XXIInd WORLD ROAD CONGRESS
DURBAN 2003

FRANCE - NATIONAL REPORT

STRATEGIC DIRECTION SESSION ST2
Roads and quality of life

Abstract

Through a series of thematic developments, this paper gives a practical presentation of the road network planning context and how the “sustainable development” concept is taken into account and has influenced the road project development process.

The paper first explains one of the key road policy thrusts, which aims to increase specialisation of road infrastructure. The quest for a more efficient response in terms of safety, to traffic requirements and more generally, to user requirements, is causing the different road networks to be tailored to their dominant functions. The paper then deals with planning and evaluation documents and processes, and reviews the innovative aspects of recent approaches that mark the change from sector-based infrastructure schemes to schemes in which priority is given to service to the user and the community.

To provide a more concrete approach to the sustainable development concept, the paper presents theory and practical illustrations of the direct and indirect effects of greater transport efficiency on human activities, by first examining regional planning, and then urban organisation and development.

The paper then analyses the perception of the road by the various social actors (general public, associations, political and socio-economic forces) and how this is changing, particularly with the build-up of environmental concerns. It shows how new partners, who set themselves up as environmentalists, are emerging beside the traditional road professionals, infrastructure builders, operators and carriers, and are playing an increasing part in the road project development process. Based on an examination of the most often denounced nuisances, and transport policy options reflecting the will to integrate sustainable development, the paper shows how the consideration of escalating environmental requirements has led road decision-makers to develop their policies in terms of technical choices and communication and consultation initiatives. In this spirit, in a context characterised by decentralisation and changing expectations and requirements, the paper shows how, under the impact of constraints of a technical, environmental, sociological, political, legal and economic nature, the teams in charge of studying road projects have moved forward.

End of the abstract

What are the priority requirements to be met by road construction in your country?

Increasingly specialised road infrastructure

In France, there still remain many expectations and requirements of road construction, which are increasingly difficult to meet for many reasons. Here, as in all developed countries, road infrastructure must steadily become more specialised if it is to better address needs that differ widely according to user categories. That is why the answer to this question will mainly revolve around a road's multiple functions and the need to manage them proficiently, particularly as regards the development of trunk networks.

One of the road's main assets is its multifunctional nature. A road can cater simultaneously for all kinds of users and vehicles while at the same time fulfilling a wide variety of transport or access functions, both in urban and rural areas: individual or collective travel, industrial transport, short, medium and long range flows, tourist flows, etc.

These multiple functions form the basis of a road's social cost effectiveness by ensuring that it is well trafficked. However, they are also the main cause of operating problems, particularly in terms of safety and free-flowing traffic.

Joint use by pedestrians and vehicles, light and heavy vehicles, slow and fast vehicles, causes safety problems that increase with the growth of this heterogeneous traffic. And it is becoming difficult to meet user requirements that differ so widely in terms of travel times, access, direction signs and services. These requirements are too diverse to enable road networks with complementary functions to offer an adequate solution.

With economic development and increasing car ownership, it has rapidly became necessary to opt for greater specialisation of road network links, by first distinguishing between roads having a priority of transit functions and those that aim mainly to provide local accessibility.

The first instance of this distinction is apparent at the institutional level, with a segregation of duties between public authorities.

For instance, in France there have long been three different road network managers: the State, the Départements (~ Counties), which number a hundred, and the Communes (36,000).

The national network mainly meets requirements for transport between regions. It only accounts for 4% of the total road network but it carries more than 40% of the traffic. Its main purpose is to:
- cater for inter-regional and international traffic flows;
- provide access to centres that generate national interest traffic, particularly large ports and airports;
- provide balanced, equitable access to the regions of France.

The networks that are managed by the counties and communes assume transport functions that are complementary to those of the national network, by handling medium- and short-distance traffic flows. And above all, they provide good access to most parts of the country, whether in town or country areas.

Tailoring road networks to their dominant functions

These networks must then be endowed with the technical features required to fulfil their dominant functions.

Development of a motorway network enables medium and long-distance links to be provided in excellent conditions of efficiency and safety. These results are obtained by separating fast vehicle traffic from slow vehicle traffic, and the through traffic function from the local access function, which is left to the conventional road network.

Conventional roads can also be better suited to local uses. Lanes exclusive to cyclists or public transport enable the corresponding specific needs to be met, particularly in towns. Traffic signs and dedicated facilities (lay-bys and information points) can enhance the touristic role of some routes.

In France, development of the motorway network has been based on the toll system for many of the interurban links. Under the regional development policy, to offset the handicaps of some remote or mountainous regions, part of the network is free of charge.

Today's requirements also include the following two key areas: relief of congestion and improved communications, but in a very different context from that of twenty years ago, owing to the development of a network of roads with motorway characteristics.

Outside cities, the most significant congestion problems tend not to occur on conventional roads but on motorways close to large urban areas and in some corridors.

Urban bypasses in France have usually been designed as dual-purpose urban and interurban infrastructure. They are not only intended to provide continuity of national routes for through traffic but also to protect city centres and to cater for inter-suburb orbital trips. This superposition of traffic, together with the development of mobility and urbanisation, are now resulting in traffic congestion.

In the future, a large number of programmes must therefore be devoted to building major bypasses, farther away from urbanisation, in order to restore decent traffic conditions for long haul traffic while relieving traffic on existing bypasses. These can then be better tailored to their urban functions, for instance by examining whether it is advisable to use part of their capacity for public transport. On the other hand, these new major bypasses can be intentionally planned with only a few interchanges so as not to encourage urban sprawl which is undesirable at the fringes of some urban areas.

Outside urban areas, motorway congestion still only affects a small part of the network during short periods. It concerns radial roads towards Paris and some North-South corridors.

In addition to conventional road widening, and where other transport modes cannot solve a problem completely, the adopted solutions seek mainly to dissociate the functions of a route in terms of origins- destinations.

For instance, a major relief motorway in the Paris basin, which is under construction, will relieve pressure from through traffic on the radial roads into Paris and transfer it onto the series of tangential link sections of this major ring road. Similarly, alternative routes will direct part of the traffic away from the congested corridors. These new motorway routes are attractive because they are more direct for some origins-destinations as they do not systematically serve a string of towns or because they cross mountainous areas that the old routes used to circumvent.

It is important to preserve this specialisation of major motorway links for through traffic requirements and to avoid multiplying new interchanges under the pressure of elected officials and local interests. This is because it is difficult to rebuild these traffic capacities. With urbanisation, more people live close to the road and are against any widening. The public and the elected representatives find it difficult to accept the duplication of infrastructure with the same functions. The high cost of these new capacities, which is due to the precautions taken in favour of the local environment with a view to overcoming opposition, makes their funding impracticable.

It is therefore important to consider and manage national motorway network capacities as rare resources and to avoid satisfying requirements that do not meet their fundamental role (particularly in peri-urban areas).

Meeting user requirements

Another challenge in France is that of meeting user requirements in terms of maintenance, operation and ancillary services. The high level of services provided on French concession motorways is an indispensable benchmark both for users and the other network managers when considering major interurban routes.

The aim is to extend some of the services provided for users of toll motorways to the entire network of roads with motorway characteristics and to determine priorities for meeting requirements. The level of service provided on the trunk network will be made consistent mainly by building more rest and service areas, co-ordinating management of maintenance and operations throughout a route instead of the present organisation which tends to be regional, and extending the radio information network on concession motorways to toll-free motorway extension sections.

In the urban areas of Paris and the other large metropolises, user information systems on traffic conditions are being developed. The new services are catalysing an increasing share of the funding allocated to the national network particularly because each year, the operation, maintenance and renewal of the equipment and systems involved accounts for a large part of the cost of the initial investment.

What planning and what assessment of road building expediency

Planning documents and how they are prepared

Planning documents are intended to prepare for the future by ensuring that State initiatives are consistent over the longer term and that public choices are transparent and are disclosed to the public. As regards the French trunk road network, which is the national network, the State introduced *Schémas Directeurs d'Infrastructures* (Infrastructure Master Plans) through the *Loi d'Orientation des Transports Intérieurs* (LOTI - Inland Transport Act) of 30 December 1982. The *Schémas d'Infrastructures* (Road Infrastructure Schemes) were thus drawn up in 1986, 1988 and 1992. These schemes set out a functional network hierarchy by differentiating between:

- motorways (whether or not under concession)
- roads ensuring continuity of the motorway network (roads planned to be gradually converted into motorways)
- major regional development road links.
- other roads.

In recent years, the transport policy guidelines contained in the Act on Regional Planning and Sustainable Development of 25 June 1999, caused the concept of infrastructure schemes to be replaced by *Schémas de Services* (Service Schemes).

This new planning approach, by focusing on service to the user and the community in a multi-modal framework, seeks ways of making better use of the existing networks before considering new infrastructure. An Order approving the collective goods and passenger service schemes was signed on 18 April 2002. The Act provides for their revision at the end of 2005, which is one year before the beginning of the new generation of *Contrats de Plan* (State-Region planning contracts), in order to ensure better co-ordination between the medium and long term approaches.

The preparation of infrastructure and service schemes follows the same overall procedure:

- a proposal made by the State after interministerial work (mainly on facilities, regional planning, finance and the environment) and governmental arbitrations,
- regional consultation,
- consultation with regional or national technical bodies specialising in transport and regional development,
- Council of State consultation,
- final development by the ministries concerned before approval through an Order.

However the preparation of service schemes differs as follows:

- It involves the regional Public Works Departments in drawing up the initial proposal and in the overall process,
- It includes discussion and consultation with regional elected officials and with more senior elected leaders.

Assessing the expediency of road projects contained in planning documents

Considerable differences exist in the expediency of road projects included in these schemes:

- A strong notion of expediency was associated with projects in the infrastructure schemes,
- The inclusion of a project in the service schemes marks the beginning of a process during which the expediency of the project has to be redemonstrated at each stage.

Projects proposed by the State under these schemes are the result of upstream studies to demonstrate their expediency. At this stage, only broad right-of-way strips with very different functions are considered, which enable a cost estimate and an impact analysis to be made. The traffic study includes an analysis of demand, both current and forecasted on the basis of contrasting assumptions for economic growth and transport policy scenarios. A socio-economic evaluation reviews the consequences of the operation for the community (with indicators such as net present value, internal rate of return and net present value per invested franc). The financial result is also assessed for concession operations. In addition, these studies include an analysis of the socio-economic actors' expectations of the transport system, and an environmental impact analysis: natural hazards, natural environments, agriculture, cultural and tourist assets, urbanisation and human activities.

These studies include an intermodal section that covers the additional or competitive transport supply provided by the other modes and enables modal split trends to be assessed according to the possible development of non-road modes.

This procedure only applies to the national road network. But all major infrastructure projects, whatever the network, must be "compatible" with these schemes. The Regions also draw up regional transport policies, which must also be compatible and must fall within the remits of the Counties and Communes.

At the regional level, a similar approach to that of the service schemes is implemented, though not country-wide, to ensure that public policies are consistent with one another and appropriate for a regional project. These are the *Directives Territoriales d'Aménagement* (DTA - Regional Planning Guidelines).

The Regional Planning Guidelines were introduced by the Act on Regional Planning and Development of 4 February 1995 and confirmed by the Act on Regional Planning and Sustainable Development of 25 June 1999. They are included in the Urban Code.

The Regional Planning Guidelines enable the State to affirm its priorities and create an integrated vision of a region's future on a matter with national interests at stake. These guidelines are territorial planning tools, midway between the implementation of policies on regional planning and urban planning.

What impact has road development had on human activities

Direct and indirect effects of greater transport efficiency

The improvement of services provided by the road network through infrastructure development or operating progress contributes to greater transport efficiency, mainly by reducing costs and increasing reliability.

However, this progress has direct and indirect effects on human activities, which are difficult to assess because they depend greatly on the economic and social context.

Take the simplest effect for a start. The direct effects on traffic already existing before the road service was developed are the most certain and, in principle, the easiest to measure. Yet they are often not studied or even mentioned. It should be borne in mind that converting a road into a motorway reduces travel times by 40% on average, which as a first approximation, enables the costs of lorry drivers' wages and equipment amortization to be reduced in the same proportions.

But vehicle operating costs do not vary greatly because savings on mechanical components made possible by more regular driving are offset by heavier expenditure on petrol owing to increased travelling speeds.

The high safety gains – fatalities reduced by three quarters – made possible by modern dual-carriageway infrastructure, are also of immediate benefit to existing traffic. Besides avoiding mental pain, they save medical expenses, work times and repair times, and consequently social and car insurance costs.

An overall assessment of these most obvious direct effects deserves to be made to take stock of the essential justifications of road improvements. In addition to these direct, automatic and unquestionable effects, there are a number of effects that are more difficult to pinpoint because they depend on the context or on the interplay of economic actors.

Academic writings have established a positive link between road infrastructure endowment (national roads and motorways) measured at county level and the increase in the county's added value. Today it can be said that the greater the road and motorway endowments at county level, the faster the added value increases.

The impact of the national network differs between counties. The contribution of road and motorway infrastructure to economic development varies with density of population, density of the county's economic fabric and the level of county development. The impact of a road network is greater in counties where population densities and levels are low or intermediate. But it has not been possible to show that the national network has effects on the locations of businesses at inter-county level.

This result is confirmed by economic observatory studies on local and regional effects of motorways. These studies seek to understand the mechanisms between road infrastructure development and economic development by making close analyses and a number of surveys on companies and local public actors. As regards the pull factor, it has been established that road infrastructure does not play a major part in attracting businesses at the inter-county or inter-regional level. Most business movements occur at local level, and when companies can choose where to locate, they prefer sites offering the best accessibility.

Gains in accessibility bring companies closer to one another but they increase competition between them, with consequences that vary according to the companies in question (increase in market shares to the detriment of others, productivity improvement, broadening of supply of products or services, etc.).

Sustainable regional development presupposes that transport infrastructure levels are made consistent, in order to ensure equitable accessibility to the entire region and mitigate isolation, even if differences are justified by amounts of traffic and tourist and transit flows.

To objectify this issue, various indicators can be examined based on statistics and trends:

- by geographical entity, lengths of motorways and two-lane dual carriageway roads with relation to the total network length,
- by geographical entity, the portion of the journey travelled on motorways and two-lane dual carriageway roads,
- the size of areas located more than 45 mn and/or 50 km from an interchange and the number of inhabitants concerned,
- travel time between the Prefecture (administrative centre) of each county and a panel of cities (such as neighbouring Prefectures or regional capitals).

For **urban organisation and development**, when major urban bypasses are built, the task is to measure their efficiency in terms of through traffic relief on urban roads and the reduction of nuisance (noise and pollution) for people living near these roads, so as to improve their living environment. Qualitative multicriteria analyses of the urban operations aspect (urban sprawl, development of public transport) are developed on an ad hoc basis for the specific contexts.

For **agricultural activities**, the impact of a road improvement measure can be assessed using quantitative indicators such as the farming areas eliminated and the numbers and surface areas of farms concerned by land reallocation.

These positive and negative impacts are taken into account in road improvement choices in a logic of compromise but they must first and foremost satisfy the demands expressed by society in its diverse components. In the light of the development status of the French road network, the strongest demands concern **economic development aid** (demand backed by local elected representatives and socio-economic actors) and **improvement of the living environment** (demand backed by associations).

Some examples

Over the past ten years, the development of the road network, above all roads with motorway characteristics, has

- greatly improved the situation of isolated regions, particularly in the centre of France. If we take the road network in 2000, the proportion of the population living in areas more than 50 km or 45 mn from a high-speed road (motorway or two-lane dual expressway) is around 4%, a sharp decrease compared with past years as the figure was 8% with the 1998 network. Consequently under today's infrastructure plans, the problem of equitable regional accessibility will mainly be solved by improving existing infrastructure.

- enabled much of the traffic, particularly heavy traffic, to be carried on a network with a high level of service, thereby limiting nuisance and improving safety. The motorway network, which represents a quarter of the national network in kilometres, thus caters for nearly half the all-vehicle journeys and more than half the HGV journeys on the national network. Between 1990 and 1996, the motorway network captured more than two-thirds (68.4%) of the total increase in traffic and three quarters (74.8%) of HGV traffic.

- contributed to European construction by providing routes with high levels of service for long-haul traffic flows between countries of the South and the North of Europe.

How is the road generally perceived in your country? What trends and what consequences?

How the road is perceived by the various actors and how this is changing

The perception of the road by the general public must be differentiated from that expressed by elected officials and economic leaders, even though there are differences in each of these groups.

The public's point of view is divided. Before they have a motorway link, they are eager for it. But when one already exists, they show some resistance to a further project. This is doubtless because they do not understand the motorway's functions properly. They are only well aware of the local access function. But the functions of through traffic flow or congestion relief are not fully realised. Neither do they have much understanding of traffic growth.

The role of the media is worthy of note as they act as a “resonance chamber” that amplifies anti-road feeling by relaying dissenters’ protests without ever giving the point of view of the “silent majority”. This poses a real problem for democracy.

Elected representatives and economic leaders solicit people’s views but remain acutely aware of the economic role of modern infrastructure. They thus achieve greater balance between the interests of people who will live near the infrastructure and its impact on the area under their responsibility. Elected representatives are often seen to take a courageous stand against some of their constituents… or to say different things to different people.

Over and above the reactions to a new project that may be observed, there can be some surprising opinions expressed on the quality of service, either by users or even by random members of the public. French people seem to be overwhelmingly in favour of the private car and this is confirmed by the traffic on the toll motorways. This shows that as soon as general ideas are left aside and the focus is on concrete, technical aspects, opinions on the road are much more favourable.

The most common complaints about nuisance

The most common individual complaint about nuisance concerns noise, which is fairly easy to measure and for which action can usually be taken at local level.

Then comes a more collective complaint about the deterioration of air quality. This is where the lack of information is most acute. Technical progress in this field is rapid and has the effect of improving air quality in all the threatened areas. But people’s requirements increase more quickly than pollution decreases. The subject is extremely controversial and measurements by associations approved by environmental protection services do not change matters.

People have difficulty in differentiating between greenhouse gas emissions and pollution. But they are familiar with the greenhouse effect which is always in their minds when they talk about air pollution from cars.

Lastly road safety is rarely mentioned, which shows collective indulgence towards accident-producing behaviour.

Nuisance caused by joint occupancy of the road by various categories of users, which is felt in towns by pedestrians or cyclists with regard to motor vehicles is also cited by car drivers with regard to lorries. This rejection of lorries is expressed in reproaches that tend to objectify the refusal of joint occupancy in terms of pollution, congestion or road hazard. Surprisingly, nuisance related to the proximity of lorries is not mentioned, whereas the lack of comfort and safety generated largely explain the phenomenon.

Reactions of road policy makers

Road policy makers are taking the growing environmental demands into account and this finds concrete expression in an average 20 to 30% rise in road project costs. This rise finances better integration into the landscape together with more efficient protective devices or more favourable road alignments for sensitive areas. In some particularly fragile zones, such as mountainous areas, the extra costs can be very high.

The second reaction of public authorities is to develop consultation in the pre-construction phase of the project. For instance, an independent authority has been set up, the *Commission Nationale du Débat Public* (National Public Debate Commission), which gives considerable importance to public debate. But despite this debate, there is still considerable dissatisfaction. In addition at present, strictly local interests are well represented, at the expense of a broader vision that would be more in line with the function and public interest of the project but which sometimes seems to be relegated to secondary status.

A third reaction of the public authorities must be to objectify road nuisance assessments and to disseminate knowledge in this field in which some commonly held ideas still hold sway. For instance, there is an idea that the road does not cover its external costs, which is a misconception in France.

Which are the active forces involved and the means of implementing a “road and sustainable development” policy

The actors involved and the growing power of environmentalists.

There is a pressure group that consists of road haulage contractors and lorry drivers. But this group rarely makes its voice heard on the subject of road infrastructure development as, except for wage problems, it reserves its public statements for regulations, petrol prices and inter-modal competitive conditions.

Owing to the road’s importance in daily life and economic life, this group has the means to bring strong pressure to bear through threats or action to block roads or petrol stations. In France, during the last oil price boom, this action led the government to introduce a plan to limit the price increase of fuel for commercial road users.

Beside the traditional professionals in the road sector, such as infrastructure builders, operators and carriers, new actors are emerging who are paying an increasing part in the road project development process.

These new actors are environmental protection advocates, whether on behalf of private interests, the general public, associations and the press, or more institutional parties such as administrations or politicians.

The characteristic fact about the general public and associations is the poor quality of the information at their disposal. In fact, road nuisances and the solutions for reducing them are not very well known.

For instance, people consider that the very fact of creating new infrastructure generates the traffic that will use it and thus adds to the nuisance. This overlooks the fact that the number of vehicles travelling on a new road consists mainly of traffic transferred from other roads. If we take into account the situation of all the roads concerned, the environmental performance is usually good owing to the precautions taken on the new infrastructure in terms of safety, integration into the landscape, containment of accidental spillage and above all, its greater distance from urbanized areas.

Some traffic is indeed generated by the new infrastructure, but only a small amount, and this additional travel is an integral part of general economic progress.

Note that this situation does not prevent private vehicle traffic from increasing. But there are no, or not enough, road users' associations able to take issue with road opponents. Bodies representing road carriers have been established and are active but they are not concerned with infrastructure. There is therefore no really substantial discussion.

Today, the press keeps alive these opposition movements against roads. The public and associations in defence of local inhabitants and the environment are increasingly called upon to take part in public debates on road projects as regulations have been strengthened in this respect by some recent legislative texts. But these public debates have not yet enabled people to have meaningful exchanges that will improve the level of knowledge.

Institutional environmentalists, public bodies working in the environment sector, elected politicians, the French Ministry of Ecology and Sustainable Development and the European Commission which is closely concerned by these matters, have all come out against the road and in favour of the railway. Through their efforts, a legislative and regulatory framework has been developed, which now forms a comprehensive action plan. This regulatory framework, which tends to lack precision in its provisions, leaves the field open for court proceedings which are becoming increasingly common.

This has encouraged the emergence of new actors who been drawn into the road project development process: lawyers.

They are present at all stages, insofar as legal proceedings are sometimes brought at a very late stage, after the declaration of public utility, and even in the course of project work. This complicates the procedures and creates real legal insecurity, which can prove costly.

Sustainable development

Prospects for improving the environmental performance levels of road vehicles are reassuring as regards air pollution over the medium term. In conjunction with this progress, the efforts made to integrate infrastructure into the landscape and to protect water enable road projects to be consistent with a sustainable development approach.

But the effect of a reduction in vehicle fuel consumption will still be lower than the effects of traffic increases. This means that in France, by the year 2020, there will be an increase in greenhouse gas emissions of around 30% (for a traffic level increasing by around 80%). It is therefore on this last point that we must make the most progress.

On this subject, sustainable development is taken into account through France's international commitments, which include the signing of the Kyoto Protocol and subsequent European commitments, and through the recently adopted *Plan National de Lutte contre les Changements Climatiques* (PNLCC – National Climate Change Action Plan). This series of texts which will regulate France's efforts, is completed by the expression given to them in the public transport service schemes. These documents, which enumerate all the major infrastructure projects, contain assessments of their environmental impacts. The guidelines in these documents, particularly those concerning railway freight, are consistent with the commitments that have been made.

How are the road project study teams formed

The effect of the new requirements on team membership

Changes in the project design process further to the new constraints have determined changes in the road study teams.

Road project studies on the French national road network are conducted by the County Departments of the Ministry of Public Works, which contract out all or part of the project engineering work to the Ministry's Regional Engineering Departments or to private consultants, depending on their work loads and skills requirements.

In a country such as France, road projects are increasingly complex. This complexity is the result of a number of continually changing trends:

- Decentralisation. This generates a new division of powers, new partnerships, and new territorial levels. Elected representatives are very demanding in terms of time frames, cost control and quality,
- Changes in expectations and requirements regarding the democratisation of decision-making processes, quality, safety, environmental protection and sustainable management of resources,
- Relations with private engineering firms, which demand a clear order from the project owner, a clarification of the project owner's and project engineer's roles and the place of these firms in a context of fair competition.

The major constraints are technical, environmental, sociological, political, legal and economic.

- **Technical constraints**

These constraints are not those that pose the most problems for the Ministry of Public Works teams, which are supervised by engineers trained in the national public works colleges.

However, two types of problems are encountered:

- Maintaining these skills at a high level, in view of the many non-technical concerns and the reduction in the volume of work which makes it more difficult to gain and capitalise experience.

- The need to be skilled in targeted domains – those concerning small populations, or the traditional domain of engineering structures, or new domains such as air pollution, water quality and the protection of fauna and flora. The environment is of major importance in these new domains. And in time, techniques related to the concept of the intelligent road should also assume substantial importance.

This situation poses considerable problems in the managing of human resources owing to the size of the populations involved, on the one hand, and because these disciplines (fauna, flora, chemistry, electronics, etc.) are not usually taught in the public works colleges.

The difficulty is thus rather to maintain the minimum skills across all the technical domains so as to steer sub-contractors properly.

- **Social constraints**

The heaviest and most varied constraints are concentrated in the earliest stages of road projects. These stages concern the justification of expediency, feasibility and staged definition of the road project. They precede the declaration of public utility. Road projects are liable to come up against strong social, not to say political or media pressure.

In practice, project owners are increasingly being challenged about the legitimacy of their acts. The value of the general interest or public utility concept is not self-evident. The State and its representatives are no longer seen to be the only parties with legitimacy to guarantee this concept.

The project designers are also challenged about the quality of their studies and the soundness of the solutions they provide. Some associations call for counter studies to be undertaken. The designers are required to abandon their technical logic and use approaches that embrace all social and environmental components.

This presupposes that it is possible to draw on very varied skills, including those of communication, to guide the project owner through the consultation stages. These skills will often be sought in private firms through assistance services and strategy consultancy services.

- **Legal constraints**

Litigation problems are increasing because of the technical, administrative and legal complexity of projects. With the multiplication of regulations, the risks of a reappraisal of procedures and decisions are increasing rapidly as more and more companies and associations lodge appeals with the administrative courts.

This situation requires quality procedures to be implemented for the preparation of project files and the creation of teams competent to manage litigation procedures. The Directorate of Roads in the Ministry of Public Works has an in-house counsel to help the county departments handle the more complex cases.

* *
*

Development skills
It is essential for the public authority to build the broadest possible consensus around a project. To cope with the complexity of road projects, we now use a diversified panel of skills.

- **For project ownership**

Project ownership is not a minor activity, it is a real road design activity. To enable the project owner's action to build towards better project quality, the following skills are required:

- planning and forward studies,
- socio-economic analysis,
- environmental sciences,
- a needs-driven approach (functional analysis),
- order formulation,
- streamlining of costs and lead times (functional analysis, value analysis),
- control of project sustainability (quality procedures)
- risk analysis,
- communication and consultation.

- **For project engineering**

Without losing sight of the basic skills, we are enhancing project leadership and administrative and financial capacity building. To manage sub-contracting properly, it is necessary to maintain the minimum skills across all disciplines, particularly for project costing (impact of project costing on the decision-making process), alignment studies and geotechnical studies.

In addition to individual skills, there must be collective capacity-building in the following areas:

- networking (not put to optimum use at present),
- identifying and guiding skills (internal and external),
- pooling skills (impact on team management),
- working in project teams,
- ability to achieve good feedback and skills transfer,
- public/private complementarity (partnerships to be developed),
- State/local authorities complementarity (shared technical doctrine).