw:

> The reasonable man adapts himself to the world.
> The unreasonable man persists in trying to adapt the world to himself.
> Therefore, all progress depends on the unreasonable man.

CHAPTER 4 - ORGANISATIONAL LEARNING

A MODEL FOR CHANGE

The previous chapter included the simple message that flexibility and innovation must be an important part of FWEL's strategy for the future in a changing world, whether strategic objectives are primarily growth, profitability or survival, and whether the generic strategy is one of quality differentiation, cost leadership or segment focus.

What we would like to address now are those organisational attributes that confer the appropriate form and degree of flexibility. The management of change and flexibility however, involves all the elements and linkages of our model of the organisation, and we could draw up lists of apparently desirable features against each of them. In fact many of the authors I have so far referred to, include their own prescriptions of such features.

I choose to start this section with the "Organisational Learning" metaphor of Argyris and Schon (5). I choose it simply because the model developed has a form which I believe appeals to the engineering mind, consisting as it does, of a series of activities and decisions linked in a flow diagram with feedback loops. There is no intent however, to limit our thinking to the perspective of the purely functionalist paradigm (15). Because it is incomplete, we can only get so far with this model, but it leads us to some of the missing elements.

SINGLE LOOP LEARNING

The simplest form of learning, organisational or otherwise, is single loop learning (5). Refer figure 4.1. Picture it as a quality control, whereby an error is detected and fed back to initiate corrective action as appropriate. Alternatively, Tichy (62) uses the less structured example of learning to ride a bicycle for the first time. Staying with our quality control example however, there is still a range of appropriate corrective actions :

1. Reject and repeat or recycle until the deliverable meets the required standard. ie Change the deliverable.

2. Accept the deliverable by relaxing the original quality standard. ie Change the specification.

3. Recycle the deliverable but modify the process to achieve the required standard. ie Change the process.

Typically, even in a simple case, any and all of the options might be considered, in any order, before acting to correct the problem. However, in all three cases, the considerations and actions all concern the original deliverable, its specification and the process that produced it. This is the essence of single loop learning.

Figure 4.1 - Single Loop Learning Model (5)

DOUBLE LOOP LEARNING

Figure 4.2 - Double Loop Learning Model (5).

In double loop learning, the essential difference is the additional level or loop of enquiry into the original "defect". Refer figure 4.2. As well as looking to correct the original error in the original deliverable, questions raised might include:

1. Are we producing the right deliverable?
2. Are we going about it the right way?
3. Is there conflict in what we are trying to achieve?
4. Is this symptomatic of some other problem?
5. Whilst we're thinking about it, is there some other opportunity we're missing (internal or external)?

Furthermore, the single and double loop considerations might also arise in the QC and learning processes themselves, as well as those involved in the deliverable and its processes. Argyris and Schon call this Deutero-learning. Learning about how to learn more effectively from your learning experiences.

Having started with a QC analogy for single loop learning, it is interesting at this stage to note also the parallel between the concept of double loop learning and a formal quality management program. As we shall see later, this is no coincidence.

Argyris and Schon admit that the distinction between single and double loop learning is not necessarily particularly clear cut in a real organisation with complex processes and deliverables whose quality standards rely more on fitness for purpose than physical attributes.

The point however is that single loop learning is not organisational learning. It is hard to imagine an organisation without a basic quality control level of learning, but the best you could hope to learn with this, is to do well what you already do. It is the very antithesis of flexibility and could only be considered satisfactory if you planned to "stick to the knitting" (48) in a permanently stable world.

Organisational learning must include the additional features of double loop learning and it must be effective. Graphically and procedurally it is perfectly feasible to describe mechanisms for generating feedback, analysing it and acting on decisions made. By coincidence I was asked to draft just such a procedure for FWEL (28) at about the same time I embarked on this project. Refer figure 4.3.

Figure 4.3 - A Double-Loop Learning Scheme within FWEL (28).

BLOCKAGES TO LEARNING

The crucial point is that, in general;

SUCH SCHEMES DO NOT WORK AT ALL EFFECTIVELY (4).

The problem with such a mechanistic scheme of organisational learning is that it is really only a description of how things might happen in some form of ideal world. As Pettigrew and Whipp put it, these are only the "secondary actions and mechanisms" for learning and change (50). It is our first indication that the double loop model of organisational learning is by itself an incomplete model of the management of change.

Typically, the real world of organisations is full of inhibitors and blockages to learning and change planned and implemented along these lines. Argyris (4) calls them organisational defences. Recognising what these are and then either breaking them down or going round them is the key to organisational learning.

Argyris and Schon's work proceeds to categorise the various defensive effects as "Budgetary Games", "Fancy Footwork", "Skilled Unawareness" and "Skilled Incompetence". They also are able to identify the points at which they arise in the learning loops, and are consequently able to develop their systematic flowchart analogy to represent many of the subsidiary distorting and counter-productive loops which can exist. But this is still just a model of the real world, and as Quinn and Cameron put it "incapable of capturing the buzzing, booming confusion [of paradox], no matter how strongly our logical arrogance tries to convince us otherwise" (56).

Remarkably however, Argyris and Schon claimed a single root cause of most, if not all, the blockages. They considered that nearly all individuals in nearly all [western] organisations hold nearly the same model of organisational behaviour (5). This "Model I Theory-in-use" as they call it could be largely summed up as "avoidance of embarrassment to yourself and others you deal with". Two points are worth drawing from this:

Firstly, we have the term "theory-in-use". That is the issue concerns the way people actually behave, not their "espoused theories", those rational principles that individuals might claim govern the way they act.

Secondly, the emphasis is entirely on underlying patterns of behaviour, in a word; CULTURE. The important implication here is that any structural or systematic blockages are either generated or preserved by such consistent patterns of behaviour.

OVERCOMING THE BLOCKAGES

We have implicitly concluded that blockages to change and organisational learning in the double loop model above are due to problems with culture. An alternative statement of the problem is that culture is the missing element in this mechanistic model of change.

More recent models acknowledge culture as an essential element involved in change processes. Dawson's model (21) includes culture in most of the processes of change. Also, this model incorporates feedback links at each stage of the process and acknowledges the unpredictable inputs possible at each stage. Refer figure 4.4

Figure 4.4 - Dawson's model of change processes (21).

Brocklehurst (10) presents a checklist of the elements of a model of change which includes specific aspects of culture. It includes the need to recognise the dominant decision making model in the organisation and to recognise the political structure in terms of the distribution of power and unity of interests across the organisation.

Carnall (17) talks of establishing "conditions which encourage the emergence of creative solutions ". On the subject of major strategic change, Pettigrew and Whipp (50) talk of establishing "primary conditioning features" needed to plan and implement change.

The choice between breaking down or avoiding blockages to change is equivalent to deciding to change the culture of the organisation or to modify existing change processes to take account of existing culture and politics. The decision is clearly contingent on the scope and nature of change under consideration and the extent to which cultural blockages are expected to interfere with desired outcomes.

A few discrete changes can probably be handled whilst playing the necessary political games, without risk of unplanned compromise in the outcome. A few discrete cultural obstacles may demand "blockbusting" (2) or specific additional actions to "overcome organisational defences" (4).

If the history of change has been either unsuccessful, or unacceptably difficult and inefficient, and general cultural problems are seen as the cause, then what may be needed is to take a leaf from the book of the "unreasonable man" and try to change the world. Make the cultural environment a little more ideal for learning.

CHAPTER 5 - PERFORMING A STAFF SURVEY

THE OBJECTIVE

So far we have talked in very general terms about some aspects of FWEL and some aspects of the management of change. We have also become focussed on issues of culture. We need now to generate data which is more specific to change at FWEL and which provides tangible information on which to base an analysis of a most intangible issue.

A survey of staff perceptions on the subject of change within FWEL was considered a practical means of gathering the necessary data. The objective of performing the survey was to gain a wider general picture of how the company itself perceived the issues of change and change management, rather than relying on the writer's preconceptions. As the survey developed, it became possible also to consider how such perceptions varied across groups within the company.

BACKGROUND TO THE SURVEY

During the study of the subject "Management of Change" on the MBA course, reference had been made to Carnall's "Managing Change in Organisations" (7). In syndicate sessions, several different checklists presented by Carnall had been used in conjunction with brainstorming and force-field analysis on case studies. These included :-

Measures of effectiveness matrix. (p73)
Functional analysis of effectiveness. (pp76-81)
Organisational diagnosis. (pp89-91)
Motivating leadership potential. (p100)
Management development needs. (p102)
Readiness for change. (pp202-203)
Managing change. (pp204-205)

The general conclusions of these exercises were that the techniques indicated powerful means of identifying key issues for the management of change, although we had clearly been limited by the level of company specific data which could be generated within such syndicate sessions.

As presented by Carnall, the checklists are generally intended for use by a consultant engaged in structured interviews or group sessions with the management team of a client
company. I decided in connection with this project that several were suitable for use as questionnaires to be completed by a wider range of staff within FW. This decision involves "suspending disbelief" that the management issues embodied in the questions might not be seen as meaningful by this wider audience.

THE QUESTIONNAIRES

Two questionnaire were generated from three of Carnall's checklists. Copies of both are included in Appendix D.

Questionnaire 1, entitled "Change Audit" includes 33 statements and comprises two of Carnall's checklists appended one after the other. Statements 1 to 15 are statements 1 to 15 from the "Readiness for Change" checklist. Statements 16 to 33 are statements 1 to 18 from the "Managing Change" checklist.

Questionnaire 2, is entitled "Organisational Diagnosis" includes 40 statements and consists of Carnall's checklist of the same name.

A few editorial changes were made to suit the questionnaire format for issue within FWEL. Since, however, it was intended to make use of Carnall's own groupings of responses according to the subject of each statement, such editorial changes were minimised.

Consideration was, in fact, given at this stage to more extensive modification to the questionnaires to tailor them more specifically towards the target population and the project objectives. It was recognised that this would have been a major exercise to accomplish, without introducing bias and preconceptions concerning the behaviour of respondents. This compromise has its down-side in limitations in the value of some of the data collected.

THE FORM OF STATEMENTS AND GRADING OF RESPONSES

Each questionnaire consists of a series of statements which prompt alternative responses. Both are closed, in the sense that respondents must select their response to each statement from those available rather than originating their own. The only open responses invited are to indicate any specific change which the respondent considered relevant in completing questionnaire 1, and to provide any additional general comments at the end of questionnaire 2. The two questionnaires are however, quite different in form.

Questionnaire 2 (Organisational Diagnosis), consists of statements requiring response on a seven point scale from 1, representing total agreement, through 4, the neutral response, to 7, representing total disagreement. Not surprisingly, as the results show later, this form prompted very few null responses, and those few could reasonably be interpreted as the neutral response in the subsequent analysis. Not only does this scale cover all possible responses, but all the responses to each different statement clearly lie on the same continuous scale. It is therefore a simple matter to evaluate and compare responses to individual and grouped statements in terms of average (mean) responses and their standard deviation or some other measure of variance.

Questionnaire 1 (Change Audit) on the other hand, has 4 individual multiple choice responses to each statement. Whilst no other responses are invited, alternative responses
are conceivable as are multiple responses and a null response is an additional alternative.
A null response might indicate either indecision or simply that the statement or its relevance are not understood, none of which are necessarily equivalent to any of the other reponses. As we shall see later, alternative responses were forthcoming

The other feature of questionnaire 2 is that the available responses are less clearly graded
on a continuous scale. For most, the first response (a) represents the ideal case and the other three (b), (c) and (d) represent less ideal cases or different and progressively more
difficult problems. As already noted, alternative or null responses generally indicate additional problems. Whilst the above is generally true, there are a number of statements
concerned with the extent to which possible problems are recognised, for example statements 20, 31 and 33 which concern the pace, effort and stress associated with implementation of change. Depending on the actual circumstances and the role of the

respondent in the change, a low perception of the issue might indicate either that the issue was not a problem or that it was a problem which went unrecognised or underestimated. These are quite different conclusions.

In analysing the general response to questionnaire 1, responses (a), (b), (c) and (d) were
in fact interpreted as a range from 1 to 4, where 1 represented the ideal or least problematic case and 4 represented a problem area. For statements 20, 31 and 33, this was reversed, ie responses (a) to (d) were interpreted from 4 to 1 on this scale. This is equivalent to assuming repondents experienced the change as end users, rather that as implementers of the change. In all cases, null and alternative responses were assigned the value 4 on this scale. This facilitated comparison of average responses to individual statements and groups of statements with other statements or groups. For reasons noted
above, however, this interpretation is imperfect and caution will be needed in drawing conclusions.

Testing the significance of any conclusions may require categorical non-parametric tests of response distributions, and may require more information about the respondents involvement in a given change than the questionnaire was designed to collect.

THE SURVEY SAMPLE

The original intention had been to select a sufficiently large random sample to represent the pattern of perception across the staff as a whole. In order to simplify its administration, the first limitation to this aim was to confine the survey to Process Plants Division, which falls entirely within the authority of the sponsoring director. The staff population of this operating division at the time of the survey was 1273. A detailed breakdown of the population is given in appendix C.

Establishing the minimum necessary sample size requires some assumption concerning the range of responses and their likely variance. The decision to obtain data which could be analysed meaningfully across various groupings within the population required sufficiently large samples within each group. The populations of pre-defined natural groupings, for example across ages, lengths of service and departments, varied widely, some being much smaller than others. This implied the need to optimise pre-defined groupings and group sample sizes as well as the overall sample size.

Whilst such an exercise was theoretically possible, there were two practical expedient reasons why this was not done :-

Firstly, the groups of interest are not clearly defined by the original scope and objective of the project. Any useful information obtained concerning response variation across groups was effectively a bonus. It was not essential that they be pre-defined.

Secondly, since the survey was to be conducted voluntarily via the internal mail system, the response sample was clearly not going to be the same as the target sample. Apart from value in analysing the level and pattern of response, it was considered wasteful to expend further effort pre-defining group samples.

QUANTIFYING THE SAMPLE SIZE

In order to draw conclusions about sample mean responses with any confidence, minimum sample sizes are needed. Looking at the questionnaires, with their four and seven point scales, the maximum standard deviations we might expect, for say an

entirely uniform distribution of responses, are 1.1 and 2.0 respectively. Assuming a more normal distribution is more likely, we might reasonably expect standard deviations somewhere less than 1 in questionnaire 1 and somewhere over 1 in questionnaire 2.

Assuming on these scales we would like to obtain estimates of average (mean) responses
+/- 0.25 with 90% confidence, then the sample size required is given by :-

$n = (t.s / 0.25)2$
where s = sample standard deviation, approx. = 1
and t = the t statistic, approx. = 1.7 for 90% CI
hence n = 46 approx.

Later our analysis will involve responses to groups of questions, groups of 3 in questionnaire 1 and groups of 5 in questionnnaire 2. Each repondent will therefore provide a sample of 3 or 5 data points on each issue analysed. This implies that the sample size required in terms of numbers of respondents could be as small as 10 or 15, ignoring any direct correlation between an individual's different responses to different questions.

Assuming a 50% response rate, then a target sample of 200 individuals will provide 100 responses. This should provide sufficient flexibility to permit subdivision into 5 sample groupings of up to 20 each. The intention, therefore, was to target an overall sample of around 200.

SELECTING THE SAMPLE

A database file representing the entire process plants division staff was extracted from the company's "Perseus" personnel database system as a formatted ASCII text file. For subsequent manipulation and sorting this file was imported into DBASE IV (R) and LOTUS
123 (R) form. For each of the 1273 current staff, the extracted file included :-

EMPLOYEE NUMBER
NAME
DEPARTMENT CODE NUMBER
JOB-TITLE
COST CODE NUMBER
STAFF GRADE
SEX
AGE LAST BIRTHDAY
YEARS SERVICE COMPLETED
LOCATION

The first action needed was to rationalise on those attributes which were of interest. This was partly to make handling the data manageable and partly for reasons of confidentiality.

Employee number was discarded at the outset. Name and Location were retained in the target sample files for use only in addressing questionnaires to individuals, and are not included in or linked to respondent files. The only unique identifiers in these files are sequential file record numbers.

Sex, age and years service were retained as attributes for subsequent sorting and grouping of the population, the target sample and the response samples.

Department, title, cost code and staff grade required some rationalisation. Department clearly indicates the general area in which an individual works as does the title, but it is the cost code which indicates the specific functional discipline. Unfortunately there are some 63 different cost codes represented in the population and their primary function is to allocate staff costs. It was considered impractical to use this cost code for grouping and sorting the sample during analysis for this project, however cost code remains as an attribute within the target and response samples. Department is the only indication of functional area of work used here.

In order to have some indication of an individual's level in the organisation in terms of management responsibility and authority, title and staff grade are relevant. Staff grades are actually an indication of wide overlapping salary bands, and the combinations of title and staff grade are not applied uniformly or rigorously across all departments. Furthermore there are some 358 unique titles and 643 unique combinations of title and grade within the population of 1273 staff. Recognising their imperfection, staff grades, of which there are 20, were selected as the only indicator of level in the organisation.

This left 5 useful attributes to be use for sorting and stratifying the population and any subsequent samples :-

DEPARTMENT
STAFF GRADE
AGE
YEARS SERVICE
SEX

It was theoretically possible, but not practically appropriate for reasons noted earlier, to stratify the population on each of these bases before selecting samples uniformly distributed within each band on each axis. A simpler approach was adopted.

The entire population was arranged alphabetically on employee surname and, starting from the randomly chosen third entry, every seventh candidate was selected. Having removed from this sample a number of anomalous entries with null attributes and zero years service completed, a sample of 165 remained.

Sorting this sample according to the five attributes selected shows subjectively at least that the sample includes a reasonably uniform proportion from each stratum. (Refer appendix C). The most apparent anomaly is the disproportionately small sample of grade
12 and 13 staff. No further attempt was made to reselect or adjust this sample before proceeding.

Each copy of the questionnaires issued was labelled with the five selected attributes (and cost code) of the target individual. This allowed anonymity whilst permitting the necessary sorting of responses without any link back to the population and target sample files.

CHAPTER 6 - ANALYSIS OF THE OVERALL RESPONSE TO THE SURVEY

GENERAL LEVEL OF RESPONSE

Of the 165 individuals targetted, 90 returns or 55% had been received at the time of the analysis described here. A further 7 individuals responded informally that they would not be returning the questionnaires. Reasons given were too few years service to comment, long term remoteness from corporate organisation on assignments, and no experience of significant changes on which to base comment. Two other individuals queried issues of confidentiality and these may or may not be included in the returns above.

A full summary and breakdown of the responses are included in appendix S. This chapter describes how the response data was handled and analyses the overall response to the questionnaires, including individual and grouped questions. The following chapter considers the response of various sample groups within the overall reponse.

HANDLING AND PRESENTATION OF RESPONSE DATA

For each returned questionnaire the data logged included :

- Details of the respondent as defined earlier.
- Their response to each individual statement, including null or alternative comments.
- The relevant change indicated in questionnaire 1.
- Any additional comments made specifically after questionnaire 2 or incidentally elswhere.

The aggregate response to each questionnaire statement is summarised and presented as a histogram with tabulated totals, and as the sample mean and standard deviation values evaluated on the scales discussed above. (Figures S6 and S7, in Appendix S, present these summaries for questionnaires 1 and 2.)

In analysing and comparing responses later, the sample means are used extensively for rating and ranking problem levels perceived in relation to FWEL. For questionnaire 1 this is a rating on the scale of 1 to 4 from least to most problematic. For qustionnaire 2 this is a rating on the scale from 1 to 7, ranging from least to most problematic, or most to least agreed with, depending on the context. For shorthand the phrase "... the statement,
[or group of statements], whose mean response yielded the most [least] problematic perception ..." will simply become "... the most [least] problematic statement [or response, or issue] ..." throughout the following analysis.

Figure S8 summarises the changes indicated in response to questionnaire 1.

Figure S9 summarises the supplementary comments received.

OVERALL REPONSES TO THE QUESTIONNAIRES

On the whole responses were generally positive, that is grouped closer to the least

problematic end of the scales defind, and relatively few extreme individual responses were indicated. A significant number of additional comments and remarks were also received. I concluded that the questionnaires had been completed thoughtfully and that there was no reason to doubt the validity of responses.

With a survey of this nature, requiring voluntary effort by each respondent, we might expect a positively biased response in relation to the whole staff population.

Of the four respondents who identified no relevant change on which to base consideration of questionnaire 1, all four left that questionnaire entirely unanswered, and one also ignored the whole of questionnaire 2. Their null responses are included in average responses on the basis described above along with null responses to other individual statements.

OVERALL RESPONSES TO INDIVIDUAL STATEMENTS

The least and most problematic statements from each questionnaire are tabulated in figure S10.

QUESTIONNAIRE 1

The most problematic individual response, No.27, indicates that on the whole staff perceived that changes implemented had included only problems and no specific incentives for users in their implementation. Contrasting this with two of the least problematic responses, No.s 29 and 30, indicates that on the whole the effects of changes were perceived to be measurable even if most perceived that any benefits did not accrue to them.

Two of the next most problematic responses, No.s 22 and 23, reveal the perception that inadequate emphasis was given to training in connection with changes. This contrasts with two of the least problematic reponses, No.s 10 and 11, whereby staff perceived senior management enthusiasm for change and the committment of resources to implementing change. Also, two more of the least problematic responses, No.s 1 and 3, indicate that changes made have generally been perceived as successful.

The implications so far are that change has generally been initiated and implemented by senior management decree rather than by wider committment to it. Consistent with this is response No. 26, indicating a perceived problem with the level of discussion between staff and management generally in connection with change.

Another of the least problematic responses in questionnaire 1 was that to statement No.12, where most staff perceived performance appraisal as important to change management. Interestingly, a number of the qualified responses to this statement included ; "What has this to do with change ?" and "[It's important] only if it's done properly." This gives an indication that whilst performance appraisal is perceived as important it is not necessarily done well, certainly not in relation to change. I suspect a number of others who agreed with its importance may have left such qualifications unsaid. This point is significant as we move on to look at questionnaire 2 on the same basis.

OVERALL RESPONSES TO INDIVIDUAL STATEMENTS - QUESTIONNAIRE 2

Two of the most problematic responses to questionnaire 2, No.s 22 and 36, indicate that on the whole, performance appraisal is seen as infrequent and arbitrary. Several writers have indicated the need to include appraisal of change performance in general

performance appraisal. I believe this is supported by the general perception within FW. Furthermore, the survey seems to indicate a significant performance gap between the perceived importance of appraisal and the experience of appraisal. Addressing this issue clearly holds significant potential for improving change management at FW.

Another problematic statement is No.12, which indicates that in general most staff consider that they deserve greater financial remuneration. Whilst this is perhaps predictable behaviour in response to the statement posed, it does indicate some potential
for linking appraisal of change performance to valued financial incentives. Significantly however, this question also yielded the flattest response, with a standard deviation of 1.68 compared to around 1.0 to 1.3 for most other responses and 2.0 for a theoretically uniform response. This clearly indicates, if further evidence were needed, that financial rewards are not the only valued motivator. This does not however undermine the implied potential in performance related rewards.

On the subject of motivation, several of those statements most agreed with, indicate the perception that individuals and teams are motivated to achieve good performance. No.17 specifically suggests that individuals consider the work itself motivating. No.s 16, 27, 37 and 40 all confirm the impression of motivation, but give no indication of the source of motivation.

Whilst on the whole individuals find the work motivating, there is strong disagreement with statement No.32 that all tasks are ncessary and effective. Not surprisingly therefore,
in response to statement No.23, there is the general perception that individuals would like to make changes to their work, coupled with the reassuring perception, in response No.31, that the organisation possesses the capacity to change.

One area where individual perceptions indicate no problem is in relationships with people around them, with statements No.11 and 19 being the two most agreed with.

There is an interesting difference between the response to statement No.1 "I understand the objectives of FW", which was one of the most agreed with, and statement No.25 "FW's priorities are understood by its employees", which was one of the most disagreed with. This looks like a behavioural issue associated with the questionnaire itself, and the wording of statement No.1. So far as an individual knows FW's objectives, it is difficult to admit not understanding them, even anonymously, and even recognising the different view of others. I note that when I trial completed the questionnaire myself, I too exhibited this behaviour.

Alternatively, if we accept individuals' objectivity in their response, the general positive bias in the overall response may mean that, in general, those who responded do indeed identify more with corporate aims than those who did not. Either way, my conclusion here is to suspect that FW's priorities and objectives, other than current project objectives, are not generally well understood.

Finally, in this section on responses to individual statements in questionnaire 2, the single
most problematic statement, No.28, and two of the others most disagreed with, No.s 14 and 30, are management criticisms.

The perception that "encouragement and recognition are not given for all tasks at FW" is a concern for motivation whose only conceivable consolation is the possibility that inclusion of the word "all" made it subtly too extreme to attract general agreement. The other two problem statements criticise "senior management style" as innefective and unhelpful, and leadership of "the management team" as innefective and uninspiring. A

number of the general comments received, presented in appendix H, also reinforce this perception

One concern with these criticisms based on perception is to establish who is being criticised. The lack of encouragement and recognition may be aimed at colleagues and peers as well as immediate supervisors and higher management, although we should bear
in mind that most perceived good relations with those around them.

I would surmise that most individuals include management higher than their immediate supervisor when referring to senior management and the management team. This is borne out by the contrast with statement No.s 5, 6 and 38 which drew consistently more favourable responses in relation to "my boss" on similar issues. Clearly this issue can be analysed further later when looking at diferences in response across different levels in the
organisation.

A second problem here is to decide if it matters whether such criticisms are based on real
or perceived problems. Clearly it does matter, in the sense that a different problem may demand a different solution, but either way a problem is indicated. If the criticisms are not founded in real objective issues of management style, then the problem may be a perception of "us and them", whoever the management team is perceived to be. Again, if not, we will need to consider what they are based on.

OVERALL ANALYSIS OF GROUPED STATEMENTS

We have analysed the overall response to individual questionnaire statements only where
their average ratings were the more extreme. There nevertheless appear to be some themes emerging concerning problem areas. In order to take account of responses to all statements not just the most extreme, it is necessary to group the responses. Carnall, on whose checklists the questionnaires are based, proposes a grouping applicable to each questionnaire based on the issues reflected in each statement. As we shall see several of the themes already identified recur in these groupings.

THE ISSUES IN QUESTIONNAIRE 1

According to Carnall, for questionnaire 1, concerned specifically with planning and managing changes, statements represent groups relevant to the folllowing issues :-

TRACK RECORD (No.s 1, 2 and 3). Has past change been successful, resisted, misunderstood, met with caution ?

EXPECTATIONS (No.s 4, 5 and 6). Does everyone know what to expect from change, are the objectives clear ?

OWNERSHIP (No.s 7, 8 and 9). Who identifies with the change; staff,

management or is it just procedure ?

TOP SUPPORT (No.s 10, 11 and 12). Are top management supportive, do their actions match the perception ?

ACCEPTABILITY (No.s 13, 14 and 15). Is there a fit between current work, future aims and planned change ?

PLANNING (No.s 16, 17 and 18). Are change plans clear and achievable, are responsibilities well defined ?

INTEGRATION (No.s 19, 20 and 21). Will the scope and pace of change be accommodated by the organisation ?

TRAINING (No.s 22, 23 and 24). Is appropriate training provided, is it correctly targetted ?

COMMITTMENT (No.s 25, 26 and 27). Will the manner of implementation create ownership and committment ?

FEEDBACK (No.s 28, 29 and 30). If the benefits will accrue slowly or to others, will users see them ?

STRESS (No.s 31, 32 and 33). Is it recognised, how will problems be handled in the "coping cycle" ?

THE ISSUES IN QUESTIONNAIRE 2

For questionnaire 2, concerned with organisational performance as a whole, Carnall arranges responses to the statements into 8 groups of 5 as follows :-

KEY TASKS (No.s 1, 9, 17, 25 and 33). Are the basic objectives defined and work tasks meaningful ?

STRUCTURE (No.s 2, 10, 18, 26 and 34). Are there problems with the organisation and structure of tasks ?

RELATIONSHIPS (No.s 3, 11, 19, 27 and 36). Are there problems with the way staff relate to one another ?

MOTIVATION (No.s 4, 12, 20, 28 and 36). Are there problems with encouragement, recognition and reward ?

SUPPORT (No.s 5, 13, 21, 29 and 37). Are there problems with organisational support ?

LEADERSHIP (No.s 6, 14, 22, 30 and 38). Are there problems with management style and leadership ?

ATTITUDE (No.s 7, 15, 23, 31 and 39). Do staff have an attitude problem towards change ?

PERFORMANCE (No.s 8, 16, 24, 32 and 40). Are there problems with performance and achievement ?

ANALYSIS OF GROUPED RESPONSES

On the basis of the above groupings the mean responses to each group of statements in both questionnaires are presented in figure S11. These are ranked in order from the most to least problematic issues as perceived by the aggregate sample. Perhaps not unexpectedly, the most and least problematic groups of statements include several of the
most and least problematic individual responses.

In connection with change specifically, the same issues arise in questionnaire 1 as perceived problems. For example ;

The two most problematic issues concern TRAINING in connection with change and implementation of changes in ways likely to achieve COMMITTMENT. Again also, this is contrasted with the fact that TOP SUPPORT for changes from management is not in doubt and must, in part at least, be responsible for the perceived success in implementing
specific changes.

The next most problematic issues were perceived to be INTEGRATION and ACCEPTABILITY. These indicate possible problems with changes not being perceived to fit with wider goals and objectives or previously defined tasks, or problems with introducing specific changes too fast on too wide a scale.

Three of the least problematic issues were perceived to be the TRACK RECORD in actually implementing changes, the generation of FEEDBACK from changes, and the PLANNING of changes. The success in actually planning and implementing specific changes should be expected in an organisation whose core operation is project management.

On the whole questionnaire 1 did not exhibit a wide spread of ratings for the mean response to grouped questions. Such trends as are indicated however, appear consistent with the analysis of the more extreme responses.

Looking at the mean grouped responses for questionnaire 2, also presented in figure S11,
we see again the issues of MOTIVATION, LEADERSHIP and organisational SUPPORT perceived as most problematic. Conversely, Individuals see the definition of KEY TASKS and objectives, the general ATTITUDE towards change and their RELATIONSHIPS with others as least problematic.

Generally again, the analysis of grouped statements reinforces the analysis of individual statements without highlighting any new issues and it is now possible to summarise the overall response to the survey :

SUMMARY OF THE OVERALL SAMPLE RESPONSE ANALYSIS

Having analysed the overall sample mean responses to individual and grouped statements, we are in a position to summarise the analysis of ovearll staff perceptions. A number of themes and key issues have arisen, several of which are common to both questionnaires. In summary :

* Planning and implementation of identifiable changes in the recent past are perceived to have been successful.

* The support from top management for such specific changes is

perceived to have been enthusiastic and this has contributed to such success.

* There is perceived to be an underlying recognition of the need for further change and an implicit desire for involvement in it.

* Problems are perceived concerning involvement with and committment to changes experienced, possibly related to inappropriate use of training and feedback, though feedback in itself is not perceived as a problem.

* The style of management and leadership is perceived to be discouraging, which conflicts with management enthusiasm for specific changes and which acts against the apparent positive attitude to further change.

* Problems are perceived with motivation generally and specifically with incentives to generate change. There is evidence to link this with ineffective use of performance appraisal, reward and recognition.

* There is a perception that corporate goals, wider than immediate project objectives, are not widely recognised.

CHAPTER 7 - SURVEY ANALYSIS ACCORDING TO RESPONDENT SAMPLE GROUPS

ANALYSIS OF REPONSES FROM DIFFERENT RESPONDENT SAMPLES

All the previous analyses have been based on the mean responses from the overall sample of 90 respondents, looking first at individual questionnaire statements and then at grouped statements relevant to particular issues. We can get information about how responses vary for various groups within the sample by sorting according to the various attributes defined earlier for each respondent and calculating mean responses within each
sample group.

There is no specific requirement in the stated objectives to analyse particular groups, but any significant response differences may warrant different conclusions and recommendations concerning that group. The main objectives here in analysing different sample groupings are firstly, to establish the extent to which the overall sample is representative of the overall population, and secondly, to establish the extent to which the overall mean responses reflect general perceptions or merely the average of more diverse perceptions of different groups of the population.

THE SELECTION OF SAMPLE GROUPINGS

The overall sample responses were sorted according to each of the respondent attributes recorded earlier and according to the change indicated in connection with questionnaire 1. Against each of these axes, the sample was grouped into bands which were contiguous across the whole sample, and which maintained useful sample sizes within each band so far as practicable.

Analysis of responses to individual statements was going to be impractical across multiple groupings and therefore all considerations of useful sample size were based on subsequent analysis of groups of three and five statements per issue. Using the arguments which led to the original overall sample size, the target was to select groups of not less than 15, although groups of 10 only could be considered useful in analysing responses to questionnaire 2.

Because of the limited objectives in analysing the group samples there was no intent to establish significant correlations between groupings on different axes, nor sub-groups within groups. In looking at responses from different smaller sample groups to different issues it was useful to bear in mind the sample mean confidence intervals implicit in the data. The analysis includes references where applicable to approximate estimates of the 90% confidence intervals related to the actual sample sizes and sample standard deviations.

GROUPINGS ACCORDING TO CHANGES INDICATED

Respondents indicated relevant recent changes in response to questionnaire 1, the change audit. These are summarised in figure S8, and discussed below. An important point to bear in mind during the subsequent analysis is that the responses give us no indication of the individual's role in the change indicated, other than that they experienced it and thought it relevant to the survey.

Apart from those 6 respondents who identified no relevant change, only 7 changes were

identified by more than one respondent. The groupings of change indicated are as follows:

CHANGE INDICATED "SWIPE"

16 people referred to the introduction during the previous year of an electronic swipe card system, as a combined replacement for security passes and manual clocking-in cards
for all employees. As far as individual users' activities are concerned , practical effects ofthis change are limited to eliminating a few minutes effort each week manually calculating and reporting their hours attended at the office. The system automatically generates such records for management, and permits interested individuals to interrogate
their own hours recorded so far. For supervisors and administrators, checking of manually
completed clock-cards is replaced with the task of checking and reconciling system error reports.

CHANGE INDICATED "DMS"

Interestingly, the next most frequently indicated change reflects the other side of the same coin. 14 people indicated the introduction and upgrade of a project management information system. The Document or Deliverable Management System (DMS) was first introduced over four years prior to the survey and since then has been introduced onto most projects and has undergone a couple of upgrades. The system impinges on all staff involved in project operations, who must individually allocate and report their hours spent
against work breakdowns and subdivided activities associated with deliverables within the DMS. Prior to introduction of this system, reporting of activities at levels lower than overall contract and account codes was the exception rather than the rule. For line managers, project managers and supervisors, the DMS is one, if not the, key means of planning activities, allocating manpower resources and budgets and the monitoring and controlling subsequent progress. In some areas, the definition of tasks within the system are being linked to specific procedures and work instructions for quality management purposes, and to higher level planning and estimating activities. Like any powerful MIS, its value relies on detailed planning, reporting and forecasting by those involved at the individual task level. This is the other main area where DMS impinges on the activities of most individuals in involved in project operations.

CHANGE INDICATED "TQM"

9 respondents indicated as their subject change, the introduction during 1989 of a Juran based Total Quality Management program. This has so far involved setting up of a Quality Council, several Quality Improvement and Action Teams and numerous Quality Circles. In part at least, its introduction stemmed from recognising its importance to major clients, but also from internal recognition of its potential for making operational improvements. Having adopted TQM is almost certainly a marketing success, and in fact much of the language of TQM has become accepted curency throughout the company and on projects. It is quite normal to refer to "TQM facilitators", "team building", "internal customers" and "opportunities" as opposed to problems. The jury must remain out concerning the extent to which significant tangible benefits have accrued, but it is still relatively early days to expect dramatic improvements. Despite frustration in some quarters, there remains high level recognition that TQM not only holds enormous potential

for change, but also that tangible benefits may need to be preceeded by less tangible cultural changes. To some extent, the brief for this project stems implicitly from this latter point.

(With a sample of only 9 groups of 3 or 5 statements, the 90% confidence interval for sample mean responses is estimated to be around +/- 0.33 on each of the scales defined.)

CHANGE INDICATED "LRQA"

Another 9 respondents selected another quality related change; accreditation of our operation by LLoyds Register according to BS 5750 Quality Systems. More so than with TQM, this was a directly market driven change. The organisations we were dealing with and important competitors were becoming accredited and there was a danger of this becoming a definite diasadvantage in the market place. FWEL has operated systems and procedures satisfying much of the intent of BS 5750 or ISO 9000 since before such standards existed. This quality image had in fact probably given FWEL certain competitive
advantage prior to widespread accreditation. Individual involvement with this change varied enormously. Some were heavily involved in a major "facelift" given to all our existing contract execution procedures. Most if not all individuals will have been exposed to the published revisions to these procedure. To a greater or lesser extent many have been involved in preparation for and participation in increased audit activities, prior to during and since accreditation.

(The same comment applies to the sample size as TQM above.)

CHANGE INDICATED "PC/IT"

15 respondents indicated IT changes. This included 4, who referred to the widespread introduction of Personal Computers (PC's) for general purpose use, whilst the remainder indicated 11 different specific IT changes affecting their own areas of work. Only one referred to the widespread introduction of "PDS" 3D CAD modelling as the main design tool on current projects. Only one referred to the recent introduction of, so called, "intelligent flowsheets" as a project engineering tool on some recent contracts.

OTHER CHANGES INDICATED

Changes indicated by the remaining 21 respondents are lumped together as the "REST" for later analysis.

Of these, 5 identified the adoption of an American Express (AMEX) based personal expense account system to replace the existing internal system.

3, all from Project Engineering, identified the reorganisation which merged their department under the Engineering and Computer Aided Design department.

5 others identified structural changes; various separate group reorganisations and one personal assignment change.

The remaining 8 identified different procedural changes, such as the introduction of specific new systems or practices into specific groups.

It is relevant to note at this point the nature of the changes indicated as relevant by more
than one respondent. Three of the changes indicated are administrative or control systems (SWIPE, DMS and AMEX), and two are quality management initiatives (TQM and LRQA), the other being a structural change. None are operating systems.

Clearly we might expect a larger sample from the administrative changes simply because they directly affect most of the population. Whilst this finding does not in itself indicate a low level of operational changes, it does nevertheless seem to indicate a lower general emphasis on these as perceived by the staff population.

GROUPINGS ACCORDING TO SEX (Refer figure S3)

Not much mystery here about the groupings. In fact the response included 76 men and 14 women and hence these form the two groups analysed. This reflects a very similar response rate between the sexes, 58% for women, 54% for men. The target sample was also very uniformly distributed according to the distribution of the sexes in the population, 15% women and 85% men. The overall response sample analysed earlier is therefore very closely representative of the mix of sexes within the staff population.

GROUPINGS ACCORDING TO STAFF GRADE (Refer figure S2)

With 20 different staff grades represented in the population and the target sample, the response sample includes widely ranging response rates and sample sizes for each individual grade.

Firstly, consecutive grades were grouped to provide useful sample sizes as follows :

Grades 18, 19 and 20 formed a sample of 11
Grade 17 formed a sample of 15
Grades 15 and 16 formed a sample of 21
Grades 12, 13 and 14 formed a sample of 14
Grades 10 and 11 formed a sample of 18
The remaining grades 0 to 9 formed a sample of 11

Even having done this, the response rate and population proportions vary significantly between groups. For example :

The higher grades 17 to 20 had a higher response rate of 73% to 75% compared to 55% overall, whereas grades 12 to 14 and 0 to 9 yielded a lower response rate of 34% to 45%. Whilst this is in itself of interest in terms of identifying the most positive response behaviour amongst the higher grade staff, the effect on the representative nature of the overall response needs also to take into account the bias in the target sample.

As noted earlier, grades 12 and 13 were already under represented in the target sample. The net result is that the overall response analysis presented earlier is biased towards the
grade 18, 19 and 20 group, and under represents the 12 to 14 and 0 to 9 groups. We need to bear in mind also that staff grade is only an imperfect indicator of organisational level.

GROUPINGS ACCORDING TO AGE (Refer figure S4)

Responses were first grouped into age bands of useable sample sizes.

Those up to and including 25 years of age last birthday

formed one group of 15.
Those 26 to 35 years formed a group of 18.
Those 36 to 40 years formed a group of 13.
Those 41 to 45 years formed a group of 16.
Those 46 to 50 years formed a group of 11.
Those 51 and over formed the remaining group of 17.

The response rate across the age groups was quite uniform, ranging from 49% to 59% compared to 55% overall, except for the 41 to 45 year band which yielded a 76% response. Taking into account the original bias in the target sample, the overal population was uniformly representative of the population age bands, with a slight bias towards those in the 36 to 45 year groups being over represented.

GROUPINGS ACCORDING TO LENGTH OF SERVICE (Refer figure S5)

As with the other groupings, the response sample was grouped into bands which provided useful sample sizes.

Those with 1 to 2 years service completed formed the first group of 25.
Those with 3 to 5 years service formed a group of 12.
Those with 6 to 10 years service formed a group of 22.
Those with 11 to 15 years service formed a group of 16.
Those with 16 and over years formed a group of 15.

There was some variation in response rate; the 6 to 10 and the 16 and more year bands yielded 69% and 65% responses compared to the overall rate of 55%.

The overall response sample was uniformly representative of the population, except for a bias towards the 6 to 10 year band being over represented. Because of a deliberate bias in the target sample, the response did not include those with less than one years service completed at the time of the survey.

GROUPINGS ACCORDING TO DEPARTMENT (Refer figure S1)

Departments do not fall into neat groupings, and several smaller individual departments yielded very small response samples. It was not generally possible to create artificial groupings of useful sample size, as was the case with other groupings. Those groups analysed are summarised as follows :

The Glasgow and Glasgow assigned departments, 111 and 112, formed one small group of 8 responses.

The Process Engineering department, 152, yielded another small sample group of 7 responses.

The Engineering and Computer Aided Design department, 153, is the largest department and yielded the largest sample group of 38 responses.

The Materials Management department, 165, incorporating purchasing, inspection and shipping groups, provided a useful sample group of 11 responses.

The Home Office and Field Construction departments, 193 and 196, yielded another small sample group of 5 responses.

The remainder formed a group of 21 responses.

Both the Glasgow (111/112) and Construction (193/196) departments yielded below average response rates of 44% and 42% compared to 55% overall. Construction departments response rate as recorded is depressed by two of their target sample who failed to receive their questionnaires in time, whilst assigned to more obscure locations. Unfortunately, Construction were also somewhat under represented in the randomly selected target sample. The low response from Glasgow may be connected with two queries of confidentiality originating from there.

The net result is that the overall sample is clearly dominated by the largest department; Engineering and CAD. The overall sample is in fact biased towards both this dept and to Materials Management department, whilst both Glasgow and Construction departments are under represented.

The sample sizes of response from Glasgow, Process and Construction departments are too small to draw much significance from their mean responses.

ANALYSIS OF RESPONSE FROM GROUP SAMPLES

For each of the sample groups described above, mean responses were evaluated from the aggregate response to each defined group of statements relevant to a specific issue, in the same way described earlier for the overall sample.

These mean responses for all sample groups for all groups of statements are presented in a single table; figure S12. In this figure responses are tabulated within each questionnaire in the same ranking from most to least problematic issues derived from the
overall analysis. By highlighting the two most and the two least problematic issues according to the perception of each sample group in this table, comparison between the ranking of issues according to each sample group and the overall sample is facilitated.

Several alternative graphical representations of this data were investigated, involving either large numbers of individual histograms or fewer multivariate histograms. I concluded that none were any easier to interpret and compare across the groupings than the tabular form. Clearly if specific comparisons or correlations warrant further analysis, then specific graphical presentations may prove more useful and the data remains available to generate these at a later date.

The following analyses are therefore based on the data tabulated in figure S12.

GENERAL OBSERVATIONS ON SAMPLE GROUP RESPONSES

The first point to note is that the general rankings from most to least problematic issues according to the perceptions of each sample group is much the same as the overall sample. The following are three examples of the extent to which this is true :

Firstly, there are no exceptions to the statement that the top 2 most problematic issues in any of the 32 sample groups in either questionnaire are always ranked more highly in the overall sample than the 2 least problematic issues in the same sample group.

Secondly, there are only 2 exceptions to the statement that 3 out of the 4 most

problematic issues in any sample group of responses to questionnaire 1 are ranked amongst the four 4 problematic issues in the overall sample. Furthermore in 12 of the 32 sample groups, all 4 issues fall in the overall top 4.

(Interestingly, for 12 of the 17 groups where only 3 of their top 4 fall in the overall top 4, the 4th ranked issue is STRESS, the 5th most problematic issue in the overall sample. As noted earlier, this issue incorporates reponses to individual statements 31 and 33, whose evaluation on the scale adopted was most suspect, depending on an assumption about the individual's role in the change.)

Thirdly, there is only 1 exception to the statement that 2 out of the 3 most problematic issues in any sample group responses to questionnaire 2 are ranked amongst the 3 most problematic issues overall. Furthermore, 25 of the 32 groups have the same top 3 issues as the overall sample.

Having said that, a number of exceptions and trends are observable amongst the sample groups:

RESPONSE DIFFERENCES ACCORDING TO CHANGES INDICATED

The mean responses from the sample indicating the TQM change were generally less problematic than the overall reponse for both questionnaires.

As a well publicised initiative, whose objectives have been the subject of numerous presentations and communications within the company, there are relatively low problems
perceived with the issues of COMMITTMENT, INTEGRATION and ACCEPTABILITY. Perhaps not unsurprisingly, TQM scores relatively badly on issues of TRACK RECORD and FEEDBACK, consistent with a perceived lack of tangible benefits.

The sample indicating the LRQA change produced the lowest average level of perceived problems in questionnaire 1, although it exhibits virtually the same relative ranking of problem issues as the overall sample. Particularly low perceived problem levels were indicated for the issues of ACCEPTABILITY, EXPECTATIONS, PLANNING and TOP SUPPORT. This was a change whose success and schedule were known by all to be of the highest importance to top management and to FW's position in the market.

The response from the sample indicating the SWIPE change also reflects the nature of the change and its implementation. FEEDBACK was the least problematic issue, but then the system provides some immediate feedback to those interested. It gave the 2nd lowest STRESS rating, but then it involved minimal new activities for most users. Interestingly, it scored above average perceived problem levels for the issues of COMMITTMENT, ACCEPTABILITY and EXPECTATIONS, but then the success of a change with minimum tangible impact on users does not necessarily demand high levels of committment and understanding of its fit with wider objectives.

The DMS change reponse yielded the highest perceived problem levels for questionnaire 1. The system involved in this change is now widely active and hence successfully implemented. This is reflected in the relatively low perceived problem level for TRACK RECORD. Nevertheless FEEDBACK yields a relatively high problem level, probably reflecting a significant body of users who remain sceptical about its benefits outweighing the extra effort and discipline. This too is consistent with the higher than average problem ratings perceived for the issues of COMMITTMENT and ACCEPTABILITY and the highest perceived problems with STRESS. Despite higher than average problem ratings for the DMS change, TOP SUPPORT still yields one of the least problematic ratings, reflecting that users are nevertheless well aware of the importance that higher

management attach to this system.

In questionnaire 2, the change indicated is not directly relevant, but reflects firstly, the particular groups of individuals who saw each change as relevant in the previous questionnaire, and secondly, the extent to which perceptions specific to the change are carried forward to the general issues in questionnaire 2.

In fact, responses to questionnaire 2, the organisational diagnosis, vary little with the change indicated in questionnaire 1. The only significant observation is that those who indicated the DMS change also yielded higher than average general problem ratings for questionnaire 2. This group yielded the most extreme perceived problem levels for the issues of LEADERSHIP and MOTIVATION, which appears quite consistent with this group's perception of the DMS change.

RESPONSE DIFFERENCES ACCORDING TO SEX

As the dominant sample, response to both questionnaires from the men more or less reflect the overall sample analysed earlier.

Women perceived higher average problem levels for both questionnaires. Both sexes agreed on the four most problematic issues in questionnaire 1, but women perceived COMMITTMENT and ACCEPTABILITY issues of specific recent change as significantly more problematic.

Women also considered STRESS as least problematic, which could reflect either that women are more tolerant of pressure, or that women in the organisation are less exposed
to it. The survey sample summaries in appendix S show that the distribution of womens roles are skewed into certain grades and departments, however to pursue any correlations and causal connections is beyond the scope of this dissertation. (Remember also that responses concerning the STRESS issue are of more doubtful significance due to survey limitations.)

In questionnaire 2, women are also unique as a group in perceiving the definition of KEY TASKS and objectives as one of the most problematic issues. The fact that the women do emphasise different issues from men supports the idea that encouraging women into a wider range of roles and levels can only improve the balance of issues addressed in future decision making.

DIFFERENCES ACCORDING TO STAFF GRADE

With perceived problems of management style, LEADERSHIP and MOTIVATION as key themes emerging, any pattern or trend in perceptions across levels in the organisation would be of particular interest.

In questionnaire 1, the change audit, those in the hihest grades, 18, 19 and 20, yielded higher than average problem ratings but this does not seem to reflect any general trend across the grades. Significant differences in the general ranking of issues include the fact that ACCEPTABILITY and STRESS are elevated to the top two perceived problem issues for grades 17 to 20.

In questionnaire 2, the organisational diagnosis, there are differences across grades, but

again no clear trends are apparent. All except grades 10 and 11 perceive MOTIVATION and LEADERSHIP as the two most problematic issues. Grades 10 and 11 place SUPPORT and MOTIVATION as the top two problem issues and relegate the issue of LEADERSHIP below STRUCTURE and PERFORMANCE. The lack of any clear trend is illustrated by the fact that grades 1 to 9, 12 to 14 and 17 all perceive the issues of MOTIVATION and LEADERSHIP more problematic than do grades 10 and 11, 15 and 16, and 18 to 20.

DIFFERENCES ACCORDING TO AGE AND YEARS SERVICE

These two groupings are analysed together because they exhibit very similar patterns, probably reflecting a correlation between age and length of service.

In questionnaire 1, the two most problematic issues concern TRAINING and COMMITTMENT for ages up to 35 years and all lengths of service up to 10 years. Above these bands, there is a general reduction in average problem levels received, bringing issues of INTEGRATION, ACCEPTABILITY and STRESS to the top of the list of problems.

In questionnaire 2, the three most problematic issues remain MOTIVATION, LEADERSHIP and organisational SUPPORT across all bands of age and all lengths of service, except those 46 to 50 years of age. The three issues perceived as least problematic, RELATIONSHIPS, ATTITUDES to change, and the definition of KEY TASKS and objectives, also remain the same across all bands, except for those over 16 years service where issues of structure are perceived less problematic.

DIFFERENCES ACCORDING TO DEPARTMENT

There are observable differences in response across departments, but the dominant samples from departments 153, 165 and the REST (excluding 111, 112, 152, 193 and 196) agree most closely with the overall ranking of problem issues. The more marked differences are yielded by the less significant samples, department groups 111/112, 152 and 193/196.

Of the more significant samples, Engineering and CAD department (153) yielded the highest average perceived problem levels for questionnaire 1, the change audit. Of the less significant samples, Process Engineering department (152) perceived the highest average problem levels.

Glasgow departments (111/112) indicated COMMITTMENT and INTEGRATION as their most problematic issues, which would be consistent with a general perception that Glasgow tend to be less involved with Reading originated changes. It is worth noting at this point that the voluntary response rate to the questionnaire was particularly low from Glasgow.

Process Engineering department (152), also one of the smaller less significant samples, yielded the highest average perceived problem level for questionnaire 1. It was however also a particularly flat response, such that even the two issues perceived as least problematic, TRACK RECORD and TOP SUPPORT, are in fact rated more problematic than even the average problem ratings of most other groupings.

In questionnaire 2, the two most significant samples from Engineering and CAD department (153) and Materials Management department (165), show the highest perceived problem ratings for the MOTIVATION issue. Also in questionnaire 2, department 152, Process Engineering, was unique in ranking ATTITUDE to change equal to LEADERSHIP as the most problematic perception, relegating MOTIVATION to third place.

GENERAL CONCLUSION FROM SAMPLE GROUP RESPONSES

The general conclusion from this section must support the general observation at the start of the analysis of sample group responses, namely that the ranking of perceived problem issues is uniform across most groupings. This can only reinforce the impression that the analysis of the overall response does reflect generally held perceptions.

A possible alternative conclusion, which I believe should be discounted, is that the design and execution of the survey is unsatisfactory and is perhaps unable to separate the issues involved. The responses could merely reflect some other random scatter of responses associated with surveys of this type rather than the specific statements and issues.

Faith that the survey does indeed reflect perceptions concerning the issues under analysis
was confirmed in particular by the variation of responses according to the change indicated. Significant variations in the change audit perceptions as a function of the change seemed to fit most plausibly with my own ab-initio experience of the specific changes, quite separate from the questionnaires themselves. Furthermore the rankings of responses to questionnaire 2, the organisational diagnosis were particularly uniform across the same grouping. This was entirely consistent with the prior statement that the response to the organisational diagnosis should not be directly dependant on the change indicated in the change audit.

CHAPTER 8 - DISCUSSION AND CONCLUSIONS

Part of the objective stated in the introduction was to identify FWEL's strengths and weaknesses in relation to the management of change.

The strengths can be summarised under four headings:

- Project Management
- Project Culture
- Networking
- Total Quality Management

The weaknesses will be discussed under also under four headings:

- Bureaucratic / Role Culture
- Management Style
- Corporate Identity
- Performance Appraisal

STRENGTHS - PROJECT MANAGEMENT

The implementation phase of any change whose intended outcome can be pre-defined in terms of deliverables can be managed as a project. Project management is a core aspect of FWEL's operation and we should not be surprised to find this a strength in the management of change. Visible top management support and clear planning have contributed to successful implementation of specific changes.

STRENGTHS - PROJECT CULTURE

As well as the mechanics and skills of project management, a general feature of the operation is that most functions are project based. The majority of the workforce is accustomed to a fresh start on each new project assignment. This break with the old is particularly clear-cut for those physically assigned to new task forces. Many things about the new role will be the same as the old, but the start of each new assignment is a trigger to ask what's new. The start of each new project is also the natural opportunity to introduce new systems.

This does not in itself overcome the natural fear of uncertainty in any new features of a new project, but staff are used to having to cope with it. This feature too may also contribute to the relative success in implementing specific managed changes and to the positive attitude towards change perceived by individuals.

A counter feature however is the natural effect that in order to have a necessary level of continuity from project, and in order not to reinvent too many wheels each time, there is the need for formalised systems and contract execution procedures against which tasks are planned and controlled.

STRENGTHS - NETWORKING

The regular setting up and disbanding of project teams means that individuals meet a range of opposite numbers in different groups with which they must interface on each project. Groups of individuals who gain good experience of team members on one

project have made useful contacts to draw on informally when difficulties arise on later projects.

This feature can at least partly explain why individuals generally perceive satisfactory interpersonal relationships whilst experiencing some remoteness from members of their home department and line management.

STRENGTHS - TOTAL QUALITY MANAGEMENT

The current TQM initiative already represents a significant investment in financial and human capital. I am not able to claim from this project that there is evidence of tangible success in TQM, but it is an undoubted asset in the management of change.

Key aspects include identifying relevant indicators of performance by open brainstorming, monitoring and evaluating the indicators, diagnosing problems and opportunities, evaluating and selecting courses of action and so on. The aims and philosophies of TQM are entirely consistent with the management of change

In addition to the techniques and tools of change management, TQM also recognises the importance of less tangible elements like culture and commitment, even if it does not itself provide prescriptions for managing these.

WEAKNESSES - A BUREAUCRATIC ROLE CULTURE

We have already noted that the range of specialist disciplines and functional titles in the organisation tend naturally to indicate a role culture. Even before quality management systems became widely formalised, health and safety aspects of the operation demanded clear definition of authority and responsibility for technical decisions of all kinds. Extensive procedures and administrative controls are a natural consequence.

As IT spreads into the work processes and control systems, the controls can take on the flavour of direct technological control. When it does, the balance between control and discretion moves towards control, and it becomes increasingly difficult to buck the system. I consider that these lines of argument can explain some of the perceptions of an impersonal bureaucracy.

It seems almost unnecessary to point out that such a culture is a weakness when trying to encourage creativity and innovation.

WEAKNESSES - MANAGEMENT STYLE AND LEADERSHIP

Another inescapable weakness is the fact that management styles and leadership are perceived to be ineffective and even discouraging.

We noted that questionnaire statements referring to "my boss" drew generally more favourable ratings, implying that the perceptions were levelled mainly at higher management, however this is not necessarily the whole story. Whilst some individuals' perceptions of "higher management" will be based on their direct experience of individual managers or directors, many will not. Some will no doubt be based on here-say and reputations, but it is quite possible that many could be attributed to a more anonymous image perceived through the culture of the organisation.

(Added 1994) Note also the later survey (65) of 80 staff members of one particular large department yielded extremely low ratings concerning the extent to which management

inspire leadership or any vision for the future - ratings so low as to place them in the bottom 15 to 20% of any management population sampled.

WEAKNESSES - PERFORMANCE APPRAISAL

Another motivational weakness identified concerns the perception that performance appraisal is infrequent and arbitrary. Linked to this perception is the perception that there is insufficient attention to reward, recognition and encouragement.

I believe the importance of performance appraisal in encouraging creativity and change is being overlooked. There is potential for linking such appraisal to rewards and recognition in general.

WEAKNESSES - CORPORATE IDENTITY

One downside of the project management strengths and the project culture is the weakening effect on corporate identity. Individuals identify with their current project(s) and for good project management reasons are encouraged to do so. For a large body of individuals, assigned to one project after another, links with line management and corporate aims can be greatly weakened.

It is not surprising therefore to find the perception, in both this survey and Paul Peters' survey (45), that corporate goals and performance are not widely recognised, and that corporate management appear somewhat remote.

CHAPTER 9 – RECOMMENDATIONS

Recommendations are proposed under four headings:

- Total Quality Management
- Measures of Performance
- Corporate Identity Program
- Management Development

TOTAL QUALITY MANAGEMENT – A ROSE BY ANY OTHER NAME

My first recommendation is quite simply that any of the following recommendations be explored and developed under the TQM banner using TQM tools and techniques. I have already stressed that TQM is an important asset for the management of change.
It would be entirely inappropriate to institute a further general program of change alongside or in place of TQM. To supersede TQM with a new initiative concerned with change and flexibility would be to replace it with TQM by any other name.

If there are perceived to be blockages to achieving success with TQM in the corporate sphere, as opposed to on projects, then these should be addressed directly.

MEASURES OF PERFORMANCE

As a short-term measure, awareness of the importance of performance appraisal of individual staff should be raised amongst all managers, who should be encouraged to ensure that existing arrangements are at least applied regularly.

In the longer term, measures of performance should be addressed more widely by an appropriate Quality Team. Those measures directly relevant to individual performance should become the basis of performance appraisal and performance related rewards. For example, If contributions to change and flexibility are valued by the company, then performance appraisal must reflect this. Ultimately rewards should be directly related to such performance indicators.

The concern with measures of performance is much wider than this however. We need to be concerned with the "performance gap", or the "cost of poor quality" in Juran TQM terms, across a whole range of values of importance to the company. Subsequent use of such measures in all appropriate applications can gradually define the cultural values within the company.

Carnall's "measures of effectiveness matrix" (17) presented in figure 8.1, may be used as a framework for brainstorming ideas relevant within FWEL. The important point is that we should aim to identify a whole range of measures that together give a balance between efficiency and effectiveness, between resources and objectives, and between the quantitative and the qualitative. It is a simple matter to identify quantitative effectiveness and efficiency objectives like profitability, growth, productivities and reject rates. It would be normal to find an existing imbalance of available measures in this direction and qualitative resource measures are needed to restore the balance.

All future Quality Teams will have this inventory of measures available on which to base assessment of other desirable improvements, and against which to monitor their

progress. If the performance of TQM activities is to be valued, they too need measures of performance.

CORPORATE IDENTITY PROGRAM

Corporate identity programs are credited with a whole range of operational, marketing and other benefits, and may comprise a whole range of elements, from the visual image of the corporate logo to the less tangible aspects of corporate culture (45) (43). We are not concerned here with the arguments for or against FWEL initiating a corporate identity program of this type, however the need to address the extent to which staff identify with corporate aims, is a clear conclusion of this project.

I recommend that another quality team be charged with the task of establishing a corporate communications program. The object would be to increase awareness of corporate aims and performance against those aims. It must draw on the measures of performance established above. It must also, where appropriate, raise awareness of the significance of specific aims in relation to FWEL's position and threats in the market and the environment in general.

Vehicles of communication should not be limited to one-way top down publications and presentations, but should also consider the use of more interactive discussions at group levels. In other words such communication must address understanding, commitment and involvement as well as information.

MANAGEMENT DEVELOPMENT

It is impossible that perceived problems with corporate leadership and management style can be seen here as specific actual problems with specific remedies. There can be little doubt however, that the perceptions are genuine and that they do represent a blockage to creativity and change which needs to be addressed.

We have already acknowledged that part of the problem may be a general perception of the culture rather than specific experience of individuals or groups of managers. Strengthening the image of a wider range of corporate values can go some way to improving this general cultural perception.

Perceived visibility and remoteness of line management from project assigned staff could only benefit from a simple recommendation that managers should increase their use of "management by walking around". A renewed attention to regular performance appraisal would also improve perceived visibility.

Reading the perceived criticisms of discouraging management style and ineffective leadership, managers may not openly recognise specific failings that they could correct. Understanding and accepting such problems as may exist would however be a pre-requisite for planning any remedial action.

Ensuring that the range of performance indicators explored above included qualitative management performance indicators is an essential step towards identifying such problems. A natural next step is to ensure such indicators are included in managers' performance appraisals. Management involvement in quality teams addressing management performance indicators may in itself also contribute to those managers recognising problems of management style.

In an organisation tending towards a bureaucratic role culture, it would be surprising not to find these development activities compromised by existing politics, organisational

defences (4) and various perceptual, emotional and cultural blockages (2). Performance indicators themselves will be prone to manipulation for diverse ends during definition, reporting and analysis. This is one reason for ensuring that the widest range of performance indicators is available and in use wherever appropriate.

Nevertheless, it may be necessary to address such cultural blockages directly, rather than expecting commitment to TQM and the establishment of clearer corporate values to generate a gradual change in the underlying values. There are no clear conclusions from this project as to how this might be achieved and there is every indication that this would be a far from easy process. It is beyond this dissertation to propose specific actions here.

CHAPTER 10 - CONCLUDING REMARKS

This project has been successful in achieving the stated objectives of identifying strengths and weaknesses in the areas of attitudes and culture relevant to the management of change at FWEL, and of identifying actions intended to exploit or mitigate these. This dissertation has presented findings which may be summarised as follows:

Concern with future change and flexibility at FWEL is a relevant current issue demanding attention with some urgency. FWEL must be ready to change in ways that cannot necessarily be predicted.

FWEL's Total Quality Management and Project Management resources provide powerful mechanisms for managing change, but successful change and flexibility rely on more than mechanisms. There are cultural weaknesses manifest in perceptions of bureaucracy, management style and corporate identity, which the recommendations address directly and indirectly.

As acknowledged at the outset, the subject was wide and encompassed most general management issues, many of which I have barely touched upon. Choosing to focus on attitudes and perceptions of culture and style has presented a challenge in objectivity of analysis and presentation.

The survey itself, which made direct use of checklists presented by Carnall (17), appears to have been successful in identifying the issues. Limitations arose from failing to establish each respondent’s role or involvement in the specific changes identified, and in the selection of sufficiently large samples from some of the groups of interest.

The actual response to the survey yielded no major surprises, however it provided essential data without which objective analysis of intangible issues in the FWEL context would have been near impossible.

There were two conclusions that interested me in their own right, quite apart from their future relevance to FWEL.

The first was the realisation of the close parallel between the management of change and TQM, although I did not followed up any links in the literature. It reinforced the impression that making TQM work is an essential component of future change and flexibility.

The second was recognising the culture of the FWEL organisation in my own choice of the organisational learning model of change as the starting point of my analysis. I was starting with a logical, rational system model against which the softer issues might be seen as secondary. It's the way we do things around here, or at least it has been.

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APPENDIX B. COMPANY ORGANISATION AND STRUCTURE

APPENDIX C. PROCESS PLANTS DIVISION STAFF PROFILE

APPENDIX D. THE STAFF SURVEY QUESTIONNAIRES

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APPENDIX S. SURVEY SUMMARY AFTER 90 RESPONSES

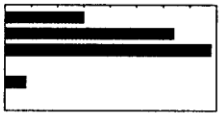
(The Survey Summary after 90 Responses below contains the original questionnaires together with all responses and stats pasted.)

Figure S.6 , QUESTIONNAIRE 1 : Bar graphs and numbers in boxes represent number of responses
(Equivalent to Appendix E)
Values in parentheses, Means, Standard Deviations and 90% Confidence Intervals., relate to the problem value on a scale from 1 (Least Problematic) to 4 (Most Problematic) as defined in Chapter 5.

Consider your general experience of changes within Foster Wheeler ;

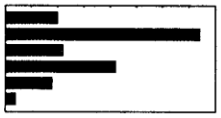
1. In general, new systems or procedures introduced in the past have been :

		Mean	SD	90CI
15	(1) a. Seen as meeting employees' needs			
32	(2) b. Not well understood			
39	(3) c. Greeted with some resistance			
0	(4) d. Vigorously resisted			
4	(4) No response	2.36	0.81	0.14
0	(4) Other response			



2. In general, employees may be best described as being :

		Mean	SD	90CI
10	(1) a. Innovative			
37	(2) b. Independant			
11	(3) c. Apathetic			
21	(4) d. Resistant to change			
9	(4) No response	2.72	1.06	0.19
2	(4) Other response			

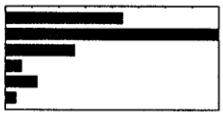


Now consider any specific recent or current change within Foster Wheeler ;

Indicate which change you have in mind ; **A summary of changes indicated is included in Figure S.8**

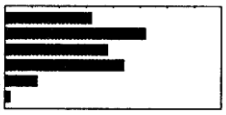
3. The change could be described as :

		Mean	SD	90CI
22	(1) a. An effective success			
44	(2) b. Moderately successful			
13	(3) c. Having had little obvious impact			
3	(4) d. Not successful			
6	(4) No response	2.14	0.93	0.16
2	(4) Other response			



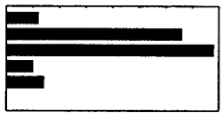
4. Expectations of what the change would achieve were :

		Mean	SD	90CI
16	(1) a. Consistent throughout FW			
26	(2) b. Consistent amongst management			
19	(3) c. Not at all consistent			
22	(4) d. Unclear			
6	(4) No response	2.68	1.10	0.19
1	(4) Other response			



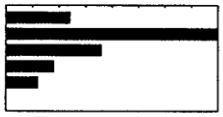
5. What description could those affected by the change give about FW's strategic objectives ?

		Mean	SD	90CI
6	(1) a. A full description			
33	(2) b. As it affects their own group			
39	(3) c. A general idea only			
5	(4) d. Little or nothing			
7	(4) No response	2.63	0.80	0.14
0	(4) Other response			



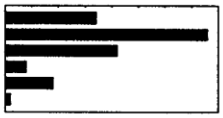
6. The required outcomes of the change were :

		Mean	SD	90CI
12	(1) a. Specified in detail			
45	(2) b. Outlined in general terms only			
18	(3) c. Poorly defined			
9	(4) d. Undefined			
6	(4) No response	2.40	0.92	0.16
0	(4) Other response			



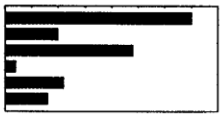
7. Existing procedures affected by the change were seen as requiring :

		Mean	SD	90CI
17	(1) a. Major change			
38	(2) b. Significant revision			
21	(3) c. Minor adjustment			
4	(4) d. No change			
9	(4) No response	2.36	0.96	0.17
1	(4) Other response			



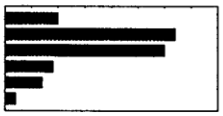
8. Any problems which the change was designed to deal with were first raised by :

		Mean	SD	90CI
35	(1) a. Those people directly involved			
10	(2) b. Supervisors or line managers			
24	(3) c. Senior management			
2	(4) d. Outside consultants			
11	(4) No response	2.34	1.21	0.21
8	(4) Other response			



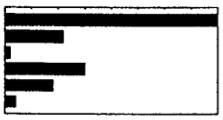
9. The change was viewed by end users as :

		Mean	SD	90CI
10	(1) a. Crucial to the organisation's future			
32	(2) b. Beneficial to the organisation			
30	(3) c. Largely a matter of procedure			
9	(4) d. Benefitting only some users			
7	(4) No response	2.62	0.93	0.16
2	(4) Other response			



10. Senior management support for the change was :

		Mean	SD	90CI
52	(1) a. Enthusiastic			
11	(2) b. Limited			
1	(3) c. Marginal			
15	(4) d. Unclear			
9	(4) No response	2.01	1.32	0.23
2	(4) Other response			



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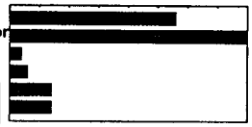
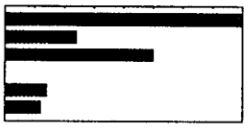
11. In order to implement the change senior management :

		Mean	SD	90CI
28	(1) a. Committed significant resources			
43	(2) b. Expected existing resources to actio			
2	(3) c. Withheld resources			
3	(4) d. Had not planned resources			
7	(4) No response	2.09	1.04	0.18
7	(4) Other response			



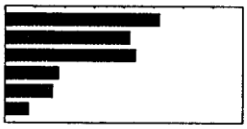
12. The process of performance appraisal of individuals, including managers, is :

		Mean	SD	90CI
40	(1) a. Important in managing development			
12	(2) b. Helpful in solving problems			
25	(3) c. Routine			
0	(4) d. An obstacle to improvement			
7	(4) No response	2.12	1.13	0.20
6	(4) Other response			



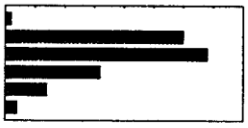
13. The change dealt with issues relevant to the current business plan :

		Mean	SD	90CI
26	(1) a. Directly			
21	(2) b. Partly			
22	(3) c. Only indirectly			
9	(4) d. Not at all			
8	(4) No response	2.42	1.14	0.20
4	(4) Other response			



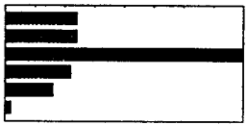
14. The change affects individuals' jobs by making them :

		Mean	SD	90CI
1	(1) a. More rewarding financially			
30	(2) b. Easier and / or more satisfying			
34	(3) c. Replace old tasks with new ones			
16	(4) d. More difficult			
7	(4) No response	2.92	0.81	0.14
2	(4) Other response			



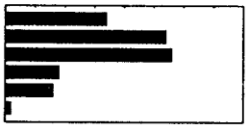
15. Technically, the scope of the change was :

		Mean	SD	90CI
12	(1) a. Very similar to other recent changes			
12	(2) b. Slightly different from other changes			
46	(3) c. Largely novel			
11	(4) d. Unclear			
8	(4) No response	2.82	0.93	0.16
1	(4) Other response			



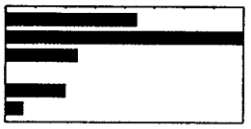
16. The implementation plan provided :

		Mean	SD	90CI
17	(1) a. Clear targets			
27	(2) b. Reasonable targets			
28	(3) c. Only broad objectives			
9	(4) d. No targets			
8	(4) No response	2.52	1.01	0.18
1	(4) Other response			



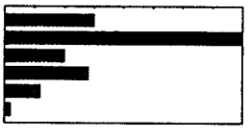
17. The likelihood of change deadlines being achieved was :

		Mean	SD	90CI
22	(1) a. High			
43	(2) b. Moderate			
12	(3) c. Low			
0	(4) d. Impossible			
10	(4) No response	2.18	0.96	0.17
3	(4) Other response			



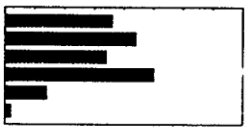
18. Day–to–day control of implementation was managed by :

		Mean	SD	90CI
15	(1) a. One specific person			
44	(2) b. Several specific individuals			
10	(3) c. No specific individual			
14	(4) d. Not sure			
6	(4) No response	2.41	1.02	0.18
1	(4) Other response			



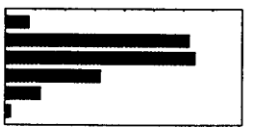
19. Implementation began :

		Mean	SD	90CI
18	(1) a. In one small section or group			
22	(2) b. In several sections or groups			
17	(3) c. Across a major project or division			
25	(4) d. Across the entire organisation			
7	(4) No response	2.72	1.15	0.20
1	(4) Other response			



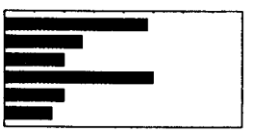
20. The plan introduced the change :

		Mean	SD	90CI
4	(1) d. Very slowly			
31	(2) c. Gradually			
32	(3) b. Rapidly			
16	(4) a. Virtually "overnight"			
6	(4) No response	2.82	0.86	0.15
1	(4) Other response			



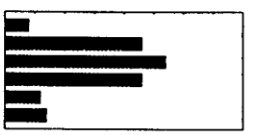
21. Those initially involved in implementation of the change were selected because :

		Mean	SD	90CI
24	(1) a. They were supportive of the change			
13	(2) b. They were committed to FW			
10	(3) c. They most needed the change			
25	(4) d. No apparent reason			
10	(4) No response	2.80	1.28	0.23
8	(4) Other response			



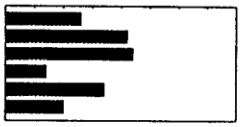
22. Training in connection with the change was provided mainly by means of :

		Mean	SD	90CI
4	(1) a. Outside training			
23	(2) b. Specific in–house training			
27	(3) c. New manuals or procedures			
23	(4) d. Not at all			
6	(4) No response	3.06	0.91	0.16
7	(4) Other response			



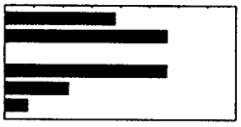
23. Such training was designed to :

		Mean	SD	90CI
13	(1) a. Solve specific problems			
21	(2) b. Involve users' initial experience			
22	(3) c. Inform a wider audience			
7	(4) d. Take no account of users			
17	(4) No response	2.86	1.08	0.19
10	(4) Other response			



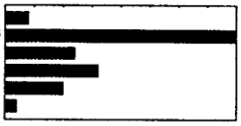
24. Such training involved :

		Mean	SD	90CI
19	(1) a. Only key end users affected			
28	(2) b. Everyone affected			
0	(3) c. Those other than the end users			
28	(4) d. No specific training			
11	(4) No response	2.74	1.25	0.22
4	(4) Other response			



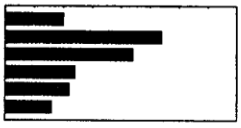
25. Any new system implemented by the change :

		Mean	SD	90CI
4	(1) a. Gives users full control of their tasks			
46	(2) b. Helps users better control their tasks			
12	(3) c. Reduces control by users			
16	(4) d. Exerts control over users directly			
10	(4) No response	2.71	0.96	0.17
2	(4) Other response			



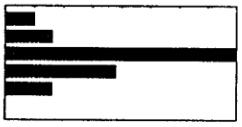
26. Managers dicuss changes with users and others in order to :

		Mean	SD	90CI
10	(1) a. Develop plans for implementation			
27	(2) b. Obtain feedback on implementation			
22	(3) c. Inform users and others			
12	(4) d. Control progress			
11	(4) No response	2.82	1.03	0.18
8	(4) Other response			



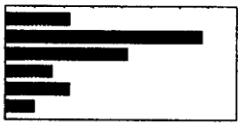
27. Implementation includes :

		Mean	SD	90CI
5	(1) a. Built-in incentives and rewards			
8	(2) b. Provision for recognition of success			
50	(3) c. No specific incentives			
19	(4) d. Problems for users			
8	(4) No response	3.10	0.78	0.14
0	(4) Other response			



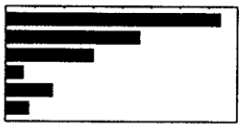
28. Benefits of the change occur :

		Mean	SD	90CI
11	(1) a. Immediately			
34	(2) b. Quickly			
21	(3) c. Within a year of implementation			
8	(4) d. Over a year after implementation			
11	(4) No response	2.64	1.00	0.18
5	(4) Other response			



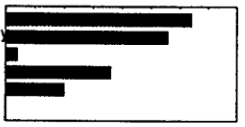
29. Direct benefits of the change are apparent :

		Mean	SD	90CI
37	(1) a. To users and others			
23	(2) b. To managers and supervisors			
15	(3) c. Only to senior management			
3	(4) d. Only indirect benefits			
8	(4) No response	2.09	1.11	0.20
4	(4) Other response			



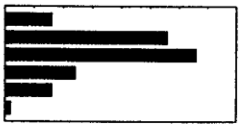
30. Effects of the change, positive or negative, are :

		Mean	SD	90CI
32	(1) a. Measurable in quantitative terms			
28	(2) b. Measurable as subjective ratings only			
2	(3) c. Largely anecdotal			
18	(4) d. Not clear			
10	(4) No response	2.29	1.24	0.22
0	(4) Other response			



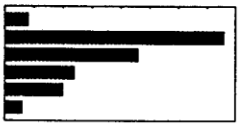
31. During the change, those involved needed to put in :

		Mean	SD	90CI
8	(1) d. No extra effort			
28	(2) c. Some extra effort			
33	(3) b. Significant extra effort			
12	(4) a. A great deal of extra effort			
8	(4) No response	2.74	0.91	0.16
1	(4) Other response			



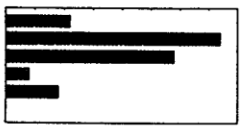
32. During the change, management provided those involved with :

		Mean	SD	90CI
4	(1) a. Every possible support			
38	(2) b. Adequate support			
23	(3) c. Some limited support			
12	(4) d. No support			
10	(4) No response	2.77	0.91	0.16
3	(4) Other response			



33. During the change, those involved experienced :

		Mean	SD	90CI
11	(1) d. No extra pressure			
37	(2) c. Some extra pressure			
29	(3) b. Significant additional pressure			
4	(4) a. High levels of stress and pressure			
9	(4) No response	2.49	0.88	0.16
0	(4) Other response			



A SUMMARY OF "OTHER RESPONSES" IS INCLUDED IN FIGURE S.9

Figure S.7 , QUESTIONNAIRE 2
(Equivalent to Appendix F)
Graphs show number of responses. Numbers to the right relate to the mean value on the scale 1 to 7.

Agree		Neutral		Disagree		
1	2	3	4	5	6	7
Totally Agree		Agree Slightly		Disagree Slightly		Totally Disagree

1.	I understand the objectives of FW.	9	52	12	14	0	2	1	Mean 2.49 S.D. 1.12 90CI 0.20
2.	The organisation of work at FW is effective.	0	38	27	13	7	4	1	Mean 3.06 S.D. 1.21 90CI 0.21
3.	FW managers will always listen to ideas.	2	26	25	17	13	7	0	Mean 3.38 S.D. 1.30 90CI 0.23
4.	I am encouraged to develop my full potential.	7	24	19	12	13	13	2	Mean 3.52 S.D. 1.63 90CI 0.29
5.	My boss has ideas that are helpful to me and my group.	7	34	19	16	7	6	1	Mean 3.04 S.D. 1.40 90CI 0.25
6.	My boss is supportive and helps me in my work.	15	32	14	14	7	7	1	Mean 2.90 S.D. 1.54 90CI 0.27
7.	FW keeps its policies and procedures up-to-date.	2	31	21	18	7	9	2	Mean 3.36 S.D. 1.44 90CI 0.25
8.	We regularly achieve our objectives.	4	24	27	22	8	5	0	Mean 3.23 S.D. 1.22 90CI 0.22
9.	FW's goals and objectives are clearly stated.	3	18	31	20	7	10	1	Mean 3.49 S.D. 1.34 90CI 0.24
10.	Jobs and lines of authority are flexible.	4	28	19	11	17	11	0	Mean 3.47 S.D. 1.50 90CI 0.26
11.	I can always talk to someone if I have a work-related problem.	13	52	13	7	1	3	1	Mean 2.38 S.D. 1.17 90CI 0.21
12.	My salary is commensurate with the job that I perform.	1	16	16	16	14	17	10	Mean 4.30 S.D. 1.68 90CI 0.30
13.	I have all the information and resources I need to do a good job.	0	14	20	11	22	21	2	Mean 4.24 S.D. 1.47 90CI 0.26
14.	FW's senior management style is helpful and effective.	1	9	13	36	13	15	3	Mean 4.20 S.D. 1.31 90CI 0.23

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Figure S.7 , QUESTIONNAIRE 2
Graphs show number of responses.
Numbers to the right relate to the mean value on the scale 1 to 7.

Agree			Neutral		Disagree	
1	2	3	4	5	6	7
Totally Agree		Agree Slightly		Disagree Slightly		Totally Disagree

								Mean	S.D.	90CI
15. We constantly review our methods and make improvements.	2	16	38	16	13	5	0	3.41	1.16	0.20
16. Results are attained because people are committed to them.	14	32	25	9	7	3	0	2.69	1.26	0.22
17. I feel motivated by the work I do.	7	41	25	10	6	0	1	2.68	1.10	0.19
18. The way in which tasks are divided is sensible and clear.	1	18	23	29	11	8	0	3.61	1.22	0.21
19. My relationships with others in my group are good.	26	56	3	5	0	0	0	1.86	0.72	0.13
20. FW has opportunities for promotion and more responsibility.	5	35	21	13	10	4	2	3.09	1.40	0.25
21. FW sets realistic plans.	1	14	31	27	9	7	1	3.60	1.19	0.21
22. Performance is regularly reviewed by my boss.	5	13	23	18	14	12	5	3.88	1.58	0.28
23. On occasions, I would like to make changes in my job.	12	49	17	9	0	3	0	2.39	1.05	0.19
24. People are cost concious and seek to work efficiently.	1	27	17	16	19	8	2	3.63	1.46	0.26
25. FW's priorities are understood by its employees.	1	7	32	16	18	13	3	4.04	1.36	0.24
26. We constantly seek to improve the way we work.	8	25	33	16	3	5	0	2.96	1.20	0.21
27. We cooperate effectively in order to get the work done.	8	35	27	8	7	5	0	2.84	1.27	0.22
28. Encouragement and recognition is given for all jobs at FW	0	6	14	22	24	20	4	4.56	1.29	0.23

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Figure S.7 , QUESTIONNAIRE 2
Graphs show number of responses.
Numbers to the right relate to the mean value on the scale 1 to 7.

Agree			Neutral			Disagree
1	2	3	4	5	6	7
Totally Agree		Agree Slightly		Disagree Slightly		Totally Disagree

29. Departments work together well to achieve good performance.	3	15	23	11	19	19	0	Mean	3.94
								S.D.	1.51
								90CI	0.27
30. FW's management team provides effective and inspiring leadership.	1	10	19	29	17	11	3	Mean	4.07
								S.D.	1.31
								90CI	0.23
31. FW has the capacity to change.	10	40	19	13	7	1	0	Mean	2.67
								S.D.	1.15
								90CI	0.20
32. The work we do is always necessary and effective.	3	8	21	17	21	18	2	Mean	4.19
								S.D.	1.44
								90CI	0.25
33. In my own area, objectives and roles are clearly identified.	6	40	14	12	11	6	1	Mean	3.04
								S.D.	1.45
								90CI	0.26
34. The structure of work in FW produces general satisfaction.	2	15	32	22	15	4	0	Mean	3.50
								S.D.	1.15
								90CI	0.20
35. Solutions to conflicting views are understood and accepted.	0	16	19	32	17	5	1	Mean	3.77
								S.D.	1.17
								90CI	0.21
36. Individual performance review is against agreed standards.	2	9	14	31	17	14	3	Mean	4.18
								S.D.	1.35
								90CI	0.24
37. Other departments assist my own when needed.	4	36	30	14	3	2	1	Mean	2.84
								S.D.	1.10
								90CI	0.19
38. My boss's style helps me in the performance of my work.	3	26	22	24	7	6	2	Mean	3.36
								S.D.	1.35
								90CI	0.24
39. Creativity and initiative are encouraged at FW.	4	12	29	21	14	9	1	Mean	3.67
								S.D.	1.34
								90CI	0.24
40. People are always concerned to do a good job.	9	32	24	18	6	1	0	Mean	2.81
								S.D.	1.13
								90CI	0.20

Please feel free to add any additional comments :

A SUMMARY OF ADDITIONAL COMMENTS RECEIVED IS INCLUDED IN FIGURE S.9

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Thank you for your time and trouble.