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PAPER TITLE	**Assisting the Algerian administration in the implementation of a road asset management system – The role of a twinning project financed by the EU**		
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ABSTRACT:

This paper presents a project, completed in October 2018, which was developed for an approximately three-year period by a French-Portuguese Consortium. Its main purpose was to assist the Algerian National Body for Technical Control of Public Works (CTTP) in the implementation of a decision support system for the management of the national road network and bridges. It was a "twinning project", i.e., a cooperation instrument made available by the European Union through an Association Agreement Program with Algeria. Moreover, this paper reports from the perspective of the Portuguese partner, the National Laboratory for Civil Engineering (LNEC), the main results obtained and the lessons learnt from this interesting opportunity for cooperation and for exchanging technical knowledge.

Within the project, three main interrelated subject areas were addressed: 1 – A data-base and a maintenance management system for road pavements; 2 – A data-base and a maintenance management system for bridges; 3 – A traffic counting and vehicles weighing system. It involved around 40 experts from the partners, as well as technical staff from CTTP, and comprised not only local missions, but also training actions and technical visits to Europe. The overall result was considered to be highly positive as recognized by the project supervision bodies and by the local authorities engaged.

Since large investments in road construction were made during the last few decades in Algeria, attention is now being increasingly directed to the maintenance and rehabilitation of these assets, with a view to ensure the provision of an adequate service to road users.

Assisting the Algerian administration in the implementation of a road asset management system

The role of a twinning project financed by the EU

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1 INTRODUCTION

Economic growth of Algeria during the last few decades has led to territorial developments and consequently to an increased demand for mobility of people and goods, which in turn has justified the large public investments made in transport infrastructures, mainly in the road sector. The following Section 2 presents a brief overview of the country's main features and particularly of its road environment.

The existing road patrimony constitutes therefore a very important asset, which implies a thorough knowledge of its condition and a permanent care to ensure its maintenance at adequate service levels. This is a policy currently followed by the Algerian Government that, apart from completing the main links of the road network, is increasingly allocating resources to the preservation and rehabilitation of those infrastructures.

The National Body for Technical Control of Public Works (CTTP), as a public institution, plays an important role in this context, by providing technical support to central and local administration bodies, in several areas, among which the regular assessment of the condition of the road network based upon data collection and analysis.

Furthermore, a step forward was envisaged by the Algerian administration, which consisted in the implementation of a decision support system, upon which sound decisions on the interventions in the road network could be made and priorities could be duly justified, on the basis of technical ground and taking into account the available resources. CTTP was entitled to conduct this process, for which external knowledge exchange was deemed useful, by taking advantage of the experience of other countries where these developments have already attained a mature state and are currently in use. For this purpose, a cooperation instrument, financed by a European Union (EU) program was found to be particularly suitable: the "Twinning Project". Section 3 characterizes the main aspects of this tool for international technical and scientific cooperation, as well as the French-Portuguese consortium that won the call for offers to develop the said project, in conjunction with the beneficiary Algerian institute (CTTP).

The work ahead proved to be hard and challenging. Indeed, the project was developed for an approximately three-year period, as described in Section 4, and covered the three main objectives defined as activity areas: 1) To implement a road data base and a decision support system for pavement maintenance management of the Algerian national road network; 2) To implement a data base and a management system for the maintenance of road bridges in the national road network; 3) To extend the traffic counting system to the whole Algerian national road network, and to master the technical domain of a vehicle load control system, including the weigh-in-motion of heavy vehicles.

As considered by the stakeholders, the main objectives of the project were reached, as mentioned, for instance, in the project closing Seminar held in Algiers in October 2018. The results obtained, together with the experience gained by all the partners constitute a valuable asset to be explored, which is expected to contribute to the continued improvement of the management system. Section 5 presents the overall conclusions not only as refers to those results and lessons learnt but also to the relevance and added value of pursuing this form of technical cooperation among different countries.

2 ALGERIA AND ITS ROAD NETWORK

Algeria, whose territory occupies an area of 2.4 million km^2, is presently the largest country in Africa (Figure 1). Its population, of around 42 million inhabitants, presents a high annual growing rate (2.2%), with predominance of young age groups. This population is very unevenly distributed, presenting a high density on a stretch less than 200 km wide, along the 1000 km Mediterranean coast, where all the main cities are located, among which the capital city of Algiers, with a population of around 8 million living in its metropolitan area (Macedo, A et al. 2018).

The motorization rate in Algeria has been steadily increasing, with over six million vehicles in circulation. Alongside the growing traffic volumes there is a high accident rate, which poses a serious road safety problem, even though currently presenting a decreasing tendency; from 3000 reported deaths in 2015 to 1700 in 2017 (CNPSR 2018).

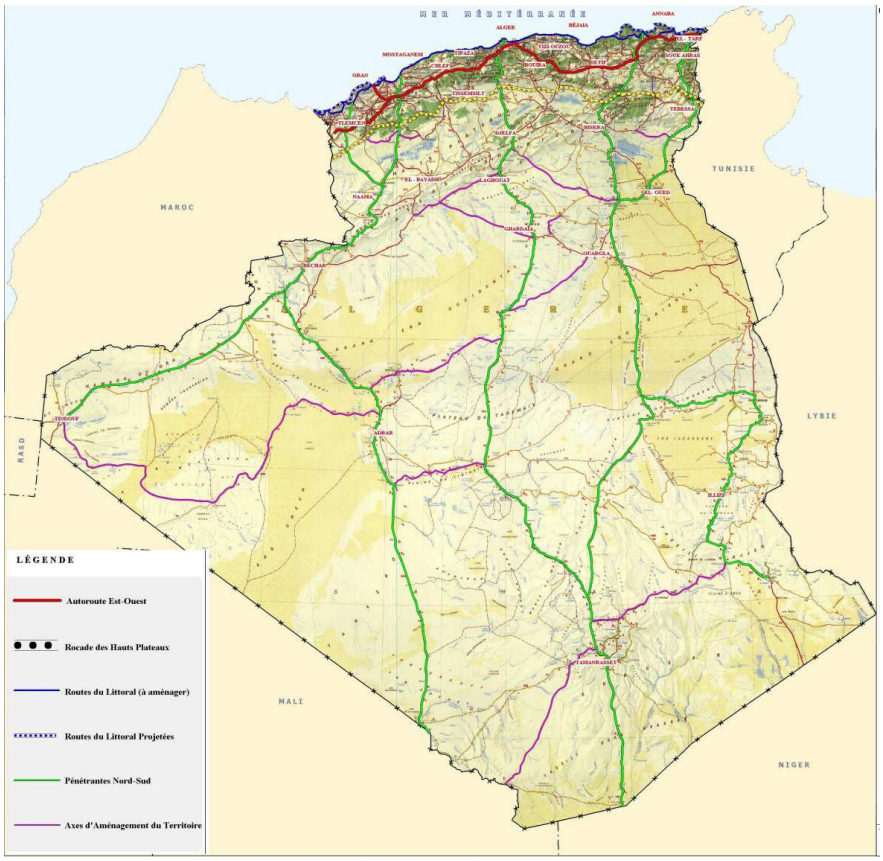


Figure 1.Algeria road map (MTPT 2017)

The total length of the Algerian road network is around 114000 km and comprises 29573 km of national roads, 24109 km of provincial (*Wilayas*) roads and 60420 km of local community roads and paths (MTPT 2017). The motorway network, totalizing approximately 2500 km, is included in the first group. In the national road network, 4815 bridges and tunnels are in operation.

The medium and long term development of the national network has followed the National Master Plan for Roads and Motorways 2005-2025, presently under revision. This strategic plan has contemplated, for example, the construction of the 1216 km long East-West motorway, parallel to the Mediterranean coast, as well as the strategic North-South traffic links connecting the Southern interior and border sub-Saharan countries to important Mediterranean ports in the North. The same Plan also foresees the strengthening of the road maintenance at the network level.

3 A TOOL FOR INTERNATIONAL TECHNICAL COOPERATION

3.1The EU Twinning Project

Various cooperation instruments are available for financing joint initiatives between the European Union and neighbourhood policy countries, namely through association agreements, as those established with some African countries of the Mediterranean basin, which is the case of Algeria. Among those instruments are the so-called "Twinning Projects", which provide a framework for partnership cooperation between the public administrations of the Member States and of a Beneficiary country, with a view to achieve mandatory results/outputs jointly agreed with the Commission, and in connection with policy objectives.

Twinning projects were launched by the European Commission in 1998 in the context of the preparation for enlargement of the EU and are still an important institution building instrument. According to the "Common Twinning Manual" (EC 2018), Twinning is a joint project of a grant nature, and not a one-way delivery of technical assistance from a Member State to a Beneficiary country. Each partner assumes different responsibilities: the Beneficiary commits itself to undertaking and funding reforms to which the project contributes; and the Member State to accompanying the process for the duration of the project. The partners sign a Twinning work plan at the beginning of the implementation of the project work. Following the completion of the Twinning project the Beneficiary administration is expected to have achieved significant progress in the identified area of the project.

In brief, this instrument delivers public sector expertise from EU Member States, with a view to upgrade the administrative capacities of a partner country. For each project, a Resident Twinning Adviser (RTA) is seconded from a Member State to the beneficiary administration for the entire duration of the implementation action. The work plan usually foresees short-term expert missions, training events in the partner administration and awareness-raising visits to the Member States.

Within the scope of the Algeria-EU Association Agreement Support Program (P3A) a call for offers was launched in 2014 to develop a Twinning project with the overall objective of strengthening the Algerian governmental policy of road infrastructural patrimony preservation by means of adequate management methods. Its specific objective was to assist the "*Organisme National de Contrôle Technique des Travaux Publics"* (CTTP), as Beneficiary, in the implementation of a decision support system for the management of the national road network, including its bridges.

In response to this call, a proposal was submitted by a French-Portuguese consortium. This proposal was afterwards selected and a contract was signed by all parties for the project execution, which started in January 2016. To this project, under the designation CTTP1 – DZ/20 (Figure 2), a 1,6M euros funding was allocated, for a two-year period. The deadline was subsequently extended for further 10 months.

Figur 2 Heading of the Twinning Project DZ-20

The project by being financed by EU grants was hence managed according to EU's financial regulations. The P3A Program Management Unit (UGP), under the Algerian Ministry of Commerce, coordinated the twinning operations, acting as a communication point between the European Union Delegation in Algeria, the National Contact Points of the Member States and the Algerian beneficiary administration.

The contracting parties agreed upon the appointment of a Resident Twinning Adviser (RTA) for the duration of the project, which was indicated by the French partner. A local counterpart of the RTA was appointed by CTTP.

Expertise France, the French public agency for international technical assistance, assumed the responsibility for all the administrative and financial management of this Twinning project, as mandated body designated by the leading partner.

3.2 The Beneficiary body (CTTP)

CTTP, created in 1997, is under the supervision of the Algerian Ministry of Public Works and Transport. Among its main assignments are the technical control and expertise of public works; the issuing of technical regulations; the technical assistance to the provincial directorates for public works (DTP – *Directions des Travaux Publics des Wilayas*); the conduction of related studies and research projects; the assessment and follow up of the condition of public infrastructures, involving the creation of data bases; as well as the preparation of standards for the management and operation of road networks. Its competence domains include roads, bridges and tunnels, soils and materials, road safety, road management, metrology, maritime infrastructures and airports. Presently its staff has around 500 employees, 34% of them holding an engineering degree.

CTTP is installed in Algiers. In the same campus, central offices and laboratory buildings are located (Figure 3).

Figure 3.CTTP main office in Algiers

3.2 The French-Portuguese Consortium

The Member State Project Leader was appointed by the French Ministry for Ecology, Sustainable Development and Energy (MEDDE), and the French participation was ensured by experts from CEREMA (*Centre d'Études et d'Expertise sur les Risques, l'Environnement, la Mobilité et l'Aménagement*), supervised by that ministry. This participation included also experts from IFSTTAR (*Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux*). The project leader, together with its Algerian counterpart, chaired the project's "steering committee".

CEREMA is a French public body, established in 2014, which gathers the competencies of former eleven public services, and is, at national and territorial levels, a center for technical and scientific expertise, giving support to both the State and the local agencies. It conducts multidisciplinary research activities and intervenes in various domains, such as: environment, housing, cities and sustainable construction, transports and infrastructures, mobility, road safety, risk prevention, sea, energy and climate.

IFSTTAR is a major French public institute for science and technology, created in 2011, from the merger of the National Institute for Transport Research (INRETS) with the Central Laboratory for Bridges and Pavements (LCPC). It delivers applied research and expertise in the domains of transport, infrastructures, natural risks and cities, aiming at improving life conditions and enhancing sustainable development of society.

The Member State Junior partner was represented by The National Laboratory for Civil Engineering (LNEC – *Laboratório Nacional de Engenharia Civil*), which was supervised then by the Portuguese Ministry for Planning and Infrastructures. LNEC nominated a Deputy Project Leader and ensured the participation of the Portuguese experts.

LNEC is a Portuguese public research institution, established in 1946, which is devoted to science and technology and has the status of State Laboratory. Its main goals are to carry out innovative research and development and to contribute to best practice in the various domains of civil engineering. LNEC also plays a role in advising the Portuguese Government in technical and scientific matters in its domains. LNEC campus is located in Lisbon (Figure 4) and its staff comprises around 450 employees and 100 research fellows; 30% of the personnel holding a PhD or equivalent degree.

The Transportation Department is one of LNEC units. Its activity covers the areas of road, railway and airport infrastructures, as well as traffic, road safety, and transports planning and economy. Most of the Portuguese experts were selected from the staff of this Department and from the Structures Department.

Figure 4.LNEC campus in Lisbon

4 DEVELOPMENT OF THE DZ-20 TWINNING PROJECT

4.1 General characterization of the project

For attaining the proposed objectives and delivering the expected results, the DZ-20 project was structured into the three main component areas (so-called “Results”) as follows:

Result 1 – Development and implementation of a road data base and a decision support system for pavement maintenance management, for application to the Algerian national road network;

Result 2 – Development and implementation of a data base and a decision support system for bridge maintenance management, for application to the Algerian national road network;

Result 3 – Expansion of a traffic counting system for use on the whole road network, and definition of a heavy vehicles weighing control system, with a view to ensure the preservation of the road network.

The work in each of these areas was carried out through a number of tasks. For each Result, one of those tasks referred to study visits to France and Portugal by selected technical staff from CTTP.

Throughout the 34 months of the project execution, over 60 missions of experts from the Member States partners were made to CTTP in Algiers, the logistics being provided by the beneficiary. A total effort of 600 MD was delivered involving around 40 experts from France and Portugal, which represented an execution rate of 96%, and corresponding, in budgetary terms, to a 93% rate. The Portuguese participation, ensured by 7 experts from LNEC, represented around 14% of the total effort; these experts being involved in 36 missions to Algiers and having organized 3 study visits to Portugal. For these visits an important support was given by the Portuguese transport infrastructures administration (IP – *Infraestruturas de Portugal*).

A total of 50 technical staffs from CTTP was mobilised for the project. Besides training, either through local actions or study visits abroad, a number of deliverables was produced mostly as documents (spreadsheets, manuals, guides, reports, etc.), which were intended to be used for supporting not only on going activities and the current exploitation by CTTP of the implemented systems, but also any other developments that may be undertaken in the future.

It is worth noticing that, contrarily to what was initially expected, CTTP decided to develop with its own technical means, namely within its computer systems centre, the data base applications foreseen for the project, rather than purchasing commercial products,. This decision, somehow controversial among the actors involved, caused a delay in the project scheduling, especially as regards the tasks depending on those tools. However, it eventually proved to be a successful choice that may bring future benefits to the organisation. The role of the external experts in this case was to provide specifications and to follow up the internal developments, as well as their testing.

4.2 The road data base and pavement maintenance management system

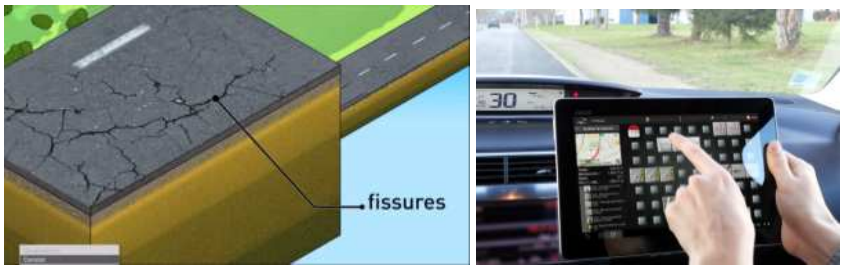
Five interrelated tasks were implemented to achieve the specific objectives of this project's component. The initial goal was to test the systems under development on a number of pilot sections totalizing a 500 km length of the Algerian national road network. However that intention proved to be too ambitious in view of several constraints found as the work progressed. Finally, a sample of pilot sections with a total length of 70 km was used.

As a prerequisite for further developments, particular attention was initially paid to the data location reference system to be used. A strong interaction with the experts was undertaken at this point, aiming at defining the appropriate methodology for geo-referencing the network and on how to collect and structure the data accordingly.

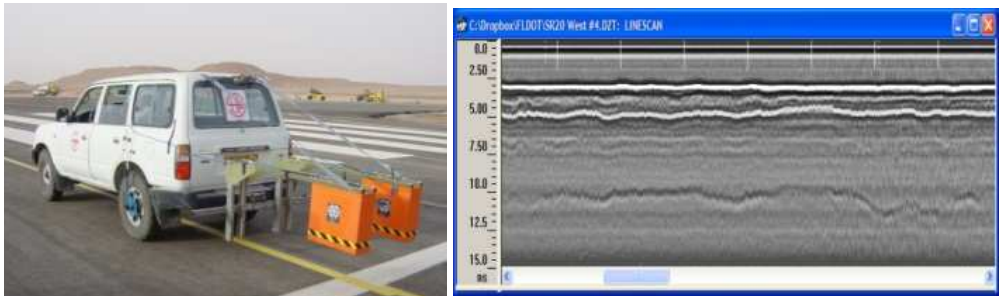
Another aspect to which significant effort was devoted by all parties since the beginning of the work was the design and implementation of an adequate pavement data catalogue, encompassing the choice of the data items to be included and the data collection procedures to be followed by CTTP, particularly as regards pavement distress. The main reference for this purpose was the French data catalogue "*Isidor*" used by CEREMA. The catalogue specifications were adapted to the specific Algerian environment, through real condition assessments discussed in joint sessions involving CTTP, CEREMA and LNEC. As final results, three deliverables were produced: a "Pavement Data Catalogue", a "Pavement Degradations Catalogue" and a manual for "Pavement Pathologies Survey".

The local contact with CTTP premises and laboratory facilities provided a sound knowledge on its capabilities not only in terms of laboratory characterization of pavement materials, but also as refers to equipment for on-site survey of structural and functional behaviour of pavements. Some examples are shown in Figures 5 and 6.

Figure 5.Examples of CTTP equipment



a) *In-vehicle pavement cracking survey and classification device*



b) *Ground Penetrating Radar*

Figure 6.Examples of CTTP in-vehicle devices and equipment for pavement surveys (Bakour, M. 2017)

Furthermore, the implementation of the envisaged decision support system for pavement management required the definition of pavement condition indicators (functional, structural, comfort and safety) and criteria for the classification of the overall state of pavements and for the allocation of available resources to current maintenance and to big repair interventions, in order to produce a decision matrix.

The methodology followed, and agreed upon by all parties, was defined considering the proposals from the experts, which were based on the procedures adopted in France by its regional road directorates and by the Portuguese road administration. This methodology was applied on the 70 km pilot sections of the Algerian national road network, mainly located in or near the Algiers region. Some conclusions were drawn from these tests, for instance regarding the pavement degradation surveys, which implied the need for adaptations in the relative weights given to the importance of the degradations, and in the path to obtain global quality indicators.

The whole activity described above enabled the computer center of CTTP to develop the software system that was intended to support the Road Management System SAGER (*Système de Gestion des Routes*). The SAGER system is composed of 8 moduli that incorporate the cartographic reference system management, the data validation and the road sectioning procedure, the collected data treatment and the road data base integration (Figure 7), the calculation of the pavement condition indicators, and, finally, the decision matrix application.

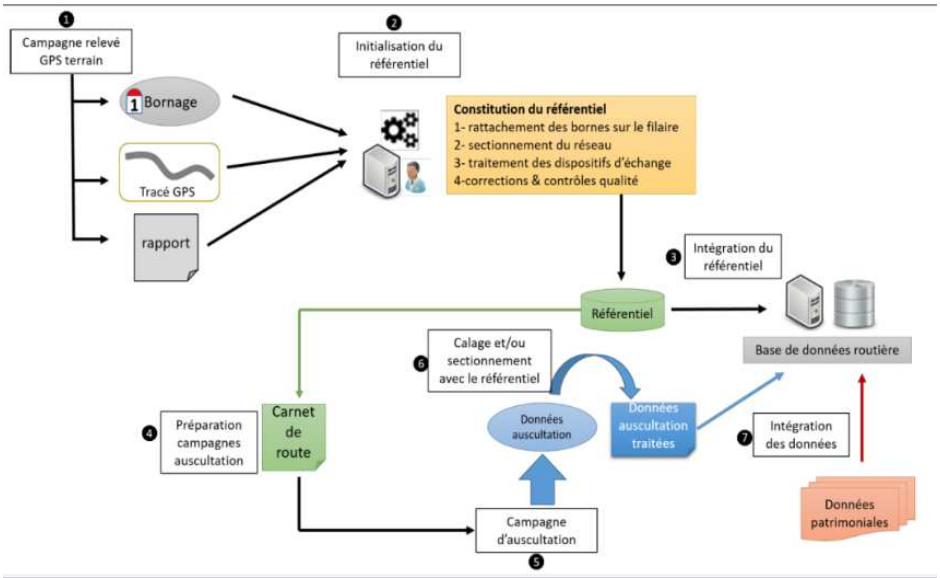


Figure 7. The framework for the constitution of the SAGER data base (Bakour, M. 2017)

The partner expert team mobilized in this project component organized several training actions for the technical staff of CTTP at their premises. Moreover, a number of study visits, focused on this subject area, were held in France and Portugal, aiming to providing a close contact with similar systems in operation in both countries. In Portugal, for instance, the body most involved in this activity was the transport infrastructures administration (IP) which actively collaborated in the organization of a visit (Figure 8).

Figure 8.Study visit to IP in Portugal

The main results obtained as regards this component area of the project, can be summarized as follows:

- A road data base was implemented, associated to a cartographic representation of the road network, and to a reference system, which were installed in compliance with GPS technology;
- This data base serves a decision support system that was developed as a tool for the implementation of a rational road maintenance government policy;
- Guidelines, manuals and best practice procedures were established for the current operation of the system and as contributions to its regular improvement.

Some recommendations were drawn for the future:

- The need to update, on an yearly basis, the reference and cartographic support of the system, following very precise operational procedures;
- The interest to extend the system to other road authorities (i.e. motorway administrations) in order to encompass all the national road assets;

- The need to implement a more secure computer system, for both the functioning and the storage of data.

4.3 The bridge data base and the maintenance management system

Similar to the pavement management area, this component area of the project required a dedicated data base for storing data files. These files were completed with selected data items related both to the infrastructure administrative and constructive characteristics and to its condition data, to be collected during scheduled surveys. The design of the data base and the respective information system were also developed at CTTP, with significant intervention of its computer center. The Member State experts followed up and gave advice in the various stages of this process.

It was foreseen that a sample of 24 bridges, representing different types of structures in the Algerian national road network, would be tested within the scope of the project.

Besides the data base implementation task, the work carried out was intended to contribute to the definition of the administrative framework and the management model to be adopted for the whole network. For that purpose, a choice was made regarding the use of the French model as reference (Figure 9). Accordingly, for current inspections, the IQOA procedure (*Image de la Qualité des Ouvrages* d'Art) was followed and, for detailed bridge inspections, the practices of the French departmental road directorates and of CEREMA were adopted; the proposed model becoming the one used for the same kind of interventions to be undertaken in Algeria by the DTP and the CTTP.

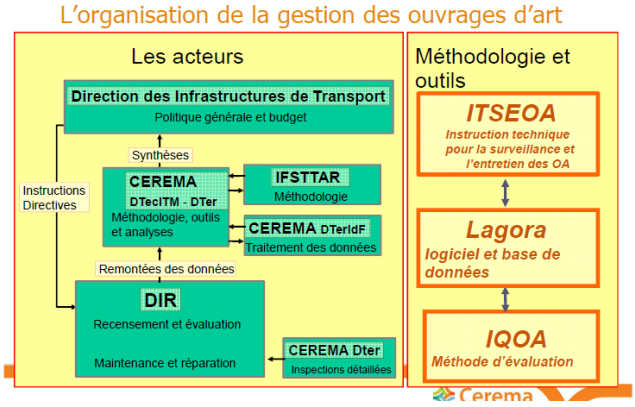


Figure 9.The French framework for bridge management (Ditchi, H. et al. 2016)

As one of the tasks of this project component, a training scheme was prepared for bridge inspection and various training actions were delivered to a number of selected CTTP technical staffs. These actions included the acquaintance with the inspections method and the criteria for condition classification of inspected bridges, as well as with the procedures for identification of distresses, that may require structural repair interventions. In this context, comparisons were made between the methods used in France and in Portugal, and their differences, advantages and disadvantages were discussed. The Portuguese bridge management system (SIGOA), a tool that is currently in use by the national transport infrastructures administration (IP), was presented to CTTP technicians during a study visit to Portugal dedicated to this subject area.

Moreover, a specific training action in the field was carried out in Algeria, which involved the site inspection of three selected bridges of different types: a steel bridge; a steel-concrete mix bridge; and a concrete bridge (Figure 10). The external experts followed closely the development of this action by giving advice on the correct procedures and assessing the inspection reports submitted by the trainees.

Figure 10. Inspected bridges: *Viaduct El Mohammadia; Pont de Cinq Maisons; Pont Baraki* (Macedo, A. et al. 2019)

Finally, a draft legal document was prepared for supporting the official implementation of the proposed bridge management system, which established the competencies that should be assigned to the Ministry of Public Works, the CTTP and the DTP from the 48 provinces (*Wilayas*).

The main results obtained as regards this component of the project, can be summarized as follows:

- The existing competencies at CTTP for the diagnosis of road bridges were strengthened;
- A bridge data base was initiated;
- Descriptive files, operation mannuals, guides for bridge data collection and lexicon were delivered;
- Special competencies were acquired by ten staff members of CTTP for the analysis of structural pathologies of degraded bridges;
- A complete operational preventive maintenance procedure was set forth for the entire national road network.

Some recommendations were drawn for the future:

- Implementing an organisational scheme, decentralised under the DTP, with a view to ensure permanent bridge monitoring over the whole territory of Algeria;
- Updating the competences detained on bridge survey, by means of continuous training;
- Establishing a network for the main actors involved in bridge management, to be promoted by the Ministry and involving the CTTP and the DTP.

4.4 The traffic counting and vehicle weighing system

Two main objectives were pursued within this project component: 1) to contribute to the setting up of a traffic counting system that could be used systematically over the entire length of the national road network (30000 km); b) to contribute to improve the knowledge, on a statistical basis, of heavy vehicle overloading, using 10 stations for weigh in motion. It was envisaged that the traffic counting system would be managed in a centralized way, including the installation and maintenance of counting and weighing stations.

These objectives required a methodology for sectioning the road network, in order to adequately assign the traffic volumes registered using both fixed and mobile traffic stations. Since a preliminary sectioning already existed (1689 road stretches), the latter was reviewed and several improvements were proposed as the work progressed, namely as regards the consideration of urban boundaries, the suppression of some stretches within urban limits, the identification procedure to assign an unique number to each stretch, and the geo-referencing of the location of every counting device installed. A manual was afterwards produced for the sectioning of the road network, which included a method for macro-sectioning by linking stretches with similar traffic characteristics. The application of this manual by CTTP made it possible to section the Algerian national road network into 2200 elementary sections and 700 macro-sections.

CTTP had already several types of counting equipment, but only a few were operational. Therefore, interventions were made in order to recover most of them, and also to prepare updated versions of the respective operation manuals.

A pilot road (RN11), connecting Algiers to Oran, was chosen for testing the systems. Its 52 interurban stretches were used for assessing the application of guidelines for network macro-sectioning, and the overall traffic counting method, which required data collection during 3 days in each stretch. An existing weigh-in-motion station, after repair, was also installed in a stretch of the pilot road (Figure 11).

Figure 11. Devices installed in RN11 for weigh-in-motion testing (Macedo, A. et al. 2019)

Training and dissemination were important issues included in this component area of the project. In this respect several actions were carried out. An international Seminar was held in Algiers in 2018, covering the main issues that were dealt with in the project. A training action specifically on heavy vehicle weigh-in-motion and equipment was also delivered to technical staff of CTTP. Furthermore, CTTP staff performed study visits to France and Portugal to become acquainted with the respective systems. In Portugal, this visit was organized with the support of the motorway company (BRISA) and the traffic unit of the Portuguese National Guard (Figure 12).

Figure 12.Aspects of the study visit to Portugal on traffic subjects (Macedo, A. et al. 2019)

The main results obtained as regards this component area of the project can be summarized as follows:

- The necessary conditions were established for having a vehicle counting system extended to the entire Algerian national road network;
- Progresses were made for mastering heavy vehicle counting and weigh-in-motion procedures and the use of dedicated equipment;
- The consequences of heavy vehicle overloading were highlighted and measures were proposed for controlling the problem;
- Technological contributions and knowledge transfer made it possible to recover and put into operation several existing equipment that was out of order in CTTP premises.

Some recommendations were drawn for the future:

- To integrate the heavy vehicle weight data into the general traffic volume counting system;
- To establish a communication channel to provide data from the centralized traffic counting system to other stakeholders (DTP, police, road safety agents, etc.);
- To take full advantage of the whole capacities of the equipment that was repaired and put into operation.

5 OVERALL CONCLUSIONS

Partial conclusions have been already presented in previous sections, in relation to the objectives of each of the three main project areas of Twinning project DZ-20, which were followed by recommendations for future developments.

Furthermore, it can be stated that the overall objective of the said project was reached. Indeed, it was recognized that DZ-20 had a valuable contribution to foster the implementation of the Algerian policy for the preservation of the road infrastructures patrimony by means of advanced management practices and tools. This recognition was forwarded namely by the Algerian Ministry of Public Works and Transport, through its General Directorate for Infrastructures, the President of CTTP, the management structure of the Association Agreement Program Algeria-EU, and by the supervision ensured by the European Commission.

Nevertheless several difficulties were encountered during the project development, which required the search for alternative solutions and adaptations, within the constraints dictated by the twinning contract and also by the need to comply with external and local conditions. For example, delays in early phases of the project, caused, among other factors, by the decision of the Beneficiary to develop by itself the data base software, had to be compensated in other tasks, being one of the reasons for the significant reduction in the total length of the pilot road stretches, and for the need to extend for further 10 months the duration of the project, as proposed to and accepted by the EU.

As regards conclusions and lessons learnt, the following was deemed to be important to retain:

- It was worthwhile to undertake an ambitious comprehensive approach to the management of the country's road asset network, by incorporating the road, bridge and traffic components into the same project, which made it possible to profit from the advantages of common procedures and interdisciplinary actions; the development of the location reference system being one example.
- The solution that was chosen by the Algerian administration and the beneficiary body as a tool for international cooperation in this domain (Twinning Project), proved to be adequate to fulfil the underlying objectives. In fact, besides a means to provide financial support, it helped creating a suitable work environment, of mutual respect, enabling the exchange of information and experience and the acquisition of capabilities, while ensuring a clear commitment from all parties involved.
- It must be mentioned that the regular exploitation of the management system deployed, with the new competencies acquired by the beneficiary body (CTTP), is not deemed to succeed without a sound commitment from the supervising Ministry in ensuring on a consistent and perennial basis, the necessary resources and other conditions (legal framework, definition of responsibilities, etc.).
- Finally, throughout this almost three years' experience, special links were established among all the parties involved, facilitating future interactions and the setting up of other collaborative initiatives, not only in the same domain but also regarding different scientific and technical areas of common interest. As an example, at the end of 2018, a Memorandum of Understanding was signed between CTTP and LNEC for cooperation in several areas of Civil Engineering.

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