DESIGN MANAGEMENT
IN BRITAIN'S PUBLIC RAIL TRANSPORT INDUSTRY

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INTRODUCTION

A comprehensive and efficient system of design is a great asset for any public or private company. Design has always been associated with manufacturing and the creation of new products. Public attention is now being directed towards the use of design in the service industry, this is largely due to today's powerful media and communication network. In the past a companies image was procured by either its product, size or financial ability, now however the continual use of corporate identity has allowed a different more involved campaign source to evolve.

In order for corporate identity and design to function in the service industry, it must seek to operate within the organisational environment. Design must be regulated by management to ensure its beneficial effect for the company, the same way that a companies finances must be regulated in order to ensure a set of sound financial figures. As design becomes more widespread within the corporate network, it requires some form of control to guide its use, effectiveness and long term future. The aim of this thesis is to examine the application of such control in a well known service industry. Therefore the impact of design management at British Rail is considered, British Rail provides a unique possibility for a discussion of design management. It is particularly suited to this task since it has influenced the use of design management in over twenty international rail companies. It also features characteristics which allow a more in depth examination of design management and its effect on a large corporate body, these include the political involvement of Thatcherism during the 1980s, the potential of design mis- management as with the Advanced Passenger Train and a style of corporate management which tried to resist design innovation.

The literature on the subject of design management is comparatively rare and elusive. The teaching of design management exists since only 1976 where it was first thought as a subject at the London Business School. Courses have not yet provided a large platform of design management theorists who publish on the subject as in contrast with other design fields. Under the direction of Peter Gorb, the London Business School has produced two series of papers in 1986 and 1990 on design management, these included papers from Jane Priestman and Jim O' Brein of British Rail's design management board. Despite shedding light on the definition of design management and its use, they fail to tackle issues such as the effectivity of managed design when it is under the control of a financially motivated corporate structure. They tend to be positive in the main and avoid going beyond the corporate facade such as in British Rails case to discover how design management actually performs. Instead of avoiding these problems, this thesis uses them as the basis for discussion. Two specific examples are the effect of privatisation and politics on design policy and use, plus the effect of corporate interference on design management. The use of politics, corporate culture and innovation in the thesis, remove it from the normal explanatory type works on design management, such as Peter Gorb's Design Management.

Other literature in particular Christopher Lorenz, The Design Dimension, and the Danish Design Council Books on Danish State Railway and British Rail also deviate from more sensitive issues. Lorenz's book discusses the positive role design has to play at corporate level but fails to discuss how the two are brought together. The second two books provide only a pictorial introduction and explanation of the use of design by the two rail companies. Everyday though we are confronted with the use of graphics, corporate identity and advertising, these books provide us therefore only with the material when it is the logic and purpose of it that actually interests us. The thesis seeks to probe deep behind the corporate facade and graphic identity to find what are the reasons behind managed design and how it is formulated in order to prove a viable member of the management unit.

> the public judges the management of a business by the visual display on offer. Hour by hour our customers, judge the intent and quality of British Rail through what they see and experience (Priestman, 1990, p100).

Jane Priestman introduces the main area of interest in the thesis. Design Management can have a highly effective role to play in corporate structure, planning and interpretation. However there are many factors involved and require resolution before design management can be incorporated into an organisational institution such as British Rail's.

What will contribute to better quality and customer satisfaction without causing a major need for structural change?. The way a service or product communicates its task, skills and personality provides the only guaranteed method to achieving greater public response. This is possible because of design's three and two dimensional ability to present company ethics and make a corporate statement which can be interpreted by all. Whilst few will understand the concept of a corporate restructure, most will be able to visualise and judge the resulting change in corporate image. All of these can only be achieved through good design. Achieving good design is not just a design task but also requires some form of direction and control. This direction and guidance is provided by the profession of design management. " Design has become a vital competitive weapon in the struggle to satisfy the customer and beat the competition" (Lorenz, 1990: ix).

Design is a management discipline, the ability of the designer to communicate on a broad basis, conveying ideas, incorporating other peoples desires and unifying them into one effective system gives the designer a great ability to provide managed design. The Chartered Society of Designers first recognised design management as a profession in 1986, 1.

1.. In 1986 , the first series of lectures on design management were organised by the Society of Industrial Artists and Designers (now The Chartered Society of Designers).

It was through government support since 1982, directly or indirectly related, to the Design Council, that the link between management, industry and design has been promoted. The London Business School, under the direction of Peter Gorb, as has already been mentioned, pioneered teaching design to managers in the mid- 1970s, as part of their MBA programme. Design itself operates in three major corporate fields, environmental design, information design and corporate identity. The first two aspects of design are all dependant on the chosen corporate identity. Any decisions taken on environmental or product design are typically done in the field by specifically trained personnel.

Corporate identity covers the company's ability for internal as well as exterior change. Typically it is formed by an outside consultancy. Corporate design is creeping into management culture because it has been proven to have a beneficial effect on corporate performance and strategy making. Whilst it has always been a part of business policy to ensure the high quality of existing business skills in the investment, accounting, marketing, selling and technology areas, it is only recently that design is being drawn upon to advocate change.

> It seemed that the justification for the use of design skills at strategic level
> must lie in the fact that they will make a clear contribution to improved economic
> performance of the business (Corby, 1990, p164).

The use of corporate identity is particularly important because of its diversified make up, and the fact that most large organisations have now also developed a decentralised management style. Each sector within a company gains its own degree of independence referred to as sector management. Decisions are required as to whether each sector should have an independent identity or a single unifying identity. " A confusion of impressions is not going to do a business any good" (Corby, 1990,p167). The corporate identity acts as an endorsement of the service a company provides to the public. People are becoming very aware of the use of design from the way it is utilised. A perception of the company is conveyed to the viewerand it is these interpretations that are translated into a view of the quality and goods on offer.

> Good design can make a clear contribution to the economic performance
> of a business, and it must be managed with the same determination for
> excellence that is demanded of other skills such as marketing, finance and
> technology (Gorb, 1990, p171).

As a consequence, the managing of design, is a mainstream business activity that can not be ignored. The thesis therefore proposes that design management has a beneficial effect on any industry to which it is applied. In order to properly quantify the profession, it was decided to select an organisation or service which would effectively demonstrate its use.

Why choose the Public Transport Industry in Britain as an example ?

Public transport is an excellent example of design management, because unlike a manufacturing company it does not depend on design to ensure survival.
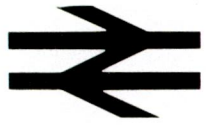
≷ InterCity

≷ Property Board

≷ **Railfreight**

≷ InterCity Sleepers

≷ Sealink

≷ Rail Express Services

≷ Motorail

≷ Europe

≷ Travellers-Fare

≷ British Railfreight

≷ British Rail International

Fig 1. An example of the use of corporate logo and typeface.
British Rail uses the same alphabet and double raillink symbol on all its sectors. It
makes minimal but effective changes in order to visually differentiate each sector.

A manufacturing company will ensure the design has quality, salability, cheap production, etc.. A service company will not promote a necessarily designed object and therefore design would be expected to have a low key involvement with the supply of a service. The opposite is true in reality, the corporate identity must always be the central resource of a service company from which the guidelines can be taken on environmental, product and information design. Each of these activities should be managed in a way compatible with the business organisation itself, otherwise the ambitions and intentions will become ill defined to those wishing to incorporate it. It follows that if budget accountability is required in each sector then design accountability should also be delegated.

> a central issue is the reconciliation of tensions - potentially creative
> yet fraught with difficulties between design, marketing and general
> management (Olins, 1985, p32).

Design can be made intensely operational, particularly within a rail service. Service companies utilise design by their use also of design consultants, the existence of design documentation and the domination of design by the marketing department. The design managers role in a service company must be to influence the company structure, finance, marketing, staffing and product development, and to co- ordinate their intentions into a package which can be designed, financed and implemented. In situations with no design manager the marketing department controls the company's image. The designer is distanced and typically will be an outside consultant with no direct control of the company's image. Design projects are therefore unstructured and design is considered to need central marketing control. Within a service company this stifles any chance of innovation, marketing can only serve to suggest, and forecast, however it cannot implement or take risks which go against the policies of marketing doctrine. Industry and the service sector, especially high profilers like British Rail and Danish State Railways, cannot have a uniform design policy for reasons of culture and practice in the company profile.

It argues therefore that an individual tailor made design managed policy is the most appropriate for the service sector. Designers working within corporate management differ markedly from the design consultants they employ. They evidence more enthusiasm for use of design with in the service sector, whilst consultants tend to enthuse for the manufacturing type industry. The design manager's concept of how a rail network should be run is at variance with that of other professions. Designers tend to harbour implement now, pay back later innovation, whilst accountants are reluctant to introduce new coaches, networks or passenger schemes unless the marketing department can guarantee a quick return. The very visual nature of a public transport company guarantees the need for effective design management, it is also the way design influences every decision made, and the importance of how such decisions are perceived by the transport users. Customers will judge the intent and quality of a transport company through what they feel, see and experience. One other problem of normal management structure is the ability of departmental managers to become lost in basic administration, –

Fig 2. The High Speed Train on the InterCity 125 sector line

and caring for the fulfilment of their profession alone. They are therefore unable to see some of the wider issues which present themselves. "the entire corporation must be viewed as a customer creating and customer satisfying organism "(Levitt, 1960,p23). Design management has as its ability the function to coach, catalyse, orchestrate and integrate a company to satisfy customer rather than corporate demands.

The broad thinking qualities of designers enable them to co ordinate each department to guarantee a clearly defined policy is implemented. " Design professionals are experienced at making sense of, and reconciling, imprecise and conflicting demands from all over client companies"(Topalain, 1993, p5). As in British Rail, Danish State Railways and The Irish Transport Company are tremendously complex systems to run effectively without even questioning the role of design. Yet Danish State Railways and British Rail have made themselves, the main protagonists of corporate and identity strategy. The incorporation of design into the structure of BR and DSB has not always been as successful, the reasons why are discussed in further chapters because they serve to explain the complexities of incorporating design into organisational cultures like BR. It is important to identify that British Rail is now five separate companies as outlined in chapter three, and that whilst their identity must be specific to British Rail, sameness of identity could present a bland image, thus a design manager is also dealing with design directly and not just corporate strategy.

Chapter one sets the scene for the thesis outlining the concept of design management and explains some of the basic principles in running a design management unit in a service industry. Its emergence as a new business weapon is examined in the light of design management and corporate strategy. References will be made to Gorb and O' Brein as the main backers of design management policy in industry.

The second chapter provides the historical meaning that design management has in Britain's rail industry and explains why it was that this country's rail industry was chosen as an example. It includes the development of design management at British Rail to the present day, and relates specifically all the areas design management must incorporate and control to be effective. The chapter also serves to prove some of the theories proposed in the thesis by relating them to actual market experiences. The chapter uses graphic examples taken from the British Rail Corporate identity manuals. These manuals are the basic fundamentals of British Rail's design management programme.

Chapter three delves deeper into the role of design management. It marks the beginning of the more innovative thoughts the author has on what effect design has on an organisational culture and vice versa. The chapter uses one main example of the Advanced Passenger Train to illustrate the reasons why design management has only recently begun to take its place in organisational culture. The chapter features material from the British Rail Board's organisational investigation into innovation, after the APT fiasco. The Cultural Study, and also material from the 1990 Home Office report 59 on the failure of British Rail to properly run its development programme.

Chapter four is again a research type attempt to quantify why design management required a rejuvenation at British Rail. It also defines the dramatic effects imposed on design management by external issues such as government policy and sees how design management deals with this. In light of the possible privatisation of British Rail the chapter will focus on the effect this will have on the company and its plans for innovation. It is impossible to discuss design at British Rail with out giving due consideration for state sponsored investment, capital financing and government policy on railway development, all elements which affect design and innovation. The chapter will centre around two government documents written on the future of rail in Britain, the Serpell Report and the Review of Main Line Electrification. The Serpell report was ordered to,

> examine the finances of the railway and associated operations in the light of all the relevant considerations, and to report on options for alternative policies, designed to secure improved efficiency in the railway industry of Britain for the next 20 years (Howell, 1982: HMSO brief).

The other report centred around a major investment programme to electrify Britain's rail industry to a comparative level with other European companies. Apart from simply supporting many construction jobs, by using coal as the original fuel it would have kept Britain's pits, 20 of which recently closed down, open for another estimated 35 years.

The conclusion sums up with an assessment of how British Rail is finally managing its design successfully, and whether design really has enhanced the corporate environment or still poses a threat to the senior members of the organisation. The answer is evenly balanced: it depends both on the design management's ability to function and remain flexible, and on government and top management to ensure development is followed through. Much depends on the government and its potential interest in privatising British Rail.

Fig. 3 Railway Uniforms prior to the formation of British Rail.

Uniforms were an important means by which status and class could be defined within a railway network, they drew their designs from military uniforms of the same period. The uniforms illustrated are those of the North Eastern Railway, 1905

Fig.4 Livery Designs used by British Rail.

British Rail uses its symbol and typeface originally designed by Jock Keinner ✗
in 1965 on all its rolling stock, above are illustrated the InterCity, London and
South East, Provincial, ScotRail and Railfreight sectors.

CHAPTER ONE

DESIGN AND MANAGEMENT

What is design management?

The effective modern origin of design management may be traced at British Rail in 1959, when plans were drawn up and unveiled for a major corporate redesign of the company.The Royal Society of Arts began to take notice of its power and by 1966 had established the Design Management Award to promote its use in industry. The essential element of design management is the combination of many different design tasks within an organisation and combining them to improve the standing of the company. The term " line" management is frequently used to denote this combination of many such managerial disciplines. Many of those within this line structure are not actual designers, and are quite unaware that they are actually designing. It is the break down of age old professional ethos which allows such non designers to exercise creativity. Open design would cause managerial strife and a muddled image within the company and it is there fore essential that a body such as a design management unit lends a controlling influence.

Design management sets out with an objective to identify specific design type decisions which are relevant to the portrayal of that companies corporate issues. Typical old style corporations saw design as a means to style products the company manufactured and sold. Design management attempts to sell not just a product but the company, to introduce design into the corporate environment as a partner, not a tool. It seeks to design all sources of information used to communicate the organisation's intentions to its customers. Three skills are required to have any sense or ability to design, these are a feeling for objects, a particular range of professional abilities and the ability to put these into practice.

> The chief reason why design should feature at the heart of a corporate
> organisation is that services and products are the principle vehicles for
> creating wealth, and design is a key discipline by which to get these right
> for the commissioners and end users (Topalian, 1993, p4).

The first skill can be difficult for most profit based managers to digest, often the link between customer satisfaction, product quality and on going innovation are forgotten. An example of this is the Japanese whose products are designed within a large structure for the market, not for the satisfaction of reaping a large profit. The second is a fundamental requirement of conceptual thought, vision and the ability to adapt / interpret design. These skills are

not the preserve of the designer alone, who requires academic training to fully develop and focus such skills. Creative ability can be present in the accountant or manager as much as it will be in the designer. The final quality should already be inherent in managers, the ability to manage. A designers ability to manage could be described as his main quality, the task of combining research and design to produce a saleable product or identity. The managerial process differs from that of the normal manager however in that a designer aims to discover a solution without perhaps having a reason, whilst the manager concerns himself with the reason why a new solution is necessary.

> The major problem associated with design management is not managing design programmes; it is not managing a design studio, it is not managing designers, the major problem to overcome in making design an effective business too is how to put design into management (Topalian, 1993:4).

Design includes the skills of many differing disciplines such as industrial designers, graphic artists, architects, etc., especially in the field of public transportation. The unification of these disciplines as a whole leads to innovation, but innovation does not always fit comfortably with annual profit statements. It will and does disrupt the stability of a company's product or identify when major change needs to be accomadated. The cost of innovation can eat in to pension funds or advertising budgets. Clearly, there fore something must be available to control and regulate such a process, something which will at the same time recognise innovation as a necessity for corporate survival. Design management is again the determining force for innovation, not only the degree but the required time span and cost of such a programme.

The role of design within the corporate body is paramount, especially when design management is described as a means by which corporate strategy can be made visible. Corporate identity design itself leads to both internal and external management change. Take the example of the acquisition of a parcels firm by a public transport company, after many months the acquisition proves to be a major financial disaster. At the same time an outside design consultancy is treating the whole transport company to a new identity. The management of the public transport company are keen to dispense with the parcels firm in secret so as not to attract poor media attention or cause a fall in share prices. However the design consultancy continues with its corporate identity work, eventually giving the aforementioned parcels sector an integrated image with that of the transport company. Apart from lost design revenue the managers now face a major financial upset through either retaining the firm or dispensing with it, with the resultant drop in share price. If both the

corporation and the design consultancy had proper design management the problem would not have occurred through task organisation, control, implementation and scheduling of the identity change.

Types of managed design in the public transport industry.

It is important to classify the types of design under the design management umbrella in order to approximate to what extent they influence the corporate structure, strategy and identity. From the classification of the design involved,comes an ability to properly organise design in an effective way.

Product design must be one of the most expensive but important criterias of the public transport system. How many passengers will reflect on the quality of the toilets, the ergonomics of the seats or the access to luggage racks." If the design of the product or service is not satisfactory, it is unlikely the customers will be attracted or retained ." (Drucker, 1977, p39). It is amusing to relate that the " *Great Scotsman* " steam train still runs on the same rail type as the *High Speed Passenger* Trains, therefore for example carriage design must have a direct effect on passenger comfort, nausea and service since the improvements are vast without a major track innovation programme **2**. An example of failed product design is evident from the *Advanced Passenger Train*, during the press launch a group of newspaper reporters who were travelling on the train began to complain of "sea-sickness" every time the train went around a bend. In 1978 there was also a dramatic derailment of an APT at over 160Km/hr, investigations in to the cause lead to the discovery of a fundamental design flaw in the bearings of the hydrokynetic brakes.

The value of product design to the company is its ability to add value to the transport service, and thus its ability to also contribute to the gross margin performance of the company in question. Gross margin is the resultant of subtracting passenger revenue from the costs, to achieve the service cost after adjustment for the cost of supplies, innovation, rolling stock, etc. It is the critical indicator of either a solvent (financially sound) company or an insolvent (financially problematic) company. The public transport industry especially rail, is without direct competition in most countries. It therefore must use design as a means for justifying rail travel over the car, boat, plane, bus, etc. Design in this context will have a range of issues which will directly effect top management.

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2. See chapter 2 - The APT tilting body mechanism, designed to make up for poor track quality, as an example of BR product design.

Fig 5. An example of
a new Interior
Design at British
Rail's Stations.

Victoria Station
The new environments
are designed to offer
more European, high
quality surroundings, in
which it is not required
to be a rail passenger.

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The question of product innovation is the first, all the necessary capital, personnel, and progress must be determined by management prior to conception. In 1983, British Rail in a major public image flop lost over 43 million due to a lack of integrated management in the *Advanced Passenger Train* project. Design tries to ensure a continual process of quality control and upgrade, this is demonstrated by British Rails on going policy of carriage refurbishment, such a scheme would be suicidal without a design management board to oversee every aspect of its management whether financial or design based.

> Business executives frequently feel they are riding on volcanoes when
> dealing with improvement programmes. The designers ability to apply
> creativity and follow through the implications of decisions helps to preserve
> the integrity of proposed solution (Topalain, 1993, p5).

The third and final example involves attempting to integrate the design of rolling stock with that of private companies (Shell, Roadstone, etc.). It also leads to new sources of revenue where British Rail discovers during the design phase that it can make an engine with 40% less materials and 30% cheaper to run than any other rolling stock manufacturer. In 1988, for the first time , *Rail Freight* carried hot edible oil in purpose built tankers. Here efficiency in design and delivery go hand - in- hand as any delays en route would mean the oil solidifying.

Environmental design covers a much wider brief, and involves itself in the complex integration of Architecture, information, planning and ecology. It is simply impossible to design a station these days without some consideration to its surroundings, its functional ability and its informatic qualities. It is therefore difficult for management to visualise the requirements of environmental design and most only measure its success by relating the investment to the effect on operating revenue. Design management besides ensuring integration will try and achieve maximum return on the management's level of investment. They will also try and reduce the required amount of investment for each innovation project. The company's capital will also be used for maintenance, salaries, stock purchase and taxes, it is easy to see why design requires the level of control it now does at British Rail. Environmental design is also a method of managing fixed assets. This led to a product innovation between British Rail and Danish State Railways, it was found that constructing a permanent station in some cases was false economy and a demographic mistake. Joint conferences were held in London and Copenhagen at which papers were tabled: From DSB ; "Policy to modernise I-C Stations" and from BR; " InterCity Stations". In the reports, stations were surveyed and two experimental projects tested, a further report was then produced by Dr. J D C A Prideaux, director of BR's Intercity Sector in January 1987. This set out a design

Marylebone

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lettering is ranged to the left, still leaving an arrow space. The only exception to this occurs on bracket signs projecting from the wall, where the legend is positioned at the end of the plank furthest from the wall.

Information

Location sign

← Information

Information →

Direction signs

11 **Plank signs : colour**
Colour on plank signs is confined to black lettering on white with arrows in blue. If, instead of an arrow, directional information in words is necessary then these should also be in blue. Safety notices e.g. 'Fire exit' white and green, and warning notices e.g. 'No entry' white and red. Fittings and posts are painted grey. Usually there will be wording on the backs of signs but where there is not plain white planks are used to cover the framework.

12 **Plank signs : stacked signs**
In situations where it is necessary to give directions to a number of places the planks are stacked one above the other, with information relating to travel taking priority at the top. If a sign is eight or more planks deep then two stacks are formed side by side. All signs or stacks of signs within an area are fixed at the same height from the ground so that the bottoms of all signs are level. The recommended height is 2.400 metres.

- ← Trains
- ← Tickets
- ← Information
- ↖ Buffet
- ↖ Telephones

- Way out →
- Taxis →
- Buses →
- Left luggage ↗

13 **Plank signs : construction**
The standard construction consists of trough section planks of aluminium faced with pre-bonded PVC and die cut letters applied with heat and vacuum pressure. The planks are fastened with pop rivets to cranked strap iron carriers which may be fixed directly on to a wall, to a framed cantilever bracket or may be hung

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General Notes
These instructions apply to fascias and projecting box signs on station catering facilities. Ordinary platform plank signs, including those for catering facilities, will be black on white following normal practice. The versions of the pictograms shown below have been specially drawn to fit into the Rail Alphabet system. Two pictograms together mean that both types of service are offered.

Colours Yellow on red background. For paintwork etc., yellow to match BS 2660 No 0.001 and BR Flame Red BS 381 C No 593. For yellow acrylic sheet, Oroglass 2037 is preferred . Perspex 2021 may be used ; for red, Perspex 3016/3017 or Oroglass 2178 may be used but Oroglass 2535 (to special order) is preferred.

Use The appropriate pictograms to suit particular locations will be agreed by British Rail Catering

Buffet

Restaurant

Licensed

Buffet

All lettering to be in Rail Alphabet. Minimum size 4" x-height normally, i.e. a 10" tile height or match elsewhere adjacent.

Buffet

Buffet

Pictogram after word if ranged right.
If only one pictogram required, make 'A' end of sign
If two pictograms required, make 'B' end of sign
Make length of fascia to suit architectural features

Fig. 6 The Corporate Identity Manual and British Rail Signage.

British Rail's Corporate Identity Manual covers all aspects of design implementation typeface construction and permitted variations, illustrated above is the signage element of the identity manuals.

philosophy for stations. It proposed designing stations which could be constructed or relocated on demand. Similarly in a lesser scale to modular furniture perhaps these buildings could be extended or scaled down on demand. This was a new departure for BREL (British Rail Engineering Ltd.) and the first time " moveable premises" was entered as part of a companies fixed assets. The system was later applied to other industries and has provided Danish State Railways and BREL with another source of income.

Relating to the passenger, the actual corporate information required, is undertaken by information design, also applied internally for managers, employees and owners. The expense of this design source is entered in the profit and loss account as a percentage of sales. It can cover a wide range of elements from the printing of the letterheads on all stationary to ensuring the corporate logo is attached to all press releases. The umbrella of all such design is corporate identity, a company can not effectively apply design without having first worked out what the identity of the company is to be. Take this example for instance

> Firstly a design policy statement is agreed by the board as part of it's
> corporate plan. Secondly a Design Policy Committee has been
> established, chaired by Jim O' Brein, the British Rail Board's vice
> chairman. This acts as an executive arm for change and makes
> long term development decisions (Priestman, quoted by Gorb,1990, p103).

It relates the kind of level of structuring required to mange design effectively. Danish State Railways modelled their identity on that of British Rail. They are two of the most visible protagonists of corporate identity, where the unmistakable is the most conceivable in the public eye.

Despite being able to run the company effectively or not this must be seen as a separate issue to the successful incorporation of design management. Other areas of the corporate structure concern themselves with timetabling, scheduling and catering, the areas most often complained about by the general public. Having a clear corporate identity goes someway to alleviating what could otherwise be seen as a visibly inconsistent network, with shoddy trains and stagnant development. Public service would therefore suffer in the long run if design management was unable to accomadate quality control or innovation in its brief. The costs of maintaining this image are trivial once the identity is created and incorporated, routine maintenance would actually cost more for an unintegrated design identity since a wider stock of parts, materials and colours would be required. Recent design identity utilises one type of logo and logotype, it then either scales these up or down depending on the application. Minor changes are made but the original logo design is always recognisable, for an example see British Rail or British Airways corporate identity.

How is design managed in public transport companies ?

Four aspects of design usually associated with the public transport industry have already been discussed they are; corporate identity, information design ,environmenta and product design. It is obvious that they cannot all be under the same management structure due to their cultural, logistic and professional requirements. Corporate identity has one central theme whether it is controlled centrally or through a consultancy, whether it is managed at headquarters or in a separate division. It must always remain a pinnacle source for the increase of public awareness in the corporate policy of that transport company. Only in this way can it influence the other design divisions within the corporation and modulate it's design activity as a whole, thereby supporting the effective portrayal of the company. The maintenance of such an investment is often in the hands of facilities managers, a fast growing profession of design trained people, as it is at Danish State Railways and British Rail. These managers maybe involved where the corporation operates in discreet but continuous environments. The design of small provincial stations, as in the DBS "moveable premises" example may be co ordinated by an environmental line manager, but a major rail centre such as that at Millton Keynes would require a separate project development division. It is easy to determine what function and the role of design management's, however broad guidelines for design management are virtually impossible to establish. For the correct application of corporate identity the guidelines, selection of staff and implementive procedure can be determined. Other types of divisions co-ordinated through design management will operate in ways which relate to the overall type of corporate management. Government initiatives have over the past decade tried to raise the profile of design and its importance to industry. Design is now being offered as a means of sanctification - like the new star that marketing was ten or fifteen years ago, " To become a significant player in world markets requires design leadership; that position is unlikely to be achieved today without design professionals (Topalain, 1989, p50 -57).

Managers also need to be made aware of what design is and how it can be applied to a service or industry. The image of design as being a solely " creative" profession has hurt the incorporation of design into the management structure. For the same reason design's incorporation into a company cannot be done from a slum or out of slum type conditions. A total system of design environment must exist before it can be implemented further down the network ladder. British Rail and CIE premises often suffer from scruffy appearances compared with many of their international counterparts such as Danish State Railways. Generally our public environments are squalid, our rail/road side verges are overgrown and undisched, whilst few people appear to be litter conscious.

Under the direction of design management such conditions would normally be somehow dealt with , why spend millions of pounds on a corporate image when the foreground is a portrait of discarded tickets and passenger waste. It suggests from this that British Rail may need to innovate some changes in its own Design Management unit, whilst CIE must start from the beginning." The age and condition of our trains is one aspect of the problem, one which the customer can see and feel for himself." (Bagwell, 1984, p106)

Design and its Relationship with Corporate Strategy ?

Over the years design has shifted from being a " jobbing" tool to a major planning contributor to corporate development. Design in itself is not difficult to manage, be it a product planning situation or a design office, what is difficult to manage is design that can effect the structure of a corporation. To understand the relationship, one needs to examine the service. The obvious first element in the equation is the size of a public transport company, whether it is in Ireland, Britain or Denmark. Danish State Railways as an example operates over twenty ferries alone between Germany and Denmark. The second criteria is the enormous scale differentiation of investment. This is reflected in the production of a 5p timetable brochure compared to the 600 million spent on developing the Electra train system at British Rail between 1988 and 1992. Finally one has the to deal with the scope of design itself, it entails the control of design for information, product, environmenta and corporate use. The public transport system is a service which cannot "break down" and must accomadate the population and geographic needs of a whole country as in the cases of the three companies mentioned. British Rail carries three out of every five people travelling in and out of London by public transport. This equates to nearly 3.8 million people every day, more than the population of Ireland, within just two divisions, the London and South West sectors. One element of British Rail's corporate strategy affected by design was the fragmentation of the company in to sectors. " Our move to management by sector, is just one of the continual changes which makes it sensible for BR to apply its corporate identity flexibly. Flexibly, but with added vigour." (O' Brien,1988,p 262). The influence of design on corporate structure will therefore provide a different skills background which will thus provide a fresh managerial perspective. Formerly fragmentation of a company was associated with the selling off of the companies individual assets. Design advances corporate strategy because its clear ability to visualise allows questioning of the status quo, thus a company with design vision is not afraid to embrace change. Design management lends itself to a disciplined application of all this creativity. Design managers are experienced at reconciling imprecise and conflicting demands from with in the organisation, this often leads to the involvement of the design manager in corporate strategy, bridging gulfs between divisions and coping with internal corporate interference when one division tries to "go it alone".

Fig. 7 An Example of British Rail External Design.

The new station at Milton Keynes reflects the burgeoning ambition and rectilinear sweep of this newly created city. Design principles applied, were those expressed in previous station designs.
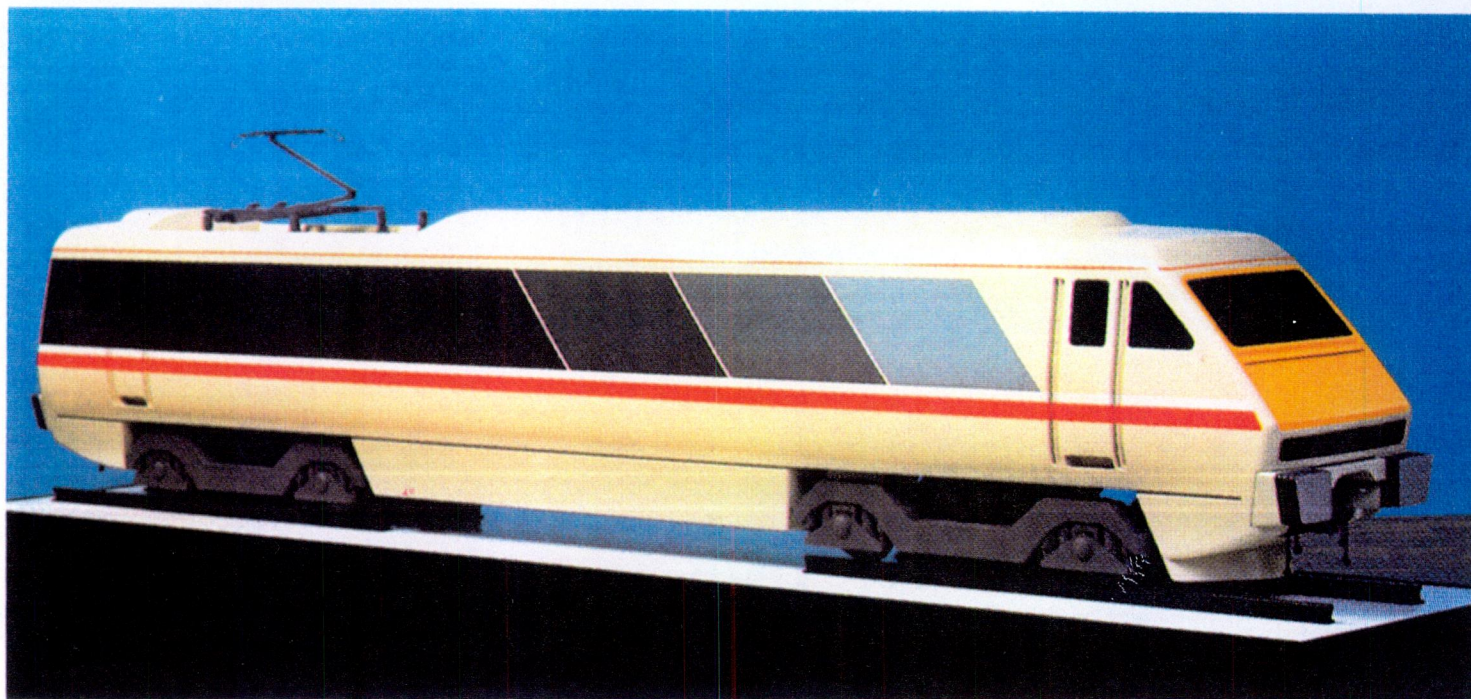
Fig 8 The Electra Concept Train
Models and Full Sized mock-ups are used to provide visual representation of form in power car and locomotive design. The model is often used in the specification to tender. This concept is for the proposed new BR Class 91 locomotive Electra.

Fig. 16 Isambard Kingdom Brunel at the Great Western Launching, 1832.

Brunel was the engineer of the Great Western Railway from the foundation of the company, and the works and supervision on that line were completed from his design and with his direction..

CHAPTER TWO

DESIGN MANAGEMENT AT BRITISH RAIL

The historical evolution of Design Management at British Rail.

Britain's railway system is the forefather of what we call today's' design management. In 1825, Isambard Kingdom Brunel began the Great Western Railway (G.W.R.) as an entity in which he had direct control over the design and installation of rolling stock, tunnels, bridges, stations and steamboats.

> Isambard Kingdom Brunel conceived and built the Great Western
> Railway as an entity including trains, tunnels, bridges, buildings and
> steamboats (Cousins, 1986, p2).

Being in control of all these factors allowed Brunel to create an image of the rail network to procure an individual design image under Brunel's management. This was essentially an early form of design management, known today as corporate identity. Tickets were invented in 1840 which also saw the beginnings of the use of specific liveries. " The Ticket was invented by Thomas Edmondson, a clerk on the Newcastle and Carlisle Railway, in the 1840s". (Simmons, 1962, 12). Railway uniforms and liveries were generally organised with reference to army structure. In 1884, it was deemed necessary to differentiate by design the employee structure, to consistently give an image of the distinctions which existed within that organisation. Railway uniforms borrowed the military brass, button and braid imagery in order to convey rank and standing in the company. The quality of the clothing also determined either a high or low authority position. A station master wore a single breasted suit with the initials NER (North Eastern Rail) in gold on his collar. All this pointed towards the beginnings of corporate identity and a designed organisational culture. " The railways were very hierarchical organisations. The occupations and ranks of employees were expressed in the cut and cloth of the uniforms" (Forty, 1986, p80). In 1922, there was confusion with 27 main companies and 97 subsidiaries all utilising different liveries. It led to a profusion of corporate identities which represented class, efficiency or respectability. It also must have caused a bewildering sight and a degree of difficulty in assessing which was the best company to travel by. The benefit of one corporate identity must lie in a visual consistency which reflects the value of service provided by that company. Where the service is not up to standard it remains any easy task to complain to one rather than twenty or more individual companies. The product design qualities of their trains were enhanced by the creative application of what is now described as graphic design, from basic signage, through commercial posters and staff uniforms, to tickets. Very few could actually afford the capital to redesign the train and carriages with most companies practicing interior carriage design only.

The rail network was gathered into four main lines by 1948, the profusion of many different line networks was proving financially difficult to control, as was the division of trackline. In order to expand the rail network, unification was seen to provide the best way forward. In the early 1960s under the guidance of the British Rail Design Board a system of managed design was to surface.

Gt. Western Ry. Gt. Western Ry
HALF DAY EXCURSION
RETURN TICKET
CHELTENHAM FLYER TRIP
Paddington 1 — Paddington 1
TO
SWINDON JN.
AND BACK
FIRST CLASS
SWINDON JN. SWIN JN
FOR CONDITIONS SEE K
020 020

Great Western Railway,
Issued on board O.G.T. S.S. "Normandie"
PLYMOUTH DOCKS
TO
LONDON (Paddington)
via Taunton
Including Special Saloon Seat.
FIRST CLASS
59/3 N Fare 59/3 N
London (Padd'n) London (Padd'n)
W.L. See back
104 104

Gt. Western Ry Gt. Western Ry
Channel Islands Service
Single Journey Single Journey
CHANGE OF CABIN
THROUGH
CHARGE 1/8 CHARGE 1/8
Issued at Weymouth Quay
FOR CONDITIONS SEE BACK
185 185

Gt. Western Ry. Gt. Western Ry.
PAUPER
GUERNSEY GUERNSEY
TO
JERSEY
EXCHANGED FOR
WARRANT NO.
THIRD CLASS
JERSEY JERSEY
W.L. SEE BACK
002 002

GREAT WESTERN RAILWAY.

SEASON TICKET.
FIRST CLASS on RAIL MOTOR CAR.
NOT TRANSFERABLE.

THE HOLDER OF THIS TICKET IS
Entitled to travel by any of the Company's Trains which
are available for ordinary Passengers, but is subject to the
special Conditions relating to Season Tickets, and to the same
By-Laws and Regulations as other Passengers.
This Ticket must be produced for examination when it is
called for by the Officers of the Company, and delivered up on
the date of expiry.
Any enquiry respecting this ticket should be made at the
Station at which it was purchased.

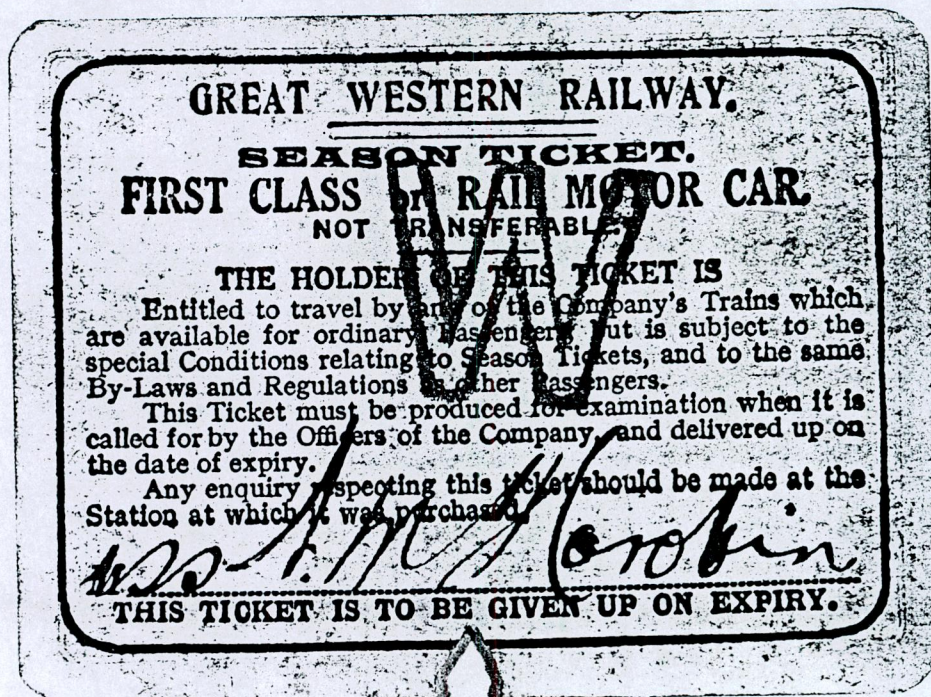**THIS TICKET IS TO BE GIVEN UP ON EXPIRY.**

Fig. 10 The First Rail Tickets.

The ticket was invented by Thomas Edmondson, a clerk on the Newcastle and Carlisle railway, in the 1840s. His numbered pre-printed pieces of pasteboard, was a system of information design basic to management control of revenue

The idea was to visually tie the British Rail (B.R.) system together as one company and project a new image, through a phased introduction of a new symbol, namestyle, alphabet and livery. The proposals were made by the Corporate Steering Committee - a part of the British Rail design panel." In November 1964, the British Railways Board agreed a series of proposals on corporate identity for its whole operation" (O'Brein, former MD of BR, quoted in Gorb, 1988, p259)

In January 1965, at the Design Centre, London, the scheme was unveiled to the public. It wasn't to be a once off launch of identity and design but an on going continually managed process of update, change and flexibility. For the first time in public transport history a corporate design manual for staff was available. This manual was a managed design instruction book, detailing the use of components of the new image and how they should be applied. Design was therefore now being managed, and it was no longer a situation of proliferation, but instead planning.

The manual was drawn up by the Design Research Unit and is still in existence today (revisions due to business expansion excepted) it defines British Railway's symbol, logotype, lettering, colours, detailing their use in everything from brochures and timetables to signposting and station fascia. The question must be proposed if these items were not managed what would the identity of Britain's Railways conjure. In Ireland the lack of uniformity in design sees the national bus carrier having three unco-ordinated liveries, *Bus Eireann, Dublin Bus and Citi Swift.* This problem is exaggerated in Dublin where Dublin Bus and Bus Eireann vehicles are used side by side. In addition to this the *Commuter Advertising Network (C.A.N.)* sells bodyspace as billboards to companies such as Smarties and Coca-Cola. What all this points to is design miss management, there is no unity in Ireland's bus public transport to compare with an example such as British Rail. " The public judges by the visual display on offer. If the customers are to be happy then design needs to be effectively managed" (Priestman, quoted in Gorb, 1990, p101). Ireland's public transport users are in the main cynical about their transport system. Having spent years utilising substandard equipment and seeing whatever corporate image existed being poorly maintained. As proof of how an integrated managed design identity can work, two years after the introduction of the British Rail symbol, it had achieved one of the highest recognition values in Britain, to match the Michelin man and other symbols.

The historical success of managed design did not go unnoticed by other international rail networks. Jock Keinner, alphabet designer for British Rail saw it adopted first by the Netherlands, then Denmark, Austria, France, Federal Germany, Norway and Switzerland. Whilst all these countries have eventually individualised or created fresh design images, the management of these design programmes as with the original, remains fundamental to their success. Each network has their own Design Manuals which structure the use and application of the image. This is to ensure that the identification of the company in the consumers mind is properly managed and co- ordinated to produce the right effect.

Rail alphabet
Combined sheet - lowercase

sheet no. **1/12/1**

issued **Apr 1985**

This sheet must be used for all lettering applications in preference to sheets 1/11 and 1/12

abcdefghi
jklmnopqr
cdego   acdegos
stuvwxyz
bceop   cdego
&-.,'()

The inner edge of the line represents the light on dark letterform

The outer edge of the line represents the dark on light letterform

arrow tile   arrow tile   word space

tile height

light letter   dark letter

Size 80
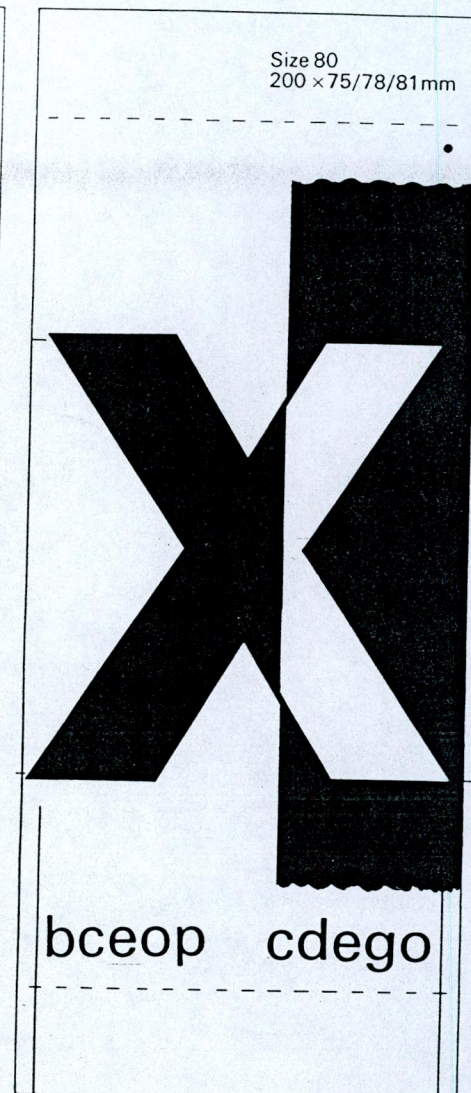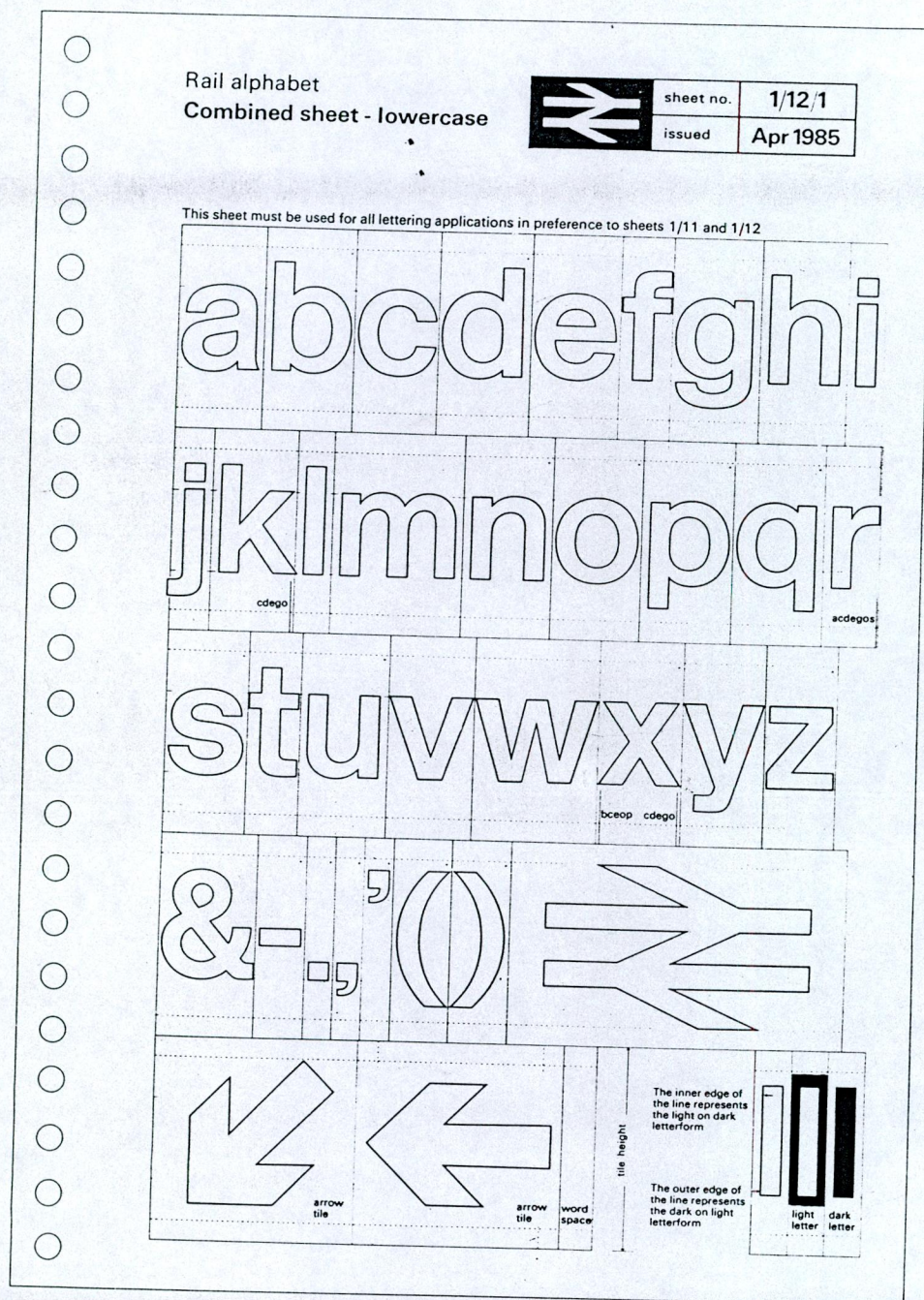200 × 75/78/81 mm

bceop   cdego

23

Fig. 11 TheCorporate Identity Manual and Typeface Design.

The alphabet was designed by Jock Kinneir, he performed tests at the Road Research Laboratory to determine that letters of an x- height of 55 mm could be read at more than 40 metres.
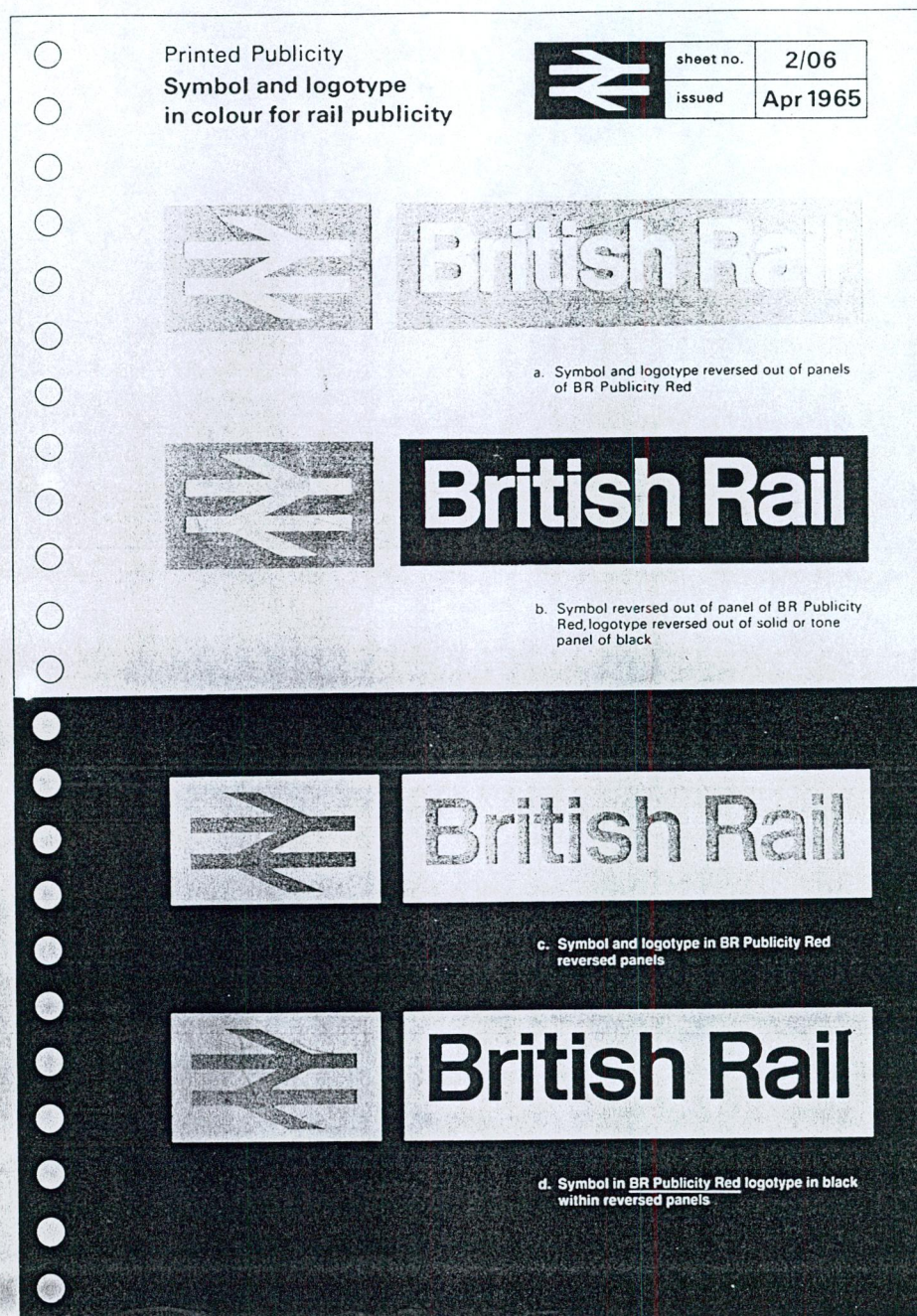
a. Symbol and logotype reversed out of panels of BR Publicity Red

British Rail

b. Symbol reversed out of panel of BR Publicity Red, logotype reversed out of solid or tone panel of black

British Rail

c. Symbol and logotype in BR Publicity Red reversed panels

British Rail

d. Symbol in BR Publicity Red logotype in black within reversed panels

18

Fig. 12 The Corporate Identity Manual and Typeface Design.

Kinneir, also determined that with such letters.put on a flat-type display of 990 x 113 mm, the station names and information displays could be indicated. The Alphabet was adpoted for use by over fourteen international railway networks.

What benefit does a managed design policy have for British Rail ?

British Rail has since the 1960s regained some of the original innovativeness started by Brunel in 1825 by application of a managed design programme. As described in Chapter Two a loophole in a design management policy can create mayhem as with the Advanced Passenger Train (APT) concept of 1983. Internally the mis- management of the design and engineering departments wasted over 43 million on the train, which failed to run on its press launch and was eventually sold for scrap.

> British Rail is undergoing a major cultural revolution. In line with other
> major organisations it is learning that design is a resource that can no longer be
> squandered (Priestman, quoted in Gorb, 1990, p100).

Through a reintegration of both the departments involved some of the advanced concept designs have been utilised on other rolling stock such as the High Speed Passenger Train (HST). It remains a sore point for British Rail that it is still without an advanced passenger train similar to the French "Tran Grand Vitesse" (TGV) or the ICE train of Germany. Whilst this caused intense embarrassment to British Rail there is no doubt that the company's managed design policy is effective. The introduction of new services into the British Rail network has proven to be efficient and cost effective. An example of this is that of the *RedStar* parcels division discussed later in the chapter.

In simple terms British Rail identifies a need or requirement for its network, because it has a managed policy it can tender external consultancies to fulfil this need with out having to worry about product integration/consumer identification problems. These companies then work within clearly defined established guidelines. Kenneth Grange's Pentagram and David Carter Inc. are just two of the consultancies used by British Rail on such design tasks. These would include seat design, trolley design and ticket vending machines amongst others. It allows British Rail Engineering Limited (B.R.E.L) to compete with other firms for world wide rolling stock projects. A recent design innovation was the Indian Light Railway (I.L.R.) system in which British Rail innovated, surveyed construction and ran the system in its infancy. The role of the design department is not therefore a dogmatic, inflexible and myopic department but one which essentially creates models and specifications for outside manufacturers. Despite the proposal for the High Speed Passenger train coming on stream only a short time after the cancelled and massive loss making Advanced Passenger Train, the British Rail Board still approved development. If design had not been represented on the Board, would this second phase of development and innovation have been allowed.

Because Design had a place on the management board they were able to convince the Board that new product design and the potential of higher speed would increase revenue. When the HST IC 125 service was implemented it cut journey times by 30% and resulted in an overall growth in revenue of 25%. British Rail because it employed a flexible design management structure did not fall victim again to the kind of organisational myopia it experienced with the APT, as outlined by Theodore Levitt.
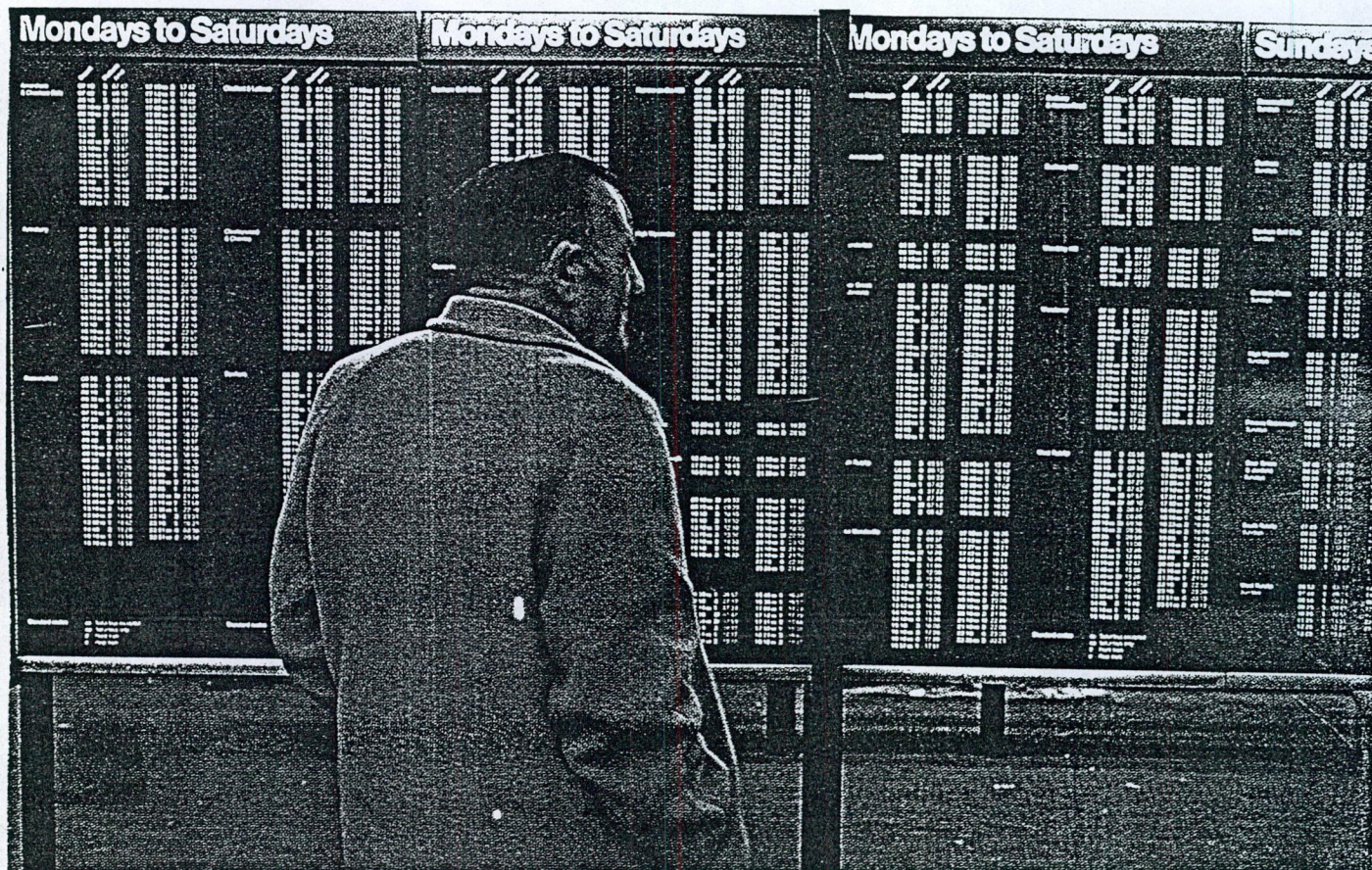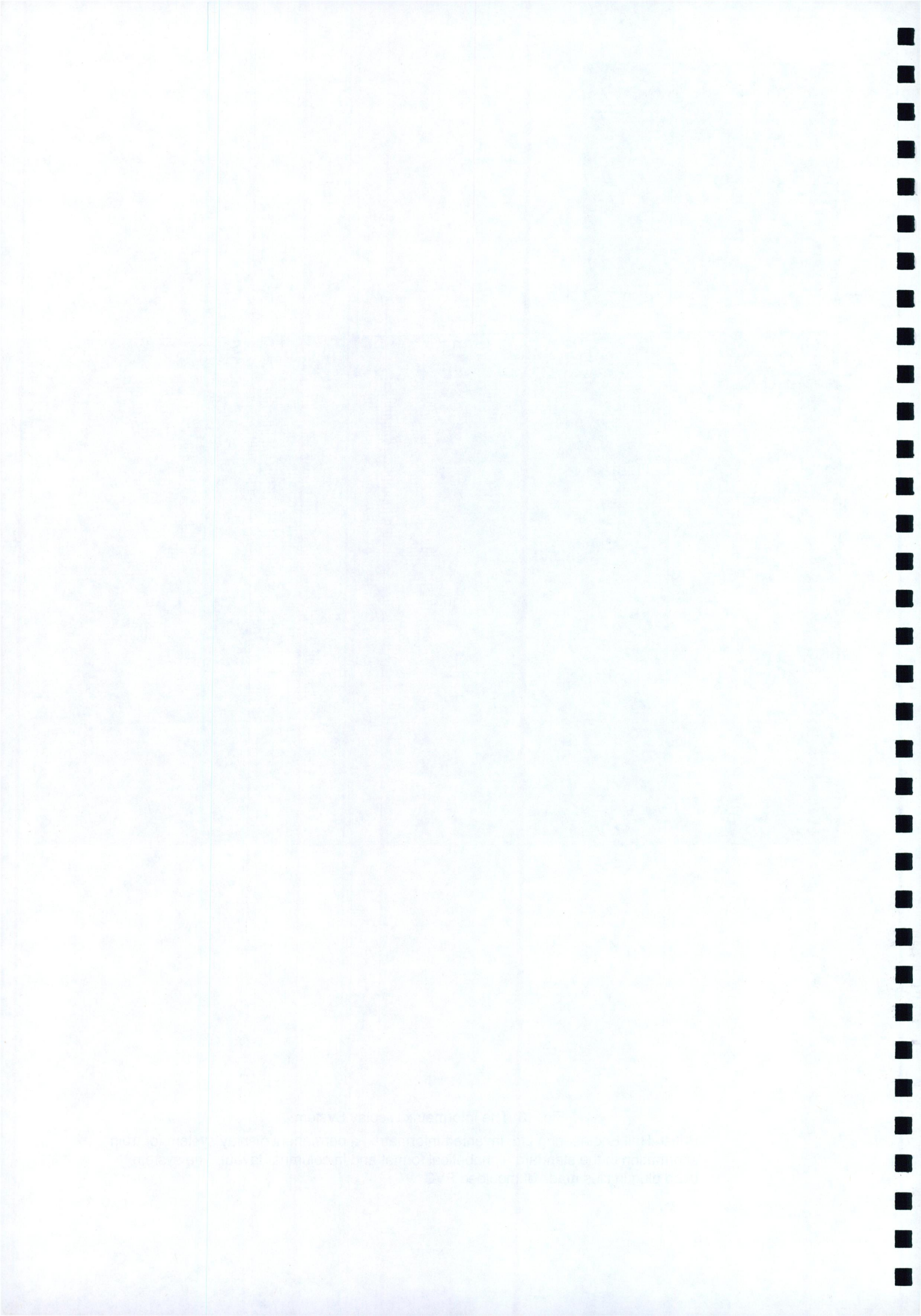
Fig. 13 The Informatrix Display System.

British Rail Engineering Ltd. invented Informatrix, a permanent display system for train information in the standard alphabetical format and in columnar layout. The system used plug in tiles made of moulded PVC

Fig 14 The High Speed Train on the new InterCity 125 sector line.

This is a typical problem of design and the corporate environment, where innovation is seen as an expensive burden rather than a financial essential. Levitt also suggests that companies with no competition often feel a managed image is unimportant, however this ignores the benefits of such a system which relays respect, quality and compassion to the user.

> The railroads did not stop growing because the need for passengers
> and transport freight declined. The railroads are in trouble because
> the need was filled by others, but because it was not filled by the railroads
> themselves. They defined their industry as railroad orientated, they failed
> because they were product orientated not customer orientated (Levitt, 1960, p12).

An example can be taken from British Rail when the *Informatrix* display system was invented, a display system was already in use and their were no obvious faults with the system. British Rail however decided to implement the new system as part of a managed equipment renewal and update policy. It was one of British Rail Engineering Ltd's tasks to provide this design for a new timetable display system. The idea has since been superseded due to use of computer displays, but the idea was profitable and went on to be used in Financial, Exchange and Foreign Transport Systems. British Rail remains convinced that an on-going design plan is fundamental for the company's future and survival once privatised. Commercial revenue from design alone netted British Rail with 150 million in 1992 [1] , and had a direct effect on network revenue as new design standards for seating and coach design were introduced.

British Rail design by Sector Management

British Rail has divided its business into five main sectors: InterCity, Provincial, London and South East, Freight and Parcels. Each has its own sector director who is responsible for key bottom line decisions. These bottom line decisions are concerned with the correct balance of image, cost, price, and quality. Regional managers focus their attention on co- ordinating and integrating production activities. There are functional directors for technical and long term sector policy decisions. Each of these rungs in the management ladder contains a design representative who is answerable to the Design Board Panel of the main British Rail Board. This ensures that unlike some commercial ventures or private industries, design is seen as having a financial and public image role to play in the management structure.

> Design in all five businesses has an effect on how the public and staff
> perceives the parent company - not just visually, but how good the service
> is, how clean the trains and stations are, whether things work
> (Priestman, quoted in Gorb, 1990, p102).

---

1. **Managing Design at British Rail, Jane Priestman, 1990, p99**

*Mindre ændringer har været
gennem tiden. For eksempel
trækket Inter-City blevet til In
ligesom et tættere spatieret i
som oprindeligt blev udført ti
af APT motorvognen, siden (
blevet indført på InterCity's ti
Der var dem, der beskyldte (
for at gøre vold på identitets,
gennem deres ønske om at
en logotype, der siger 'zap'.*

*Minor changes have occurre
example, the InterCity logoty
dropped the hyphen and for
applications adopted a more
version of the logotype – ori,
designed for application to t
of the APT power car – now
the InterCity stationery items
were those who accused the
of corrupting the corporate i
principles in their desire to p
more visual zing to the train*

Fig. 15 The InterCity Sector.
InterCity operates in a highly competitive market. It must therefore be attractive not only in
its rolling stock, buildings and marketing, but also in small detail design.

The introduction of sector management produced the requirement for an even more individual extension of the Board's Corporate identity programme in order to fulfil new venture demand. New liveries were introduced for each sector but tied together by utilising a sector House Colour policy and the original double rail link symbol. This allows variance in livery design but leaves the user in no doubt of the origins or parent company involved. Paint colours are also kept compatible for reasons of specification, maintenance, cost and application, another example of the benefits of carefully managed design where size can be made less intimidating. This is all the more important economically due to the competitive nature of the railway industry, particularly with the possible privatisation of British rail. It is also excepted that the livery must under go periodic re freshment and development. The livery is always the most dominant graphic symbol in a railway company.

The Intercity sector

The Intercity line in the past two years has under gone a gradual withdrawal from the 20 year old design of Blue/Grey to a colour scheme composed of two warm grey shades separated by bold red and white bands. Warning yellow is retained for safety requirements, though it has been incorporated into the livery design, on the HST IC 125, it is swept back along the engine carriage to suggest speed. Innovation also continues to be part of this sectors design management policy and future strategy. It includes the re- design of 41 first class carriages, 10 existing carriages converted for disabled use and a novel play area carriage proposal. " After a decade in service, InterCity's carriage fleet has started on a refurbishment programme including, tougher materials..."(Cousins, 1986, p103). InterCity is British Rails most well known derivative due to its widespread national rail links.

The Provincial Sector

The Provincial sector is a district and county line with relatively short links compared to InterCity. A new service incorporating rolling stock design was introduced in 1986 called "Sprinter", it heralded a great advance in diesel multiple unit design. " Two years of analysis and planning in Provincial have begun to pay off with the introduction of the new *Sprinter* units." (Cousins, 1986, p105). The Sprinter sector was a major beneficiary of British Rails design management philosophy. Local identity and advertising was required as well as integration with British Rails corporate image. An independent agency, Boase, Massimi and Pollitt, won the tender to produce a range of posters and leaflets which performed the delicate balancing act. The availability of a manual which specified British rails management policies for the implementation of graphics, helped the designers stay within their brief.

The London and South East Sector

The London and South East Sector (LSE) is another highly important route for

Fig 16 The Provincial Sector
Two years analysis and planning in Provincial have begun to pay off with
the introduction of its Sprinter units.

British Rail.not only is this the hub of the rail network to anywhere in Britain, but the South East will also have responsibility for the Channel Tunnel link (Chunnel) once complete in 1996. This sector was seen to require a more European approach, a factor which is changing the normal face of British Rail Stations. For the first time croissants are available from cafes owned by other companies than British Rail alone. Station architecture is being given a Euro look facelift to in order to appeal to and facilitate the new European customers expected with the new Chunnel service in 1996. To some extent the design management example British Rail gave to its European neighbours in the 1960s, is being repaid as Britain searches for examples of this European style abroad. Britain's rail stations are being given larger concourses and terrazzo's similar to those in German, Italian and Danish rail stations. It is a clear bid to bring new customers into the rail stations with having the requirement of an actual purpose to arrive or depart. This commercialisation through design of British Rail stations is hoped to provide extra revenue for the company apart from the revenue collected through travel.

The Rail Freight Sector

Rail Freight's design management task was to try and harmonise the vast number of differing railstock, provide harmony with the rolling stock of private owners, (Shell, Roadstone, Blue Circle, etc.), and to visually advertise the service in the same way as road transport utilises the side of articulated trucks. Rail Freight is further split up into *SpeedLink*, *TrainLoad* and *International*. All three divisions employ the overall characteristic alphabet, symbol, logotype, and colours of British Rails corporate design plan.

The Parcels Sector

Finally there is the Parcels sector, because its range extended beyond the rail network, a large red star with the British Rail symbol in laid in white was chosen to symbolise the division. It began in 1985 with the design as always of liveries, sales outlets, point-of-sale material, stationery and publications all dictated by a management policy clearly defined by manuals. The Star symbol was chosen because of its clear identification against the confusion of images one associates with today's moving traffic. Though Computer Aided Drafting (C.A.D) is increasingly being used for design, the design for the RedStar parcel division went back to basics. They used the same method as the original British Rail alphabet designer, Jock Keinner, had originally used. Keinner performed tests at the Road Research Laboratory in Cambridge to ensure the type was visible at more than 40 meters. Possibly a reason why the type was used by the British Airport Authority and why it was adapted for all of today's motorway signage. British Rail is therefore still growing in the context of design, management of such design change ensures it though that it never outgrows itself and that it's main function will always be to provide the consumer with the correct image of British Rail.

In British Rail the task of design management involves creating a corporate personality which is instantly recognisable and yet at the same time allows for wide rational individuality. The last thing we want is to impose an impersonal sameness throughout the company, such an attitude would be impossible to implement (Priestman, quoted in Gorb, 1990, p101).

Fig. 17 The London and South EastSector.
The sector has now embarked on *Operation Pride* which will include
comprehensive new look for train liveries, interior design and station improvements.

Fig. 18 The Freight Sector.
Current policy is to maintain the concept of a clear RailFreight identity which
is consistent with overall British Rail corporate policy.

Fig 19. An Example of External
        Consultancy work for
        British Rail.

Mock -up of Designer David
Carter's proposal for the
Electra locomotive.

Fig. 20 Prototype of the APT- P train.
The high speeds proposed meant the front end of the APT had to be aerodynamically
efficent, the required warning yellow paint work was incorporated into the exterior
design.

CHAPTER THREE

**DESIGN MANAGEMENT, CORPORATE GAMES AND
DESIGN INNOVATION AT BRITISH RAIL**

Introduction to chapter

This chapter explores the way in which design management impacts upon the whole process of running a railway network. The example used is that of the Advanced Passenger Train (APT) and details how corporations mistreat design management. It argues that design innovation, a key element of design management, even technically spectacular ones, can often fail because of problems within the culture of the organisation, and more especially its design management culture. Design innovations are paralysed by organisational microcultures which trap new ideas and prevent their full development. This chapter explores those circles and their negative impact on design innovation at British Rail with reference to DSB.

DSB has been following the way pioneered by BR - first adapting a comprehensive design management programme and fighting it fiercely. The situation highlights the classic dilemma of design management: on one hand it is necessary to motivate and stimulate innovation thinking, on the other hand to keep the overall image consistent, and in some cases restrictive (O' Brien,1988, p266).

British Rails Corporate Failure

British Rails "Advanced Passenger Train" will go down in history as one of the most successful innovations ever to have failed, despite having been the first with a design management department. At the same time British Rail had major requirements for new rolling stock, in 1979 in a European Railways Performance Comparison (British Rail Board, Table 5.4, p33) only 16 locomotives were built out of a total fleet of 1,000 requiring replacement. DSB were also suffering form staggered growth introducing their first new train for years in only 1988, the IC / 3. How did one of the main protagonists for design innovation and management fail?. One of the most promising and far sighted passenger trains of all time was turned into a huge failure, wasting twenty years of research and development within British Rail. British Rail's design management department looked to the APT as a major contributor to BR's image, the reduction of costs and a shortening of passenger travel times.

With completion of the Channel Tunnel, the train was intended to provide the ideal mode of transportation for international rail travellers as well, offering the perfect foil to the TGV (*Tran Grand Vitesse*) of France operating on the other side of the Channel. Instead the Chunnel Train, specially designed by British Rail, is to provide the service. On the 20th Dec 1993 at its first press launch, the Chunnel Train had to be pulled by diesel locomotives because of major design flaws in the braking and the different power delivery systems in operation on the other side of the Channel. British Rail is still suffering from a lack of proper innovation investment and control policy connected with the APT's failure. The APT never actually went
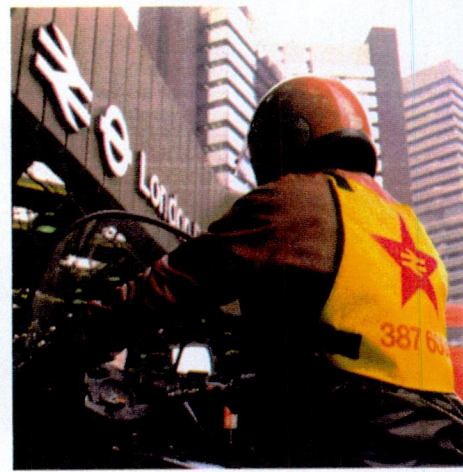
Fig. 19 The ParcelsSector.

In 1985, British.Rail decided to adopt a special corporate identity for *Red Star*, its rapid delivery service for parcels. Staff, packaging, signage and rolling stock all have a common visual identity.

into full service. The project was abandoned, only one of the original trains still survives at the National Rail Museum , the other prototypes went for scrap. The shame of British Rails failure in design and innovation management was graphically portrayed in the press -

APT's were sitting forlornly in ever breaker's yard, wheel-less and leaning over. Burly men with sledgehammers were standing on the roof of one of the coaches smashing out the windows (Nock: 1983, p7).

The story of the APT goes back twenty years to 1967, two years after the formal regeneration of British Rail's image by the design management unit. The framework of objectives was far sighted, incorporating speeds 50 per cent higher than existing trains, an ability to negotiate curves 40 per cent faster than current stock, run on existing track, be efficient in energy and noise consumption and reduce journey times. These objectives determined the main innovations to be attempted by the design management department for the APT program, which together represented the most radical jumping rail technology ever attempted.

Not content with modifications to existing train technology, the Design Centre at Trenby had set in motion a programme of fundamental research, its objectives being to find solutions to a number of intractable rail problems. One such example was the problem of "hunting" - an affliction of today's 1988 Chunnel Train. Ever since 1845 railway engineers had been aware of a trains cone- shaped wheels vibrating uncontrollably, as speed was increased and becoming unstable (rapid lateral oscillation) thus it effectively maximised the speed any train could safely reach. By trying a controlled number of systems on a radical new type of bogie suspension, the BREL (British Rail Engineering Ltd.) were able to far exceed the design speed objective (200 mph). They had thus solved a problem of 150 years standing, an event in railway terms as significant as breaking the sound barrier. This proved the value of design and its effectiveness to the heads of management at British Rail and was singularly responsible for securing the remaining funds for further APT development.

Lightweight, aerodynamically designed body structures became a major export when foreign companies were informed that they weighed 40 per cent less than conventional trains and gave a 30 per cent fuel saving at comparable speeds. Low unsprung mass technology substantially reduced track damage and therefore maintenance costs. It seemed as if the design management department at British Rail was achieving the incredible. It was succeeding in bringing together every conceivable element of British Rail and ensured that quality, cost effectiveness, and image improvement were all accounted for.

Due to the age and construction techniques used, a major part of British Rail line consists of imperfect, sharply curved track. The design management department were informed that the funds required to build " motorway" class track, as the French did for the TGV, would be infeasible and was thus required to find another lower cost solution. " In the end they did find a solution which, if it had been successful would have equalled the French for a cost of only one fifth" (Holligsworth: 1985, p215). The method involved using a tilting body mechanism to counter act powerful centrifugal forces exerted upon passengers as they hurtled round tight bends. The theory was that passengers would experience nothing unduly strange as a result of travelling in this "out of horizontal" position. Because of the elimination of all centrifugal forces they would in fact enjoy an extremely comfortable ride. The speed improvement was estimated to be anything up to 50 km/hr which, translated into journey times, meant a five hour journey would now take less than four. The Design management team were beginning to succeed beyond the aspirations of the British Rail Board, not since 1965, at it's formation had the concept of managed design proved to be worth so valuable a corporate weapon.

> So far a head of the field were the Design Managements innovations that
> license deals to use them had been immediately snapped up by more than
> thirty foreign countries, especially DSB (Bate: 1989, p158).

By any standard BR seemed to have formulated a "winning design program", and few would have predicted the debacle that followed.

The APT managerial conflict

First began the delays, it took the design management team two years to persuade the management at British Rail and the Ministry of Transport to further support the APT programme, despite its initial success. As is usual with large bureaucracies the design department had failed to account for internal conflict with its design and implementation policy.

An industrial dispute over the "one driver only" and "construction duties" of the APT caused a further fourteen month delay from July 1972 to September 1973. In 1975 several speed records were broken, but several technical and manufacturing faults also began to appear. The design department was at a loss, most engineers had been relocated during the fourteen month strike and several key elements had been discarded or scrapped. The tilting mechanism was jamming or failing, brakes were overheating, failed bearings in the

APT-P End Trailer Bogie

1 Auxilary friction brake
2 Wheelset with hydrokinetic brake
3 Secondary tranction linkage
4 Air spring
5 Lateral damper and bump stop
6 Bogie frame
7 Anti-roll bar
8 Secondary yaw damper and linkage
9 Primary suspension
10 Tilting bolster
11 Tilt jack
12 Primary traction rods
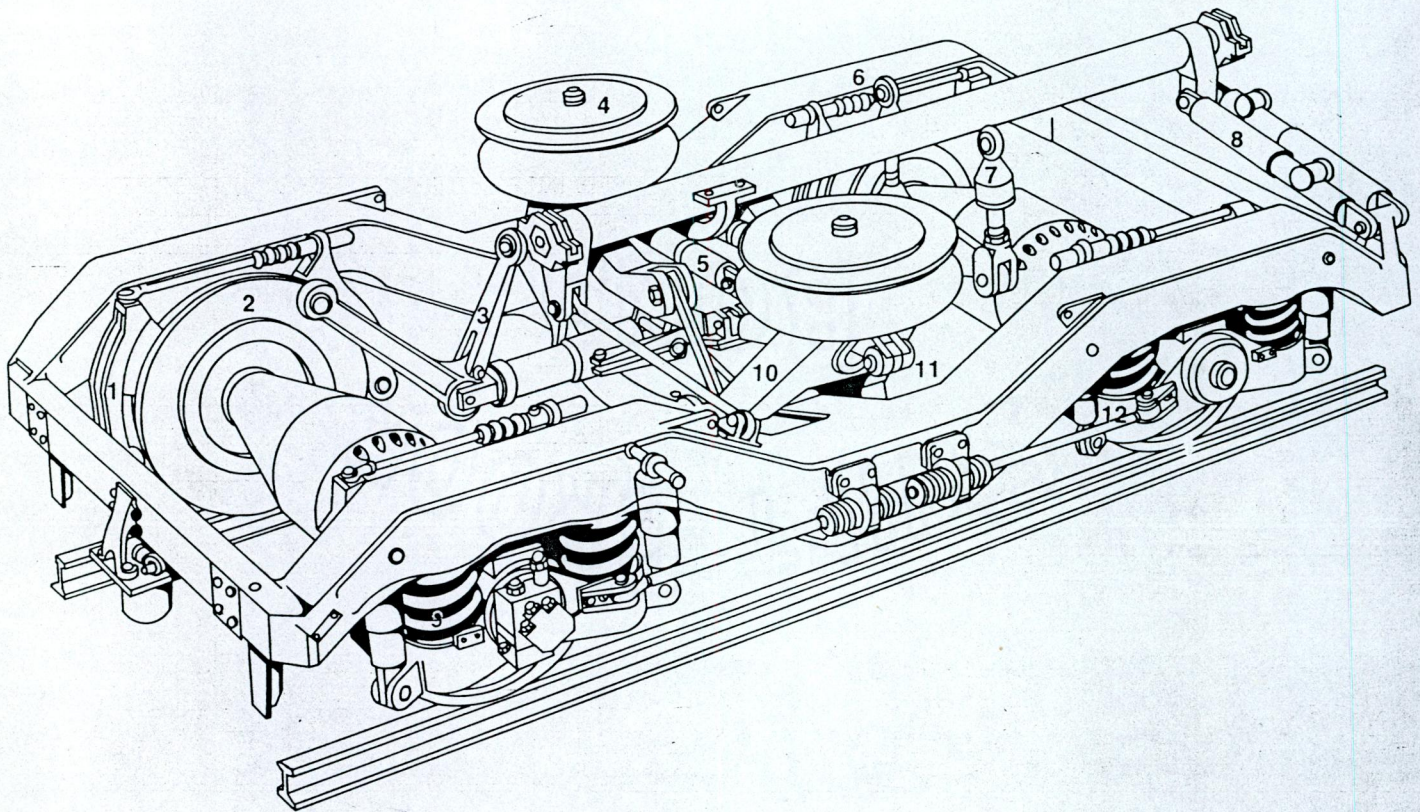
IX

Fig. 22 The APT End Trailer Bogie Design by British Rail Engineering Ltd.

The Advanced Passenger Train featured advanced features such as this self-righting bogie to allow the train to corner more quickly by allowing it to lean into the rail..
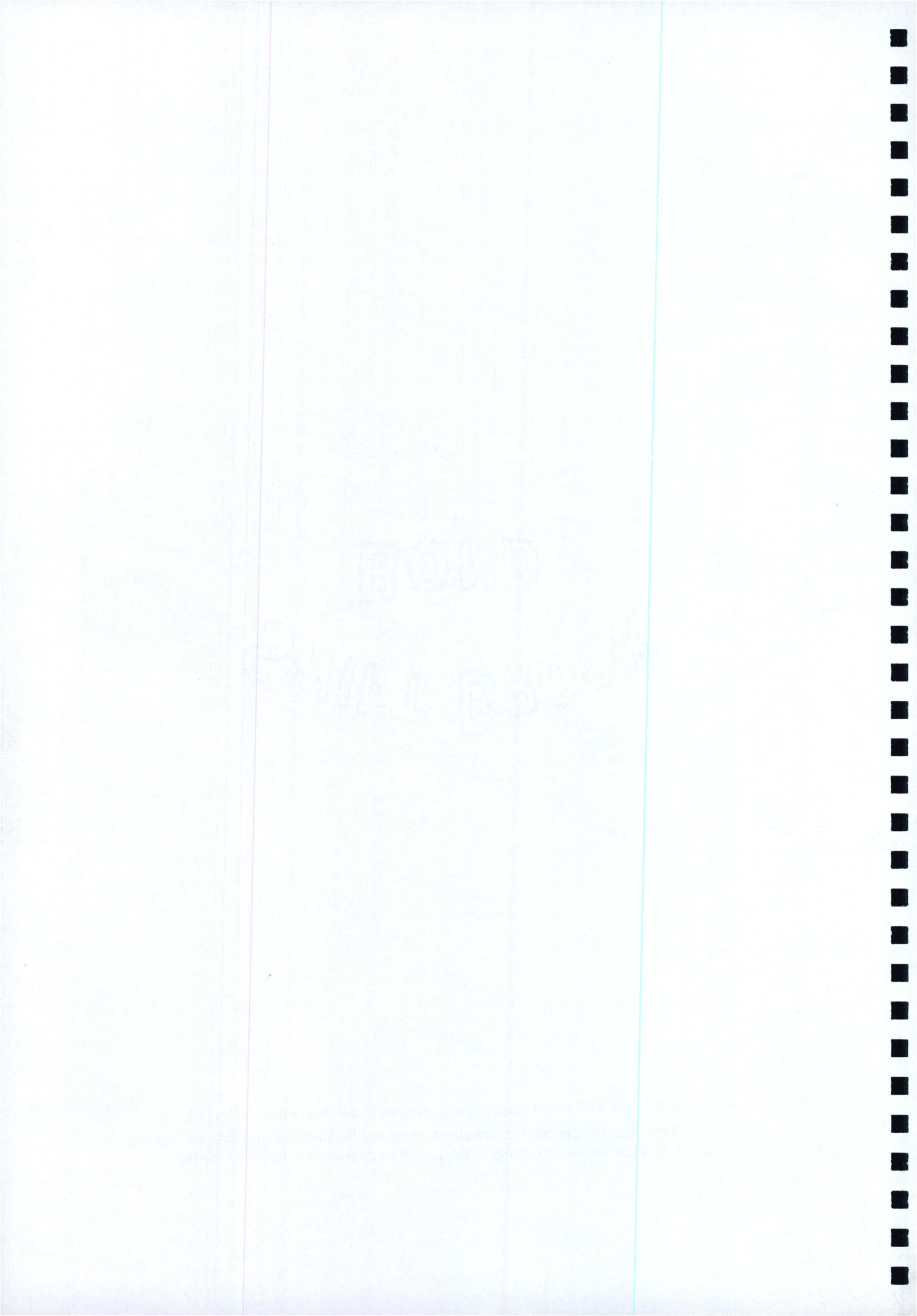
hydrokynetic brakes were exploding. Failed bearings in the hydrokynetic through seals, a problem which thirteen years later cannot be answered on the Chunnel Train, though here the difference in rail track design to France has caused the main problem. The question remains how a design or engineering department spending hundreds of millions of pounds designing a new train can discover later, that it designed a train for track it could not properly use. The problem is one of power pick up, where the English system uses a third line to provide power the French only uses two. A basic design factor which suggests that the "design based" management of the project was not very efficient, if it had, the problem of different track types should have been isolated at the design research stage. In 1978 a combination of design inefficiency led to the dramatic derailment of an APT prototype at over 160Km /hr. It was a thorn in the side of BR's design management and British Rail itself. It would be difficult to cover up twenty two meters in length of smashed train, especially since so much of the public were following the early successes of the APT. It had become a national symbol of British "know how" with features run on every television show from Tomorrow's World (1978) to Panorama (1983). In 1981 a full three years behind schedule and under pressure to show results on BR's 43 million investment, the project managers decided the introduction of the train in to public service could no longer wait. It was to highlight the key point being made in this chapter that design management can be effected by organisation culture. The design management unit resisted the trains introduction, preferring to iron out the problems by asking for more time. However British Rail's corporate culture remains financially based and in the end the design management unit was overruled

> A group of newspaper reporters who were travelling on the train and who had consumed alcohol - courtesy of British rail - began to complain of being seasick every time the train went around a bend (Bate: 1989, p158).

From now on the trials and tribulations of the APT were to turn into a daily household spectacular, which publicly began to ruin the image of British Rail. As mentioned the intentions of the design management team proved anti- establishment, British Rail decided to "go live" ultimately proving fatal for the train. On a run the trains tilting device failed, bringing passengers to their up right positions and causing glass and crockery to break. Only one of the first six trips actually reached its destination, all of this took place in a blaze of publicity. " Fearing further humiliation BR withdrew the train from service" (Hughes: 1988, p50).

The technical problems of the APT were merely symptoms of a much deeper problem of trying to manage such a complex, innovative project from within a bureaucratic organisation. The APT failed not because it was a "bad" train but because the project was
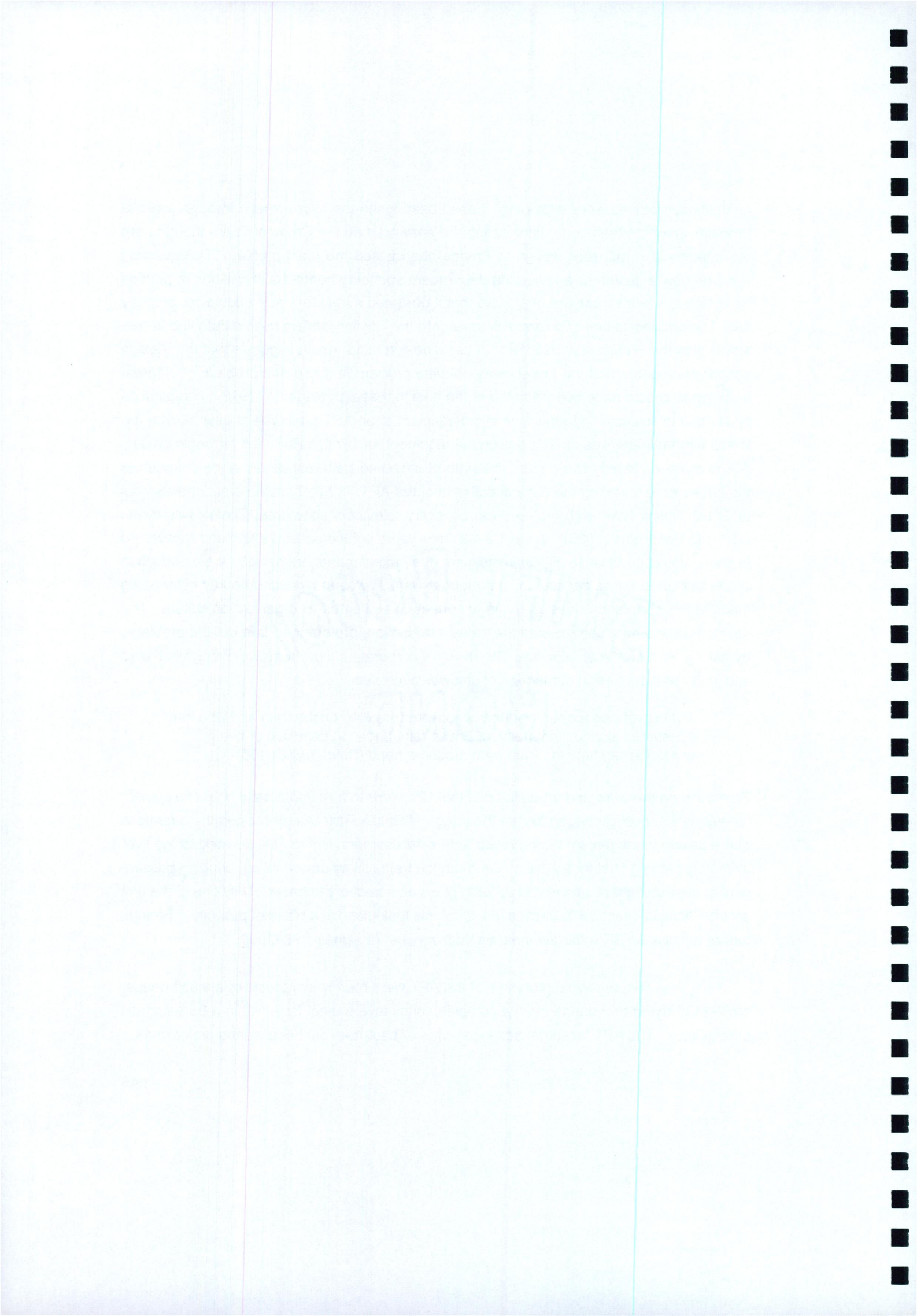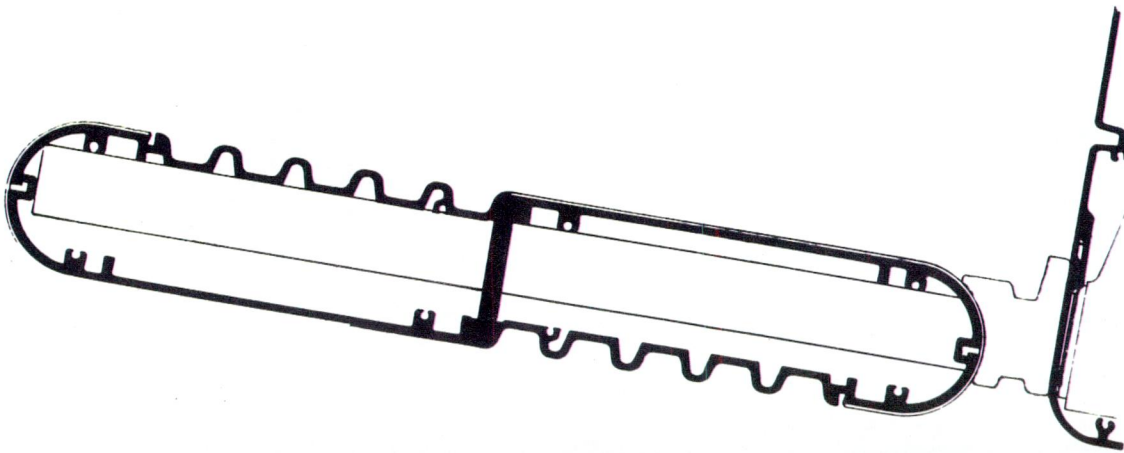
Fig. 23 The Interior Design mock up for the APT Train.
New carraige development has generally been initiated by the use of models and full
sized mock ups for evaluation according to business specification.

badly organised and badly managed. It was not the culprit of the design management unit but was itself the victim of organisational circumstances.

> There was no reason why the design management unit had produced
> a total barrier to innovation. It was in other areas of its management (BR)
> that the seeds of failure lay (Potter: 1987, p131).

The effect of organisational culture on design management

British Rail sits uncomfortably within a metaphorical arena, like DSB, large and unwieldy they are a blot on the landscape of innovation and its implementation. Mintzberg indicated, "efficiency is their forte not innovation",(1979, p346). Innovation is therefore an organisational issue as well as the soul right of a technical unit. Projects like the APT fail within DSB and BR because the organisation has reached its "limit" of understanding for innovation. It could also be said the design element of that organisation has not been allowed to reach their "limit" . But what are these limits to the full incorporation of successful design management. The most obvious is structure. "Progress on the APT prototypes was slowed down after the decision was taken to incorporate the Design Team into the Mechanical and Engineering department." (Potter : 1987, p23) . A decision taken by the British Rail executive board, not the design management unit. Such meddling with design went against the original concept of the unit, to bring together, not intimidate. The team became under increasing pressure to abandon its " distracting high tech irrelevance and get down to the real problems of day to day rail trains" (Bate: 1989, p159). A classic role conflict was induced by this structural re arrangement, without giving full thought for its effect on design and innovation. It was a form of crisis management which contrasted sharply with the steady implementation programme built up by the design management unit since 1966. Activities like innovative design, require a more flexible organic structure as constituted through design management policy. The connection between the structure of an organisation and the innovation process suggests that organisation designers have an important role to play in providing the right structure for innovation to take root and grow.

" Even the most innovation friendly structures will fail if cultural problems have not been addressed" (Bate: 1989, p159). The second type of limits are political and attitudinal, the powerful trustees of corporate status quo see an innovative initiative as a threat to their values or position. The design management unit should seek to manage and nurture such initiatives so that they do not pose such a threat to the corporate status quo. It is understandable that a management structure with its main focus in finance and profit, will not be able to

quantify the costs, or results, of such initiatives. Railways are a conservative business, and the innovations of the design management unit were anathema to the traditionalist school which typically exists in senior management. Senior management fought the design management unit behind the scenes, undoubtedly a contributing factor to the downfall of the APT.

A trend towards anti -design management in British Rail senior management

Cultural reasons have been put forward as to why design management is not always fully allowed to implement its policies. Drawing on data from a study carried out at British Rail at the time of the eclipse of the APT project, it argues that the more radical change endeavours, like the APT, were "paralysed" by BR's organisational culture, to be specific by senior management culture. It was putting a straightjacket on innovation and development, laying down a whole set of inflexible norms governing, what was acceptable and unacceptable, what was possible and impossible within BR's organisational structure. The design management unit was prevented from operating in the format originally defined for it. The limits to any design or technological innovation is the degree of perception built in to the basic concepts and the knowledge that people, individually or collectively, use to make sense of and respond to within an organisational community

Sociologist George Simmel explained in his Theory of Forms, " Aspects of reality can be grasped as possible objects of experience and knowledge only if they fall under some cognitive form" (Simmel quoted in Oakes:1980, p10). It therefore, identifies the conditions under which a certain kind of cognitive status can be ascribed to a given item. In British Rail's case senior management began to ascribe their own aspirations for innovation and design, preferring to over rule the expertise of the design management team. Design development should be an imperative based on perception. It requires that the world be seen in a particular way, that discriminations are imposed on railway development, as fine filters through which any new development must pass on its route to acceptance and implementation. Such fine tuning avoids conflicts with the potential non- innovative framework of senior management. This should exist whether a company has a design management structure like DSB or British Rail. Organisational reality for everyone, including the management community, is constituted by a multiplicity of such forms, each having its own characteristic language and logic, and each producing a representation of the world that is unique to that form itself.
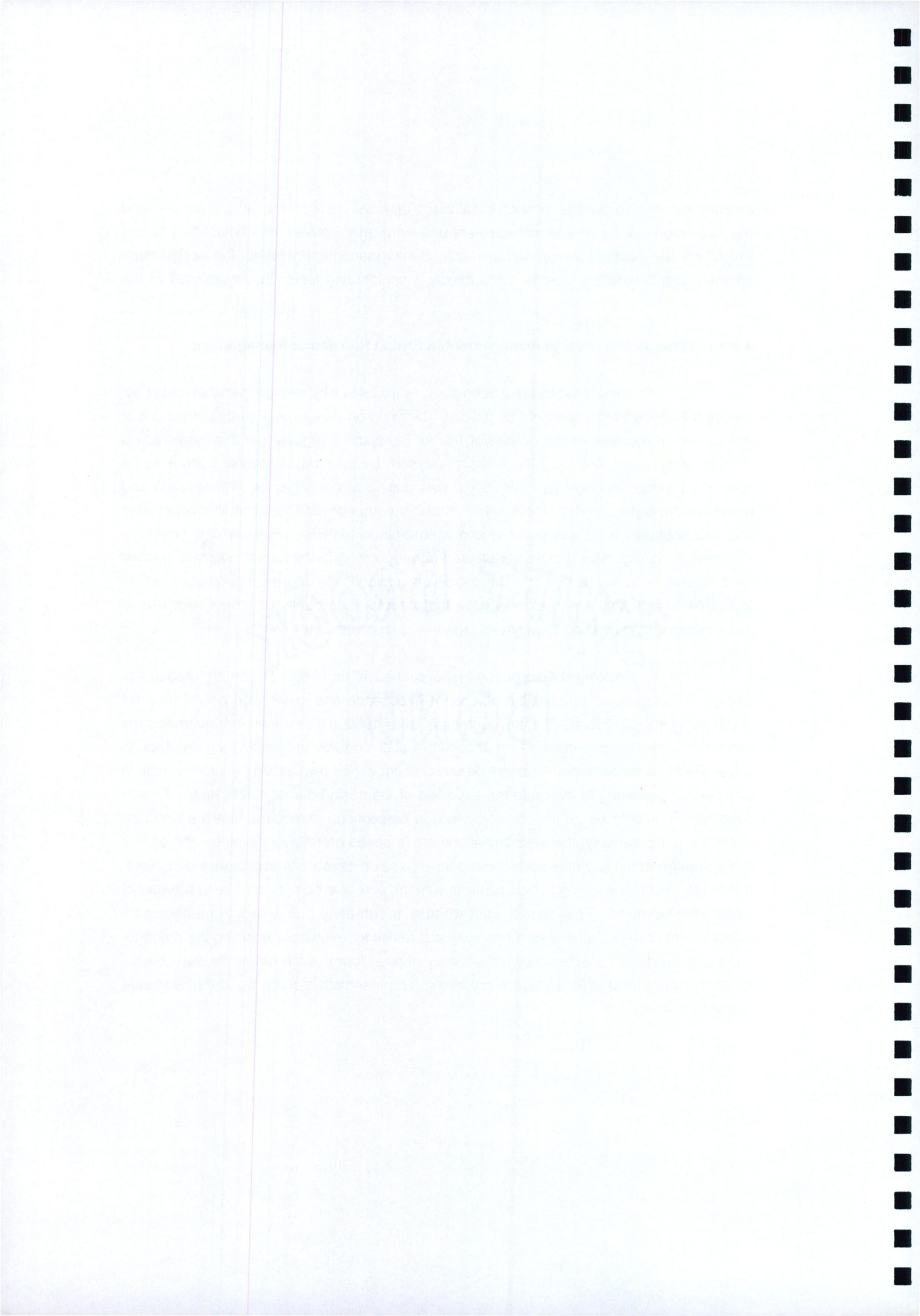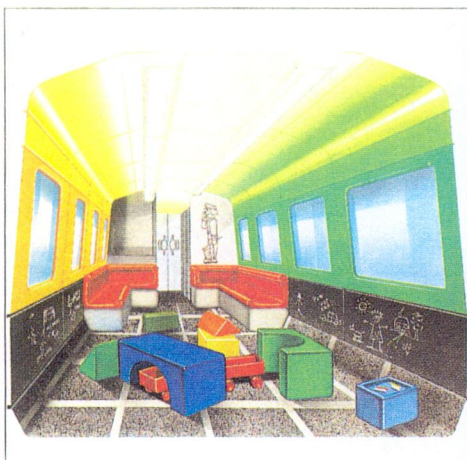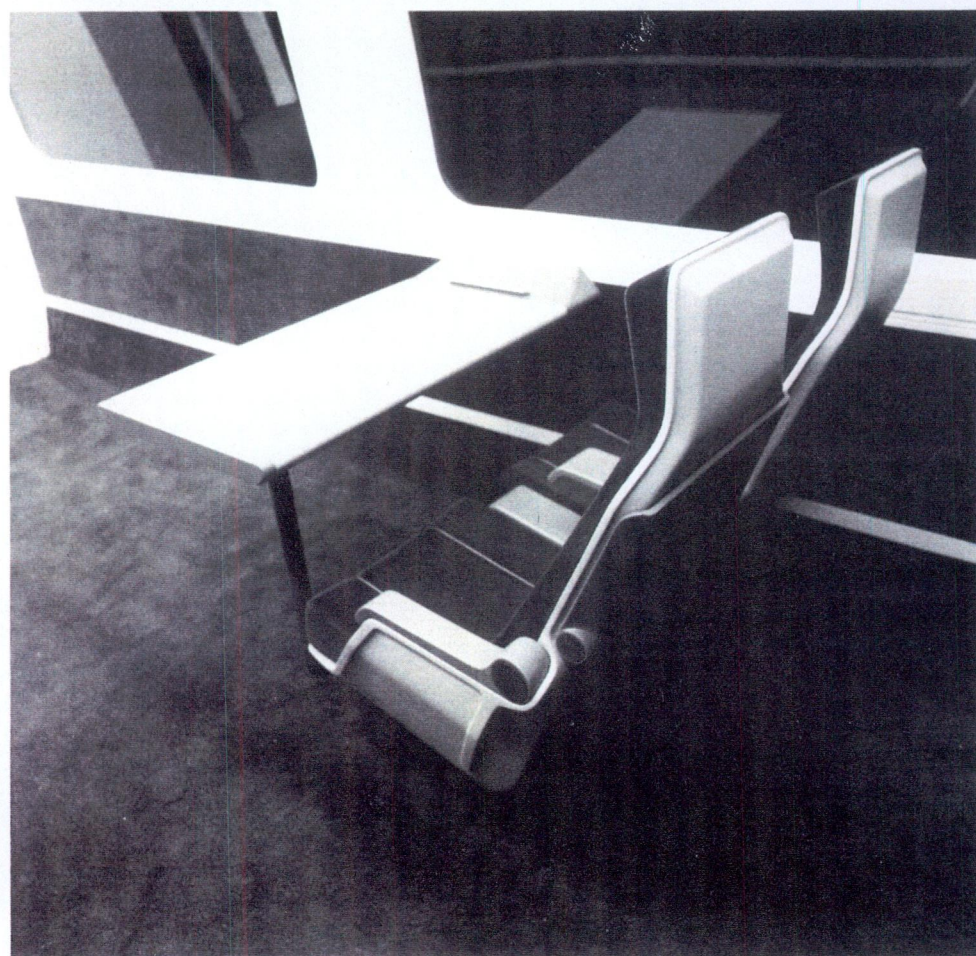
Fig. 24 The Interior Design of the InterCity High Speed Train.

Designs and trial samples to colourways.and technical specifications are produced to meet Sector business requirements. Endorsement is required from the Board's Design Panel for the environmental design of carraige interiors. A new item is the play carriage proposal.

From the perspective of the individual ..... the world of design culture
begins to assume the appearance of a colossal domain of uncanny,
threatening, and oppressive objects which he can neither appropriate
or dismiss (Oakes: 1980, p37).

The individual design management executive must passively acquire and
assimilate these rules of understanding in order to gain admittance to the senior manage-
ment community. Senior management requires such a dogmatic approach to confirm the
methods and identity of that particular executive style and provide a basis for managerial
experience. This is true for both British Rail and DSB. Certainly there is a strong moral
dimension operating within them to deter others, such as the design management unit, from
challenging them. Generally, as should have been the case with design management at
British Rail, the corporate board are not interfered with by the normal everyday process of
change. In their preference not to be interfered with, the board retains its traditional conser-
vative style of management. This ensures senior managers are protected from the need to
replace their particular managerial skills. An example of this was the APT as a scandal it
became too much of a humiliation for senior management at BR so they withdrew. If British
Rail had featured managers from the London Business School, who are taught design as
part of their MBA, would the management then have treated the situation differently?.

In 1985, in a classic euphemism that only bureaucracies, can produce,
the board of senior management announced the APT was to be
deferred indefinitely. In a word scrapped (Bate, 1990, p159).

In the context of innovation and the design implementation process, BR's
management culture is too important to ignore. Interpreting the APT fiasco is to demon-
strate how certain fixed "habits of thought" within the BR management structure - ruling
truths, dogmania, dominant mentalities and organisational interference militated against their
own design management team. Limits and narrow tolerances were imposed on it's develop-
ment, causing it to lose momentum over time. Since the APT disaster a study was commis-
sioned in 1990 by BR's Central Personnel Directorate known as the "Cultural Study". Its
broad purpose was to help the management develop new perspectives on modes and
strategies of operation and innovation, and in particular on how it went about managing
change. Data was gathered through open ended interviews with 80 of the organisations
most senior managers over a six month period. Although the APT was not on the agenda
for discussion, many of those interviewed had been directly involved and often referred to it.
The APT had come to acquire a particular significance for the people involved, people who

saw the APT as a return to 1965, the year when BR had planted the seeds of design and innovation, only to ruin the crop in 1985.

> There are powerful, enormous metal anchors on the things you want to change. They are stuck in some pretty solid ground. Given BR's unbroken history of 150 years you have got to work long and hard on your idea, but the trouble is that in the end it is easier to say ' blow it '(BR senior manager, quoted in Bate,1990, p161).

Senior Management and Innovation

The issues uncovered produced a two year and a half year organisation development programme. A close examination of the senior management group showed that they were frequently devoid of any strong innovative orientation or capability. They could on;y manage incremental change within the existing frame. This framework was well suited to individual initiative, evolutionary or "improvement" kinds of innovation but was incapable of responding effectively to the more radical research based initiatives like the APT. The APT should have been managed by the design management unit who would have been aware of the right structure under which the APT could be formulated, prototyped and approved for eventual introduction. It was senior managements role to address the resultant departmental arguments and industrial disputes which occurred during the APT saga. Senior management thinking and action is culture bound, the culture improvises but never dares to innovate. The outcome, despite the financial loss, in the case of British Rail's organisational culture was not tragic.

Revivals in the guise of the High Speed Passenger Train (HST 125 IC), occurred leading to renewal and replenishment of the whole organisation, and a new lease of life in the area of innovation. This supports the earlier comment that senior management is improvisation based. The key factor on whether BR's design management unit would recover or not hinged on the senior management group, and whether it could discern the problem early enough to do something about it. British Rail saw the problem and was able to jointly resolve, with a new head design manager, Jane Preistman, the kind of cultural shift needed.

The question is why initially companies such as British Rail fail to see the need to change and allow one of their own departments to take control of what it was set up to manage. The explanation is that senior management, as proposed by Theodore Levitt, 1980, wi suffer from " design myopia". A cognitive and personal affliction that prevents them from

gaining a clear appreciation of what's involved and the action that needs to be taken. " This myopia exists in all large organisations and is labelled, 'collective blindness' ." (Harvey-Jones, 1989, p78). It's impact is very serious, leading to a collective lack of innovation and change. It is an organisational disease which impairs the intellect and sensory functions used for innovation, individuals confronted by the disease rarely alleviate their own condition. How people will come to think about the APT will thus depend on how they "talk" about it, as was highlighted during the " Cultural Study ".

> You have to get all these plates spinning to make something
> happen a plate falls off and brings the rest of them crashing down.
> The chances of someone getting them all in the air and keeping them
> there are very small (Senior manager BR, quoted in Bate,1990, p163).

Perhaps the APT team found themselves unable to work within the confines of the Engineering department, because the modes of communication were different. Every profession has its own language, whether it is technical, judicial or financially based, failure to grasp an understanding of such language leads to ignorance and illiteracy. This eventually leads to mis understandings and a break down in communication between the departments involved. On the APT project, if the design team had been allowed to remain as an individual group working on the APT, answerable only to the design management unit more progress could have been made. Instead by allowing the engineering department to take control of the project internal communication difficulties were created. One aspect of design management is therefore to act as a negotiator, to remove such internal communication problems, satisfy the work ethics of each department and provide a means of discussion which allows beneficial co- operation.

> The meaning and significance of a process of innovation will be created
> by the linguistic enactments of those involved in the course of everyday
> communications with each other (Evered 1983, p126).

To conclude it is not difficult to understand why so little progress was made towards a management culture which embraces innovation and design as part of its corporate objectives. It is in direct contrast to what one finds in design, where for example, innovations are invariably explained by " man's struggle with form and the search for cultural transcendence " (Lodge 1981: Peckham 1985). There is much in common between the world of the arts and the world of organisation in regard to the basics of the process of invention and innovation. It requires no explanation therefore, to site the positive influence any design management unit can have on innovation and cultural change, within any organisation.

CHAPTER FOUR

BRITISH RAIL, CORPORATE MANAGEMENT
AND GOVERNMENT POLICY

It can be argued that the rail industry was the creator and major contributor to the Industrial Revolution. It created new manufacturing possibilities and use of materials, such as steel and iron production. As has already been demonstrated in Chapter Two, British Rail has been the foremost user of design and corporate identity, by management, within it's organisational structure. It also maintained the innovative status of Britain's involvement with Railway development it was was " responsible for the construction of 51,000 bridges, 700 tunnels, 22,000 miles of track and employed 78,000 in 1989" (British Rail Board, 1990, p21).

By the early eighties however British Rail development and innovation was experiencing a severe reduction in design activity. Due to economic policies, management conflict, and the continual threat of privatisation, British Rail was unable it argues strongly against the privatisation of Britain's rail industry and the potential privatisation has to further destroy design innovation policy. As the famous economist John Stuart Mils said: " countries which at a given moment are not masters of their own transport will be condemned to ruin in the great economic struggles of the future (1954, p9). Cargo will be determined by cost not need, and the quality of the service will to some extent no longer be answerable to public interest. These points are derived by the fact that , a private company is unlikely to carry the debt, or be as responsible with the debts, involved with running a full service network. British Rail pays out over 150 million a year in subsidies to British rail to ensure the service is adequately maintained.

The future and the economy of British Rail

In 1981 it was estimated by the Transport 2000 research group that 31 per cent of all households had no car. These people were dependant on bus, rail or private taxis to support their transportation requirements for shopping, medical and educational needs. Private enterprise could not hope to fulfil all the needs of this sector since, it would be unable to operate economically on low income routes. For example in 1980, the Transport Act deemed the Oxford-London route should be opened to private investors for the first time. British Rail at the time carried 15% of all commuter traffic between the two destinations. Instead of an improvement brought about due to increased competition the reverse occurred. Whilst British rail maintained it's service, the private companies diverted funds from less profitable areas in an attempt to stem the competition, " this resulted in those areas being worse served than ever before " (Hansard, 1976, p5). This in effect demonstrates the likely effect of privatisation on the transport industry. One response to the question of British rail privatisation was it's plans for new markets, an example of which exists in the form of the *Parcels* sector. It was proposed that through a subsidiary, it would form a rail-bus service, similar to that of British Rails former company, the sea-rail subsidiary " *Sealink*". However recent history with rail passengers has demonstrated their reluctance to travel on buses as opposed to rail, for reasons of reliability, comfort and speed.

One may be quite incapable of folding up in order to get into a car or of holding one position for any one time as necessitated by bus or coach journeys, and yet be perfectly able to travel by train because of the possibility of standing up and walking about (The Times, Feb. 1984).

This defines the problem as being one of design as well as management. For disabled people in particular the design difference between a bus and train causes major problems, such as access, convenience, wheelchair storage and toilet use. The redesign of Britain's InterCity trains included the adaption of 10 carriages especially for disabled people.

The second area of British Rail under threat of privatisation was the RailFreight sector. In 1981 only 114.1 per cent of the tonne mileage of goods was carried by rail compared with 64.3 per cent by road and the remainder by sea. In consideration of the reliability and road congestion experienced by road hauliers the rail network should provide a better service. Opponents of public transport have used the argument that since 64.3 per cent is already carried by road, adding the 14.1 per cent from rail would alow the closure of the British Rail freight sector. Rail traffic has been severely hit by the closure of coal and coke mines around Britain, as well as the strikes of 1982. Out of 154 million tonnes of freight, 95 tonnes consisted of coke and coal.

Freight traffic in coal and coke was well sustained because two thirds of it was carried largely in ' merry go round ' trains to the Central Generating Board (CEGB) power stations (Bagwell Philip S.,: 1984, p23).

British Rail has also suffered because of the recession. It's freight besides coke and coal was predominantly in the bulk carrier items such as steel, chemicals, heavy engineering and materials for the construction industry. These were precisely the sectors of the industry most adversely affected by the slump. Economically British Rail suffers more than privateers because it is expected to pay for the maintenance and renewal of track. Whilst road hauliers " pay 86 million less in taxation for road maintenance costs" (Wairdroper, 1988, p16). Dutch State Railway is the only network in the world with less freight carried by rail (per track mile), due to the advantages of cheap canal transport. This is all set against a major inability by British Rail to provide an increased level of service due to the lack of investment in innovation from the British Government.

Investment in British Rail - and its affect on innovation.

Due to pay conditions experienced by British Rail workers there were more strikes due to industrial disputes in 1982 than in 50 years of the companies history. **4.** This had a detrimental effect on design and innovation investment, resulting in a reduction in several deign implementation programmes devised by the design management unit. " The net loss caused by the strikes was estimated at £170 million" (British Rail Board, 1982, p7).

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4. Hansard, service Volume 918, Column 279, 26 OCT 1976.

Equivalent to the cost of four different APT development investments. At the same time the director of British Rail, Sir Peter Parker estimated loss of receipts for between £100 and £120 million, attributable to the effects of the recession. Not all design innovation was sacrificed, the design management unit and the marketing department closely worked together on the Student, Senior Citizen and Family RailCards - " The volume of rail passenger travel actually increased from 32,000 million to 46,000 million passengers a year " (British Rail Board, 1978, p15).

In the late 1970s and 1980s the Annual reports from BR revealed the Chairman, Sir Peter Parker and the BR Board regarded the provision of new trains of great importance to the successful operation of the railways. This money was mainly intended for rolling stock development in order to modernise the Railway, thus increasing the comfort and efficiency of British Rail's service. In 1955, a Railway Modernisation Plan had led to the design and implementation of diesel traction in place of the old steam units, " By the late 1970s the Diesel Multiple Units (DMU's), diesel locomotives and much passenger rolling stock were nearing the end of their useful lives ' (Parker Peter, 1979, p10).

The results of under investment in design and innovation was beginning to show through in the deteriorating quality of the service, and its equipment. British Rail was replacing its assets at a slower rate than any other European Railway and was not investing in alternative opportunities, such as DBS which had in the Danish- German border ferry network. Through Transmark, a rail design consultancy operated by British Rail, work was progressing in 29 countries whilst in England, " the railway was running hard just to stand still" (Allen F, 1983, p39). Only 16 locomotives were built in 1979, out of a total fleet of 2000 which needed replacement. " The peak spending in the late 1950s and early 1960s created a bow wave of investment which was still building up a head of the railways." (Bagwell S, 1984 , p24). It was estimated by the BR board that investment required a lift of 30 per cent just to replace worn out assets. Some of the " investment" money was required to meet the deficit in the running costs for that year. What kind of effect did this have on the design management unit?.

The publication of the Rail Policy document of 1983, spoke about greater incorporation of the design linked to investment management. It also called for a greater level of control to be exercised in the use and application of this asset within the existing system

> Br is to take the long path of progress it must also have a new financial regime.
> Under the prevailing system it has been impossible to undertake the long term
> investment programme (Fowler N, 1981, p4).

The consequences were lower standards of speed, frequency, comfort and reliability on rail services. Under an EEC regulation 1192 of 1969, British Rail had led for a time in the field of automising the railway network. The act provided payments from community funds for the automisation of level crossing barriers. Section 57 of the Transport Act provided for research and development grants to be made available for investment in British Rail and public transport authorities. " At the Derby and Trenby research center BR used these funds to develop the APT

and other products" (British Rail Council, 1982, p6).   Another blow for British Rail innovation was a 1976 External Financing Limit which put a ceiling on the level of external investment, this included money from local government and the EEC. The early idea of independently acquiring the funds had to be shelved. It seemed that under the Thatcher government the plan was to debase British Rail in an attempt to leave privatisation as the only viable option for the company. On speaking to the Board members of British Rail she stated:

> Being brought up in a household which regarded the pocession of a private motor car as a symbol of personal and family success; buses and trains, inferior forms of transport, were for those who had not 'made' it in society (Observer, Feb. 1982).

This was in direct contrast to previous governments prior to Thatcher who had always accepted the fact that publically owned buses, railway and shipping services were essential for the economic and social well - being of the country. It supports the statement made earlier that a private company can not be expected to provide the same commitment that a public company will Largely because of the subsidiaries required to successfully operate a rail transport business and allow for losses, it is beneficial for government involvement to guarantee such financial support.

> Successive cabinets of varying political complexions accept the case for subsidisation of some bus and rail services from government funds knowing that it is impossible to run them competitively without innovation (Serpell Committee, 1980, p9).

Any further hope of acquiring investment capital was ruled out, between 1979 and 1986, the shortfall in British Rail investment was 32 per cent. This seriously affected service and equipment improvement and rail service was bound to suffer during this period and British Rail had to reduce investment funds further to make up for operating losses and still keep within the External Financing Limit. " Failing to replace worn out track or rolling stock, with consequent deterioration in train services, led to declining revenues" (Howell D, quoted in Bagwell Philip S, 1986, p560).

The Example of the Electrification Innovation Programme

For more than two decades British Rail has fallen behind other international railway networks in its electrification design and development programme. By 1983 only 30 per cent of British Rail's route miles had been electrified whilst Denmark, with a similar design management unit had achieved 61 per cent electrification by this date. A British Rail/ department of Transport Enquiry took place to asses the need for such a design programme. No less than forty organisations, including the Association of County Councils, Municipal Authorities, the British Road Federation, and Transport 2000, gave written evidence to justify rail electrification by British Rail. " an estimate on all electrification options produced a real return of 11 per cent in profit if the plan was implemented" (Bagwell Philip S, 1984, p31). Aside from this England's dependence on oil would be reduced, the new innovations would produce home and foreign product orders, the construction industry would receive a boost and the problems with diesel units would be nullified. " Electric traction requires one half and one third of the maintenance staff per traction kilometer as does diesel" (Leeds University, 1979, p62). British Rail was

seeking to lower its operational costs through innovation, it brought about the investment in the Electra concept train project by British Rail. However the funds used for the implementation programme were expected to be returned by the government. No funding was ever received, an excuse provided was that the rail strikes five years earlier from January to February had lost British Rail important passenger and freight revenue. Therefore any financial plan previously provided by British Rail was void because the figures for electrification were based on pre-strike management figures.

Whilst there is no doubt that the strikes meant the design development for the Electrification of British Rail was less likely to be financed, the government's attitude had been less than positive. " It's unimaginative character is shown by its failure to take into sufficient account the traffic 'generating' effect of a new and exciting means of transport" (Duffy H, 1983, p5). There was adequate proof for those who wanted to see, that innovation could be beneficial with the introduction of the High Speed Train on the Western Region there was a 35 per cent increase of passenger traffic in two years. If this hadn't been an indication to the government that design and innovation implementation could be positive, then British Rail could only show surprise at the 43 per cent drop in investment within three years. A statement from the Transport Bill demonstrated the reasons for privatisation, " to increase freedom of choice for the public, to provide a wide range of transport services and to take the state out of activities it should not be involved in" (HMSO, 1986, p12). Government support for innovation and development was lower than those of any other European railway (except Ireland).

The design management unit argued for the project in the hope it would prop up British Rail Engineering Limited with some much required work. Gains in passenger revenue could be achieved by the introduction of new rolling stock, as with the introduction of the HST 125 InterCity it would also reduce British Rail's operational costs as, " electric locomotives cost less to build, are more reliable have a longer useful life span and cost less to maintain than diesels: (Jane's Railways, 1991, p120). It was anticipated that passenger miles would increase from 19,810 million to 20,490 million in 1985, with the quality improvements brought about by investment in the Advanced Passenger Train (Ibid, para. 3, p24). This extra revenue British Rail hoped to use in the support of electrification development, with the collapse of the APT project, revenue was lost rather than gained.

By 1990, the design management unit committee proposed that 3,000 out of the existing 22,000 miles of track would require closure, by the same date signalling equipment on 7,000 miles of railway would be 50 years old, the committee felt investment would be provided for safety reasons alone. The next crisis for design management was staffing policy, the introduction of driver operated only trains meant that the services of a guard were no longer employed thus, " when new coaches were ordered by BR no van was to be provided for bicycles, mail was to be carried in part of the passenger compartment" (Bagwell Philip S, 1984, p90). The excuse given was that a guard was required to operate both services, but that it was an economic impossibility to do so. Extensive experiments were agreed into the introduction of open stations and in driver operated only (D.O.O.) trains. With such operational procedures design mangement estimated further revenue loss, in the end only a change in management

design management estimated further revenue loss, in the end only a change in management culture could resolve the problems of implementation.

CONCLUSION

THE FUTURE OF DESIGN MANAGEMENT AT BRITISH RAIL

Design management at this time has a particularly difficult task at British Rail. In comparison with continental countries, whose railway development was more carefully planned, British Rail has a large number of stations for the services provided, and a large number of terminal staff per million. Largely as a result of sporadic growth during the industrial revolution, British Rail has been left a collection of fixed assets which complicate the smooth operation of the rail network. " British Rail suffers from the drawbacks of competitive railway promotion in the 19C with six London termini serving the South Eastern region" (Bagwell Philip S, 1984, p60). Design management has been caught up in a negative investment triangle between the British Rail Board and the British Government. It was trying desperately to project a good corporate image, but with low staff morale, out dated rolling stock and the highest fares in Europe. [5]

Jane Priestman was elected as overall Director of Architecture, Design and Environment, these had previously been under independent sector control. The idea is part of a new corporate plan to bring about British Rail's recovery, " The key foundation stone of design is profitability, built in from the very beginning, to improve quality and reduce costs" (Priestman, 1990, p100). The internal conflicts mentioned in the case of the APT would also hoped to be resolved. The co ordination between each division would become part of the British Rail work ethos, without preventing individuality, and that " territorial tugs of war " would not cause such a strain on design and innovation.. With Priestmans' introduction major financial investment was made by a more conscientious transport Minister, the removal of Margaret Thatcher, and British Rail's rediscovery through the reformed design management unit, for the potential of design.

One example is the Corporate Environment Fund, since 1988 this scheme has raised 2 million by matching pound for pound money raised through local community, etc. The Fund was set up to improve the appearance of British Rail stations. " Out of 1500 stations, 700 are unmanned, the concentration to date has been on providing improved rolling stock. Now we can start a comprehensive programme on station facilities" (Priestman, 1990, p102). An old train shed at Manchester Central has recently been converted into an exhibition and conference center. Railway arches are being converted to become central elements of inner city development. The development of connections to Stansted Airport and the Channel Tunnel are proving to be more areas requiring the steady control of the design management unit.Investment totalling £600 million on rolling stock, electrification and new locomotives will take place from now until 1996.

In conclusion this thesis set out to detail the incorporation of design management into the public transport industry and the difficulties it can experience. British Rail is one of the most noticeable public industries in the country, highly visible to the public and accountable to the government. British Rail can as it did in the past, influence more industries to

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5. **Leeds University Study - The British Rail Empire and Average Receipt per Passenger Kilometre current levels £2.845 as against Danish State Railway £1.61.**

incorporate design management as part of their structure, it can do so by demonstrating its positive effect on passenger numbers, and its ability to influence an increase in profitability. What it must avoid is dragging internal management conflict into the public arena, as was the case with the Advanced Passenger Train and the Electrification programme. The media attention given to such events eclipses the successes of design management and will lead to it being casted aside as a problem rather than an aid to effective management.

From the thesis it can also be discerned that more work is required to devise how design management can best be accomadated into a corporate environment. It will face strong opposition from the established management leaders of marketing, production and accounting. The work of people like Peter Gorb, Christopher Lorenz, and Jane Priestman should lead to an increase in the availability of more literature on the subject, this should in turn lead to more widespread knowledge of the subject.

Education must be the clue, not just education when an implementation programme like the APT goes wrong. Education on a constant basis which is required to allow for the new patterns of management and the design requirements that are evolving. If design is accepted as a management tool, it follows that education can lead to an understanding, an understanding which will bring some enthusiasm back to British Rail. This enthusiasm will communicate itself to the public and public perception can become more positive about British Rail. These are the elements that the Irish Transport Network needs to take on board, that a design management programme leads to increases in public awareness and thus passenger traffic.

The thesis has uncovered problems with the incorporation of design into management, the clear attitudinal differences which exist at board and ground level as one example. Though design receives a higher profile, it will act like a company which has a marketing function but with no Marketing structure to implement its effectiveness. If the organisational structure is to benefit from the use of a designer, the management style must be changed to realise the benefit of this, at present, this is not so. As a firm harnesses a new method such as design it must allow for the change in strategy and marketing this brings about. Only professional expertise in the area, allowing a period of tolerance for adjustment and incorporation, can bring any real long term gains in using design management. British Rail has experienced the problems which can arise with not letting design management fully settle into the style of that company. At the same time other elements of the firm must support the design management unit and agree to work within the programmes it implements. British Rail has regained its original status as the leader in design management use. With the incorporation of Priestman all the elements are in place for it to prove its worth to the British Rail Board, British industry and eventually the British public.

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