

## **Executive Summary**

Many transportation agencies have discovered that traditional highway contract administration procedures and project delivery methods do not meet current demands. In the United States, both Federal and State agencies are turning to innovative contracting procedures to accommodate reconstruction and growth. The primary goal for the majority of innovative contracting procedures is to deliver projects *faster*, without compromising safety or quality or increasing costs. Quite often, increased safety, higher quality and decreased cost can be achieved, while delivering projects at a faster pace. In the United States, the use of innovative contracting practices has been on the rise, since the early 1990s, and the highly publicized success of numerous “mega projects” is encouraging more agencies to experiment with innovative contracting methods. Likewise, numerous European nations are employing alternative contracting methods to meet increasing infrastructure needs. Recognizing the similarities and benefits that could result from an international examination of innovative contracting procedures, a diverse team of experts was assembled to research, document, and promote the implementation of best practices found in Europe that might benefit US practitioners. The Federal Highway Administration (FHWA) and the American Association of State and Highway Transportation Officials (AASHTO) jointly sponsored this study, under the National Cooperative Highway Research Program (NCHRP).

In June of 2001, a team comprised of Federal, State, contracting, legal, and academic representatives traveled to Europe to investigate and document innovative contract administration procedures that are employed in Europe to cope with growing transportation needs. See Appendix A for the names and affiliations of the scanning team members. The team traveled to Lisbon, Portugal; The Hague, Netherlands; Paris, France; and London, England. Additionally, the team met with Swedish transportation officials while in the Netherlands. The ministries of transportation, numerous private sector contractors, and research organizations involved in contract administration hosted the team. Appendix B lists the names of the organizations and their representatives.

In recent years, the European community has faced a multitude of problems that are similar to those that the US transportation community faces today. The scan team discovered that European highway agencies are better exploiting the efficiencies and resources that the private sector offers, through the use of innovative financing, alternative contracting techniques, design-build, concessions, performance contracting, and active asset management. European agencies have created contracts that focus on the users, while equitably allocating risk and seeking to establish an atmosphere of trust in the implementation of procedures. The United States can directly and immediately employ many European procedures to help cope with its most urgent transportation needs.

**=====  
The scan team discovered that  
European highways agencies  
are better exploiting the  
efficiencies and resources that  
the private sector offers...  
=====**

## **Drivers of Change in Europe**

Until the late 1980s, traditional European methods of contract administration were very similar to those in the United States. Public transportation agencies retained tight control over the

design and construction of the highway systems. Prescriptive specifications and low bid procurement methods were the public sector tools of choice for procuring new works in both the United States and Europe. In the late 1980s, approximately 10 years before change occurred in the United States, European agencies began to make significant changes to contract administration techniques. The scan team quickly realized that the drivers for change in Europe were some of the same problems that are faced in the United States today. Some of the most significant drivers of change in Europe included the following:

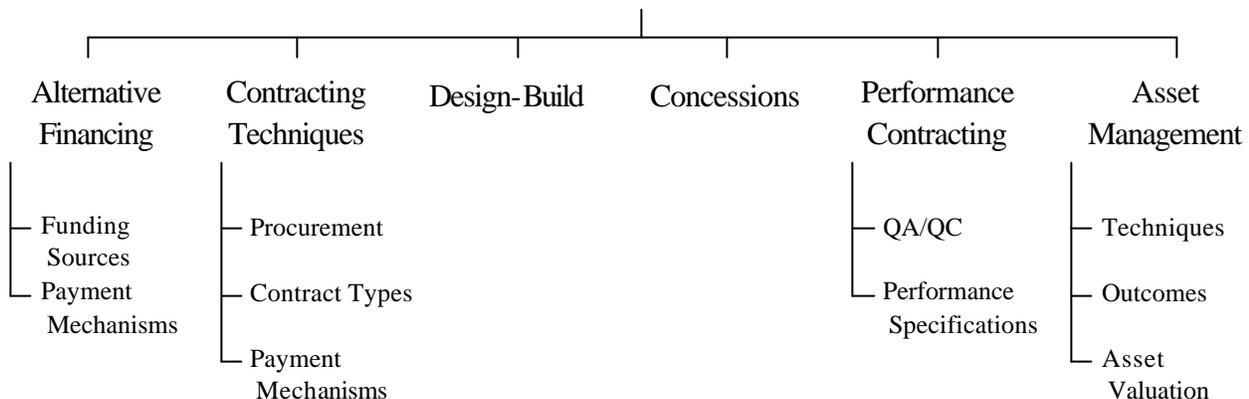
- ??Growing infrastructure needs
- ??Inadequate public funds
- ??Insufficient and diminishing staff
- ??Lack of innovation in delivery
- ??Slow product delivery and delays
- ??Cost overruns
- ??Adversarial relationships
- ??Claims oriented environments
- ??Perceived lack of maintenance efficiency
- ??New European Union directives
- ??User frustration
- ??Political discontent

These problems are certainly not unique to Europe; most US States share some, if not all, of them. (Even the European Union (EU) Directives are analogous to Title 23 and FHWA's regulations.) This report describes tools and techniques that European transportation agencies and private sector groups used to overcome their problems. Many of the tools and techniques can be directly and immediately applied in the United States, if legislative and political environments allow.

## Report Organization

The report is organized in the areas of alternative financing, contracting techniques, design-build, concessions, performance contracting, and asset management as shown in the figure below.

### Alternative Contract Administration



## Alternative Financing

There are many innovative alternative financing techniques in use in Europe that have direct application in the United States. Two primary differences should be considered in the discussion of alternative financing in Europe. First, the countries visited on the scan do not have taxes dedicated to transportation needs. This means that gasoline taxes and the like are not earmarked

for transportation projects, but are put into a general fund with other taxes. The general funds provide money for a variety of needs, including transportation projects, but no taxes are specifically dedicated for transportation projects. The second difference is that European governments do not offer tax exempt financing for public transportation projects, as is done in the United States. This causes private financing to be much more competitive with public financing. For example, in the United Kingdom (UK), the savings realized for using publicly guaranteed funds, in lieu of private funds, is sometimes less than 1 percent.

Alternative funding sources in Europe utilize a combination of bond and bank financing. Private financing is being utilized much more readily than in the United States. In some cases, governments have reached ceilings for public debt; and, in others, private financing provides a much more competitive solution to the public need. For example, the Netherlands, there is a joint development project, in which a public-private venture is completing a critical highway, while, at the same time, enhancing the private developer's real estate investment in the adjacent area. The Dutch also created a real-toll tunnel project as a corporation and plan to transfer ownership to the private sector by selling shares of the corporation to the public when the tunnel is operating profitably. In Portugal, concessionaires bid for the rights to maintain and operate existing highways, creating a type of off balance sheet approach to funding maintenance and operation for the government.

The scan revealed several new alternative financing payment mechanisms. As in the United States, real tolls are in use, but, in some situations, real tolls meet with public and political resistance. Both Portugal and the UK are using systems of "shadow tolling". Shadow tolls are an alternative financing payment mechanism in which the government pays a concessionaire for a project, based on the number of vehicles that use the facility. The

**Shadow tolls are an alternative financing payment mechanism in which the government pays a concessionaire for a project based on the number of vehicles that use the facility.**

government thereby receives the initial project financing from the private sector concessionaire, and the concessionaire takes the risk/reward for the number of vehicles that use the road. Traditional sampling methods and high tech real count mechanisms are in use to count the vehicles for the shadow toll payments. In the UK, shadow tolls are evolving from a payment per vehicle scheme to a payment based on highway performance and availability. Finally, in all countries, the team found examples of the temporary transfer of existing government assets and revenue sources to the private sector. Transfers appeared in a variety of methods, from maintenance to real tolls, for durations of up to 35 years.

## **Contracting Techniques**

European transportation agencies are utilizing a wide variety of alternative contracting techniques that could have a tremendous impact on the efficiency and effectiveness of contract administration in the United States. The report discusses these techniques in terms of procurement, contract types, and payment mechanisms. Similar to the US relationship between the State DOTs and the FHWA, the EU directives establish minimum requirements for procurement, but individual countries can develop unique contracting techniques that fit distinctive needs.

The most notable difference between European and US procurement methods is that *best value* is used almost exclusively in all types of procurements. The team observed virtually no evidence of low-bid selection. The Europeans have found that best value selection, utilizing transparent and uniform processes, enhances competition and innovation. In cases of long-term maintenance contract procurements, the business culture and quality were weighted much more significantly than the price and technical portions of the procurement. There was also widespread use of short listing in selections to ensure technical competence in the procurements. In cases of public-private and privatization ventures, careful consideration was given to the economic benefits of the procurement. The public sector transportation agencies have dedicated significant effort to evaluating and assessing best value proposals, and, in some cases, significantly changed their organizational structures. The report includes a discussion of a ‘*Public-Private Comparator*’ utilized by both the Netherlands and the UK in making the procurement decision. Finally, the ministries of transportation visited on the scan utilized confidential discussion processes much more readily than in the United States. There was concrete evidence given for an increase in design and construction innovation due to these discussions in the procurement phase.

The Europeans have found that best value selection, utilizing transparent and uniform processes, enhances competition and innovation.

This report includes discussion of a number of contract types being utilized in Europe. The United States is currently employing a number of these techniques, but the scan revealed new techniques that have merit for implementation in the States. Some of the contract types discussed in this report appear in the box below. Specific examples are discussed later in the report.

**Contracts Similar to US Methods**

- ??Concessions
- ??Design-Build
- ??Design-Build-Maintain
- ??Design-Build-Operate-Maintain
- ??Finance-Design-Build-Operate-Maintain-Transfer
- ??Two-Phase Contracts
- ??Strategic Partnering

**Contracts not Currently Used in US**

- ??Active Management Payment Mech. (AMPM)
- ??Management Agency Contracting (MAC)
- ??Private Finance MAC
- ??Framework Contracts
- ??Alliancing
- ??Joint Development
- ??Target Pricing
- ??Integrated Supply Chain Management

In summary, all of the contracts promote methods of creating more partnership between the public and private sectors. European contracts have evolved toward placing more public trust and responsibility in the private sector. The contracts discussed in this report provide concrete examples of how some European countries are equitably reallocating contractual risk to leverage the efficiency of the private sector.

Alternative procurement methods and contracts require non-traditional payment mechanisms to optimize their benefits. The biggest difference from the traditional payment methods is that payments are not based on units of work completed, but on availability of the product at the end of the project. The private sector providers are required to carry much more of the costs during

and after construction. They are then paid on the basis of availability (i.e., number of lanes open), quality of performance (i.e., smoothness), and/or safety (a reduction in the number of crashes, measured against a baseline). Disincentives were observed on maintenance contracts, and incentives were readily used for safety. In more traditional contracts, award fees for mobilization and milestone payments were observed. In concession contracts, payments are evolving towards a purely performance based scheme.

## Design-Build

In the countries visited, design-build was observed to be the contracting method of choice for all projects, ranging from green-field construction to pure maintenance contracts. Where concession and public-private partnerships were studied, design-build was inherent in the process. In the UK, the Highways Agency's contracting method of choice is design-build, and it has almost completely replaced the design-bid-build method. As in the United States, there is no singularly consistent design-build contract, but more consistent characteristics are present. Design-build contracts are more consistently awarded on a best value basis. In the best value analysis, life-cycle costs are analyzed using net present value (NPV) of return on investment (ROI). The only problems with the design-build method were encountered in the UK, where it was acknowledged that the preliminary designs were carried too far, prior to tendering. The United States is lagging far behind the Europeans in design-build award procedures. Another area where the Europeans are more efficient than the Americans is in writing *outcome (value) specifications*. US practitioners are struggling with similar performance specifications and this report includes some tools observed for developing outcome specifications, which are directly and immediately applicable to US design-build practices. In Europe, the issue of quality in design-build contracts is being dealt with through the use of 5to10 year warranties and 30-year concessions. The use of alternative financing, operation, and maintenance, in conjunction with design-build contracts, minimizes the need for owners to perform time-consuming and redundant quality assurance (QA) roles. In summary, the design-build techniques observed in Europe promote a level of partnering and early contractor involvement not yet witnessed in the United States.

---

---

... design-build techniques observed in Europe promote a level of partnering and early contractor involvement not yet witnessed in the United States

---

---

## Concessions

While the United States is employing only a minimal number of quasi-public concession and private transportation projects, the European countries visited on the scan are leveraging concessions for major portions of their highway systems. Portugal, for example, has gone from 431 km of concessions, in 1991, to a planned 2700 km of concessions in 2006 – representing 90 percent of its national highway network. The concession system is allowing Portugal to complete its strategic National Road Plan in 2006, where the use of traditional methods were anticipated to take until 2014. Motorways in Europe utilize concessions for both construction and maintenance. Concession periods vary, but were commonly found to be 30 years. The Dutch are promoting concession periods that equal 75percent design life of the product. Both public agencies and concession companies are commonly using long-term warranties, but the team observed widespread use of maintenance contracts, in lieu of warranties. A variety of concession structures were observed that ranged from fully private, to quasi-public, and fully public entities, with varying requirements for private sector equity. Drivers for the use of

concessions range from lack of public funding to a belief that private financing and maintenance delivers a higher quality product and provides benchmarks for public sector performance. Concessions are also discussed in the performance contracting section of this report.

## **Performance Contracting**

Performance contracting is in its infancy in the US transportation sector, but the tools and techniques are well established in Europe. Performance contracting provides a contractor with performance specifications that must be met, by employing whatever means the contractor determines most economical. Performance contracts are thought to allow much more room for innovation through creative construction methods—lowering the overall price of a given project. Additionally, performance contracts necessitate alternative procurement and payment practices, typically utilizing past performance and end product qualities as measurements.

Performance specifications are critical elements of performance contracting. In the Netherlands, the team observed some of the most extensive experience with drafting performance specifications. The Dutch are testing a series of 60 pilot projects to measure performance contracting versus traditional prescriptive methods. They utilize a unique method of defining performance specifications in five levels of requirements that range from road user wishes to requirements for basic materials and processing. Performance specifications detail both the operating level and minimum condition of the facility at the time it is returned to public ownership.

---

---

The Netherlands ... testing a series of 60 pilot projects to measure performance contracting versus traditional prescriptive methods.

---

---

An item of concern in performance contracting in the United States is QA/QC (quality assurance/quality control). In the United States, traditional QA/QC roles and responsibilities are not effective with performance contracting. Performance contracts observed in the scan placed the responsibility for QC solely with the contractor, and the owner retained only a minimal QA role. There is use of “stop” or “control” points on projects as a means for owner QA. There are also unique processes for penalty points and quality audits in lieu of heavy owner inspection. In one instance, the owner gives the contractor yellow or red cards for quality violations, like a referee in a soccer game. One yellow card is a warning; two yellow cards, or one red card, mean that the contractor must stop work until the violation is remedied. Again, there is a greater sense of trust between the contractor and the owner than exists in the United States.

## **Asset Management**

Because there is so much more public trust being placed in private sector, asset management appears very differently in Europe than it does in the United States. Europeans do not use depreciation in asset accounting, but, rather, value assets by replacement cost. Numerous asset valuation methods were observed. In Portugal, for instance, concessionaires bidding for the economic ownership determined the value of a 30-year highway asset. In this case, the market determined what the asset was worth, and the winning concessionaire is responsible for maintaining the asset.

Actual techniques of asset management varied from country to country. Generally, the condition of the entire asset analyzed annually. Additionally, maintainable items go through a more rigid

assessment every two years. The Europeans tie asset condition assessments to annual budgets. Both set value standards and methods standard were observed as techniques to value assets.

The outcome of European asset management is a move toward outsourcing as the predominant method. Concessions and Managing Agent Contracts are allowing the private sector to fulfill the day-to-day role of the ministries of transportation, and the transportation agencies are taking oversight role. The asset management contracts are becoming long-term; 5 to 10 year terms are commonplace in standard contracts. In the case of concession contracts, the concessionaires, not the owners, are developing 30-year asset management programs.

## Conclusions and Recommendations

The US highways agencies should better utilize the efficiencies and resources that the private sector has to offer, through the use of innovative financing, alternative contracting techniques, design-build, concessions, performance contracting, and proactive asset management. Agencies must focus on the users, while equitably allocating risk and seeking to establish an atmosphere of trust in the implementation of procedures. This report presents a number of tools to assist US agencies in meeting their growing infrastructure needs. A documentation of knowledge and best practices learned on the European contract administration scan is provided in an effort to implement these tools and make the US transportation system more efficient and effective for the public.

The team found a number of contract administration tools and techniques that will impact the US transportation community. Some of these items can be directly and immediately applied, while others will require legislative changes prior to implementation. All team members will be actively taking opportunities to educate their peers about the results. Additionally, the following actions will be taken by the team to implement the most pertinent findings:

- ?? Utilize the TRB Legal Committee to develop draft legislation for alternative contract administration processes;
- ?? Utilize the AASHTO Subcommittee on Finance to develop a policy on use of concessions;
- ?? Utilize the AASHTO Subcommittee on Construction to develop draft specifications for best value procurement and design-build contract forms;
- ?? Propose research to summarize construction procurement successes being used in the United States that are similar to those found in Europe; and,
- ?? Identify and solicit State DOTs to evaluate pilot projects in the areas of innovative financing, alternative contracting techniques, design-build, concessions, performance contracting, and proactive asset management.