COORDINATED AUDIT ON ROAD WORKS

EXECUTIVE SUMMARY

EXPERIENTIA MUTUA

OMNIBUS PRODEST*

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Coordinated Audit on Road Works

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This document was prepared based on information from the audits carried out by the Supreme Audit Institutions that participated in the joint project.

Additional information can be obtained at:

Detailed International Consolidated Report on the OLACEFS website	**National Reports**
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*A practical application of the INTOSAI motto is reflected in this Coordinated Audit: “Experientia Mutua Omnibus Prodest "(mutual experience benefits all: <http://www.intosai.org/fileadmin/downloads/downloads/1_about_us/strategic_plan/SP_INTOSAI_Strategic_Plan_2017_22.PDF> (accessed on 06/01/2017)

Organization of Latin American and Caribbean Supreme Audit Institutions.

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I. Introduction

According to INTOSAI's motto *"Experientia Mutua Omnibus Prodest"* - mutual experience benefits all - the exchange of experiences and knowledge among SAIs should be a guideline for inter-institutional cooperation.

In this context, coordinated audits, as joint impact learning activities, constitute an effective technical cooperation, capacity-building and institutional strengthening strategy. They are a form of collaboration among SAIs to exercise control over international or regional issues of common interest to the countries involved.

1st phase	2nd phase	3rd phase
The work is planned jointly (objectives and procedures are defined)	Each SAI carries out its audit in its own territory	Results are shared and a consolidated report is produced

Figure 1 - Phases of a coordinated audit

The format of coordinated audits carried out within the framework of OLACEFS combines training actions (virtual and face-to-face training actions) and audits on relevant transnational issues of common interest, making it possible to develop theoretical technical skills with practical professional competencies.

When implementing this strategy, the Coordinated Audit on Road Works contributed to fostering technical cooperation, capacity-building, and institutional strengthening for external control of public works in the 11 participating SAIs (50% of OLACEFS members). In addition, there was an intense exchange of experiences among the participating SAIs both in terms of government auditing procedures and methodologies and in relation to the technical aspects of the audited object.

This document consolidates the main results of the Coordinated Audit on Road Works. The audit was conducted within the framework of the Public Works Audit Working Group (GTOP) of the Organization of Latin American and Caribbean Supreme Audit Institutions (OLACEFS), aiming at evaluating, through compliance audits, the quality of road construction and maintenance in eleven countries: Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Paraguay, Peru and the Dominican Republic.

Figure 2 - Countries that participated in the Coordinated Audit

This executive summary summarizes the main results of the coordinated audit and the main opportunities for improvements identified. Additional and/or more detailed information can be found in the national reports on the respective audits of the respective SAIs.

I. 1 Objectives of the audit

The objective of the coordinated audit was to evaluate, through compliance reviews, the quality of road construction and maintenance works[1] under the direct administration of government[2], covering from preliminary studies to the execution of the works.

For this purpose, the following definition of quality of road works was adopted:

Quality road works are those designed and implemented in accordance with appropriate standards and technical criteria and which result in a road that offers safety, comfort and traffic fluidity without defects throughout its useful life.

Due to the participation of several countries in the audit, it was necessary to set cross-cutting and common audit criteria for the audited object. In addition, it should be noted that although the laws and technical standards applicable to road works in the various countries are similar in many ways, they are also different in many aspects.

For this reason, the evaluations carried out in the audits were based on guidelines that describe those practices whose observance was considered essential for good quality works. In planning the audit within its territory, each SAI took on the responsibility of identifying the legal and regulatory provisions adopted in their country related to the guidelines.

1 - The time between studies that support the design and implementation of the works should be as short as possible, so that the characteristics of the roads are not altered significantly during this period.

2 - Design must: be based on sufficiently precise, detailed and comprehensive studies; include all the necessary and sufficient elements to characterize the work; and fully cover all the necessary services for its completion, including those necessary to ensure compliance with environmental requirements and to identify and propose solutions vis-à-vis possible interferences.

3 - Design should be developed by qualified companies and professionals with proven technical skills.

4 - Design must be analyzed and approved by an expert technical team representing the Administration that is distinct and independent from those that developed it.

5 - The work must be carried out by qualified companies with proven technical and economic capacity.

6 - The work must be overseen by the Administration on an ongoing basis and effectively.

7 - The execution of activities or items must be accompanied by tests to confirm their quality and compliance with acceptance criteria.

8 - The procedures to be adopted for the provisional and final delivery of the works, which must be based on objective and measurable quality criteria, must be clearly defined in the respective contract.

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[1] Construction and maintenance works refer to works for implementing or paving new roads, road duplication, expansion of road capacity, road maintenance with structural interventions. Routine maintenance was not included.

[2] The scope was restricted to works contracted by government, as in works carried out under concession, government is usually only interested in the final result and it is not up to it to control the means by which concessionaire companies achieve it.

9 - Changes in the works that can have a negative effect on their design and quality and cannot be appropriately justified should be avoided.

10 - The execution schedule of the projects must be monitored on an ongoing basis to check the compatibility between the expected physical-financial schedule and the actual execution of the works and identify causes of possible delays in implementing them for timely correction.

Table 1 - Guidelines to ensure quality road works

I. 2 List of audited projects

The audits in each country were carried out for projects chosen freely by each participating SAI. It should be noted that the audited projects do not constitute a representative sample of road works in the participating countries. Therefore, the results presented in this document refer exclusively to the audited projects and cannot be applied to all road works executed in the region in general, although they may serve as a guide for other works.

1. BRAZIL

Paving of highway BR-235/BA between kilometers 282.0 and 357.4.

Images: Google Maps and Google Earth

2. CHILE

Expansion and Repaving of Highway 90 (former Highway I-50) San Fernando Sector - Crossing with Highway I-860, in the sections from Dm. 0.00 to Dm. 560.00 (toward San Fernando) and from Dm. 0.00 to Dm. 2,345.00 (toward Santa Cruz), Region Del Libertador Bernardo O'Higgins.

Images: Google Maps and Google Earth

3. COLOMBIA

Improvements in Via Palermo - Sitionuevo - Remolino - Guáimaro, Highway 2702, in the department of Magdalena (Via de la Prosperidad).

Images: Google Maps and Google Earth

4. COSTA RICA

Construction of National Highway No. 4, Bajos de Chilamate Section - Vuelta Kopper.

Image above: Google Maps

5. ECUADOR

Rehabilitation and maintenance of the San Vicente - Pedernales highway, artery corridor E-15, includes the Canoa side road.

Images: Google Maps and Google Earth

6. EL SALVADOR

Improvements in the Jerusalem Avenue - Masferrer Avenue - Paseo General Escalón intersection.

Images: Google Maps and Google Earth

7. HONDURAS

Construction of the Boulevard Kuwait - Calle de la Salud, Boulevard Kuwait - Boulevard José Cecilio Del Valle fast track road.

Images: Google Maps and Google Earth

8. MEXICO

Modernization of the Ixtlahuaca-Jilotepec highway in the State of Mexico.

Image on the right: Google Maps

9. PARAGUAY

Rehabilitation and Paving of the Santa Rosa del Aguaray - Capitán Bado section; from the intersection with Highway No. 3 at Km 282.60 m (progr. 0,000) to the border with Brazil (progr. 140+000).

Images: Google Maps

10. PERU

Rehabilitation and improvements in the Lima - Canta - La Viuda - Unish highway in the Lima - Canta section.

Images: Google Maps

11. DOMINICAN REPUBLIC

Rehabilitation and improvements in the Bávaro - Uvero Alto - Miches - Sabana de La Mar highway.

Images: Google Maps and Google Earth

II. Results of the audit

The criteria that were evaluated were distributed according to the phase of the project: contracting of companies, design, execution of the works, oversight of the works, and changes in design after project contracting.

II. 1 Criteria related to the contracting phase

In the contracting phase, four criteria were evaluated:

• Contracting of a company (or companies) to develop the project design: based on this criterion, the rules and procedures for hiring a company (or companies) to develop the project design were checked to ensure that a professional and qualified company (or companies) with proven technical capacity had been hired, without limiting the participation of other bidders in the tender processes;

• Contracting of a company (or companies) to execute the works: based on this criterion, the rules and procedures for hiring a company (or companies) to execute the works were checked to ensure that a professional and qualified company (or companies) with proven technical capacity had been hired, without limiting the participation of other bidders in the tender processes;

• Definition of quality criteria and procedures for the delivery of the completed works: based on this criterion, the auditors checked whether the criteria for accepting the works and their stages were actually defined in the bidding documents (or equivalent

instrument) and were in line with the laws and regulations of each country, as well as whether they were objective and measurable; and

• Obtention of permits and licenses: based on this criterion, the auditors checked whether the bidding documents (or equivalent instrument) actually regulated the obtention of permits, licenses for quarries, environmental impact studies or permits, etc., and whether they had been obtained in accordance with the law and applicable regulations.

Conclusions about the contracting phase

It was found that the rules applied to the contracting phase met the criteria evaluated: the contracting instruments included provisions to ensure the contracting of qualified companies, to define quality criteria and the procedures for the delivery of the completed works, and to establish rules for obtaining permits and licenses.

Therefore, it was concluded that the contracting processes met the guidelines that must be observed in the stages of contracting, design and execution of road works to ensure that the final product is a quality road.

Non-conformity was found in only one case, which was not the result of the lack of contractual standards, but rather of shortcomings in the planning of the project to ensure compliance with the established rules for obtaining environmental licenses.

Probable causes

The causes identified for the audit finding were flaws in the planning of the project.

Opportunities for improving the contracting phase

Considering that the clauses of the tender documents met the criteria evaluated and that the flaw that was identified had not been caused by the lack of appropriate provisions, but rather by non-compliance with the set standards, the opportunity for improvement that was identified is that of complying with the clauses already included in the contractual documents.

II. 2 Criteria related to the design phase

In the design phase, five criteria were evaluated:

• Design up-to-datedness: based on this criterion, the auditors checked whether the studies on which the design was based were up-to-date, i.e. if they actually reflected the current realities of the environment and of demand. If significant changes in these characteristics occurred between the design phase and the start of the bidding process and/or contracting of the company (or companies) to execute the works, the criterion makes it possible to assess whether the design was up-to-date to actually reflect the new reality;

• Technical studies for the design: based on this criterion, the auditors checked whether all the technical studies required for the design phase had been actually conducted and whether these studies had been carried out according to the normative guidelines in terms of precision, detail and depth;

• Design completeness: based on this criterion, the auditors checked whether the design was complete, i.e. whether it actually included the minimum components required to

define the work and whether it contemplated the items or activities necessary to complete the works and for them to be functional;

• Environmental factors and interferences in design: based on this criterion, the auditors checked whether possible interferences had been identified and whether solutions to address them had been considered in the design; and

• Design analysis and approval: based on this criterion, the auditors checked whether the Administration had analyzed the design through a trained team other than the one that developed the design and independent from it and whether it had been approved through a competent representative.

Conclusions about the design phase

The evaluations of the design phase that were carried out were the ones that gave rise to most of the audit findings: in 9 of the 11 projects evaluated, shortcomings were identified in this stage. Table 2 below details the design situations that gave rise to audit findings.

Criterion evaluated		Percentage of works with audit findings
Criteria related to the design phase	**9**	**81%**
Design up-to-datedness	3	27.3%
Technical studies for the design	5	45.5%
Design completeness	7	63.6%
Treatment of environmental factors and interferences in design	3	27.3%
Design analysis and approval	3	27.3%

Table 2 - Percentages of works by finding in the design phase

Situations related to the design up-to-datedness resulted from the long time elapsed between its development and the start of the works, so that by the time the works began to be executed the services foreseen in the design phase no longer corresponded to those that were actually required and/or sufficient to implement the project.

The three works that gave rise to findings were not the only ones in which there was a significant period between the design phase and the start of the works. However, in other situations, the passage of time did not change the conditions considered in the design and did not give rise to audit findings.

With respect to the findings related to technical studies, basically two situations were identified: lack of compulsory studies (traffic study, assessment of alternatives for the solutions adopted, geotechnical and hydrological studies and studies on materials); and shortcomings in the studies that were carried out (identification and studies on sources of materials, identification of interferences, traffic studies, non-observance of the minimum number of required investigations).

This is a situation requiring special attention, considering that these technical studies are the ones that lay the foundation for all the solutions that will be adopted in the design phase. In the case of failure to conduct such studies, even if the subsequent stages of design development are carried out impeccably, the result will probably be inadequate, since the design will be developed based on mistaken or incomplete information.

In addition to the problems identified in relation to technical studies, flaws in the design itself were found, which are indicated in the findings related to its completeness

(existence of the minimum components required to define the project and provision of the necessary services to complete the works and for them to be functional). This group was the one that gave rise to most findings: 7 of the 11 audited works.

Some of them resulted from problems in technical studies that led to design shortcomings: non-identification of interferences resulted in lack of solutions for addressing existing interferences; shortcomings in geotechnical studies led to lack and inappropriateness of solutions for treating soft soils, for example; the lack of an economic analysis led to adaptation needs that impacted the scope of the works.

Other shortcomings consisted in flaws in the design development phase: embankments that were not sufficiently high for the correct implementation of culverts; lane widths smaller than provided for in regulations; geometry and signage problems that affect safety; lack of technical specifications; insufficient quantities to complete the works; lack of mass diagrams.

In three situations, it was seen that the design failed to address possible interferences in the project. There were cases in which interferences had not been identified or even considered, where alternative solutions had not been assessed to minimize them or even where, although interferences had been identified, no proper measures had been taken to get clearance to execute the works on government-owned land.

Finally, in three other situations there were flaws in the analysis and approval of the project design. In two of them, there were no records showing that the project design had been analyzed and approved by the competent authority, and in one, there was no oversight or submission of complementary studies for adjusting the initial evaluations of the project.

Probable causes

The causes identified for the audit finding are the following:

- Design up-to-datedness:

»» outdated studies and design due to weak planning; and

»» lack of adjustments and relevant forecasts on the part of the contracting entity.

- Technical studies for the design:

»» shortcomings in internal controls for design analysis and approval;

»» weak oversight of study and design contracts; and

»» inadequate review of the executive design.

- Design completeness:

»» shortcomings in internal controls for design review, analysis and approval;

»» lack of knowledge and application of contract laws and other related and complementary standards;

»» in designing and carrying out the project, the mandating entity considered that the provisions of the technical document applicable to the project design were not mandatory and therefore made no adjustments to comply with the requirements indicated therein;

»» the solution to meet the standard involved developing a more comprehensive solution that meant intervening in the original overpass;

»» In the design phase, the needs and opinions of the project stakeholders had not been taken into account and neither the conditions in the project's surroundings and area of influence;

»» variations in environmental conditions in the project's surroundings and area of influence had not been reported by those in charge at the Institution when the call for bids was issued.

• Environmental factors and interferences in design:

»» shortcomings in internal controls for design review, analysis and approval;

»» no application for clearance to build on government-owned land had been filed; and

»» the Entity's employees who reviewed and approved the design and its components had failed to check whether that application had been filed; likewise, during the selection process for implementing the works, the responsible entity had failed to report that contracting regulations were not being complied with.

• Design analysis and approval:

»» the Contract Administrator failed to comply with the obligations provided for in the law;

»» lack of documentation, files and historical records of the design review and approval process; and

»» non-observance of the principles of control over the safekeeping of files.

Opportunities for improvements in the design phase

The following opportunities for improvements were proposed:

• Eliminating the practice of initiating the bidding process and/or the execution of the works without an up-to-date design, so that the risks of redesigning the project and changing its design can be properly managed;

• Check the up-to-datedness of the study that supports the project design to make sure it is not obsolete and determine the appropriateness of adjusting it to new conditions;

• Checking whether all the required studies that support the executive design were carried out according to the geographical location, complexity and magnitude of the project;

• Strengthening internal analysis controls and improving design review processes;

• Making sure that the highest authority refers the studies to competent civil servants;

• Training the staff of the entity in matters related to contracting public works and in aspects that can be reviewed in stages prior to the start of the works and whose incidence may delay their execution;

• Requiring sufficiently descriptive technical specifications, so that they may be normally executed, anticipating details and other aspects of the construction project in advance;

• Requiring the Project Executing Units to take into consideration the needs and opinions of neighboring stakeholders in a timely fashion with the aim of avoiding the need to redesign the project and of changing its design later;

• Requiring the administration to have complete files for all the stages of the projects according to the regulations in force;

• Carrying out the relevant evaluations - prior to the delivery of the final design - of the technical, economic and road safety convenience of changing, in specific cases, the standard provided for in the technical normative document; as an alternative, although the provisions of the technical document can be incorporated into the design contract, the rationale for conducting the engineering study must define which requirements of that manual are to be compulsorily applied to the project design or not; and

• Managing a timely and safe road solution if safety problems are detected after the completion of the works, so as to prevent accidents that may affect the safety of road users.

II. 3 Criteria related to the execution phase of the works

In the execution phase of the works, three criteria were evaluated:

• Execution of services: this criterion checks whether the activities or job items were carried out in accordance with the specifications, the design and the contract; whether they were accompanied by tests to confirm their quality and if such tests were applied as provided for in the contract and regulations in terms of frequency and number; and whether they were delivered and approved by checking their compliance with the acceptance criteria according to the technical standard;

• Provisional and final delivery of the works: this criterion is applied to check whether the provisional and final delivery of the works were in accordance with the acceptance criteria defined in the technical standard and the contract; and

• Compliance with schedule: this criterion is applied to check whether the works were executed according to the initial schedule and, in case of delays, whether the causes were identified, justified, and addressed to get the works back on track.

Conclusions about the execution phase of the works

The evaluations carried out in the execution phase of the works resulted in audit findings in 7 of the 11 projects evaluated, as detailed in Table 3 below.

Criterion evaluated		Percentage of works with audit findings
Criteria related to the execution phase	**7**	**63.6 %**
Execution of services	6	54.5 %
Provisional and final delivery	2	18.2 %
Schedule compliance	4	36.4 %

Table 3 - Percentages of works by finding in the execution phase

Shortcomings related to the execution of services were detected in the following situations:

- Execution in disagreement with the specifications, design or contract;
- Delivery of services without confirmation that the acceptance criteria were complied with;
- Insufficient trials;
- Measurement of services not matching what was actually executed;
- Measurement of services exceeding what was actually executed;
- Non execution of services; and
- Early signs of defects.

These non-conformities were attributed to control shortcomings related to the audit/ oversight of the works, lack of monitoring of the execution of the works by inspectors/ supervisors and lack of technical specifications for some services.

In two cases, irregularities were identified in relation to the processes adopted for provisional and final delivery of the works. In one of them, final delivery of the works was pending, even though the deadline had expired. In the other, the contractual deadline for completion of the works had expired without the project being completed. Again, these shortcomings were attributed to control shortcomings related to the audit/ oversight and delivery of the works.

With regard to schedule compliance, it should be recalled that three works were identified in which environmental factors and design interferences had not been considered (item IV.2.4). The result was that delays were recorded in the same three works as a result of interference, licenses and permits. This fact demonstrates the importance of acting preventively from the design phase to address situations of this kind with the aim of avoiding delays in completing the project.

There were also two situations in which unjustified deadline extensions were granted, including the use of mechanisms such as suspension of deadline without the respective suspension of execution and extension of expired deadlines retroactively, which may indicate a lack of commitment on the part of those involved - from the contracted company and from inspecting authorities - to complete the works as scheduled.

Probable causes

The causes identified for the audit finding are the following:

- Execution of services:

»» shortcomings in the audit and/or oversight controls of the works;

»» lack of monitoring of the execution of the works by the inspecting authority and by the company in charge of supervising them; and

»» lack of technical specification for the item "Hydraulic concrete ribbed slab paving," in which defects were detected.

- Provisional and final delivery of the works:

»» lack of control in the delivery of the works; and

»» shortcomings in the audit and/or oversight controls of the works.

• Schedule compliance:

»» ineffectiveness of the actions of the administration and/or the contractor to address problems hindering the progress of the works;

»» administrative decisions and provisions allowed the contractor to not adhere to the work schedule. Lack of celerity in procedures related to complementary contracts prevented the schedule from being met and formal justifications for extending deadlines were extemporaneously drafted and approved retroactively;

»» shortcomings in complying with contractual oversight provisions; and

»» shortcomings in monitoring the construction contracts and in supervising the works on the part of the staff of the entity.

Opportunities for improvements in the execution phase of the works

The following opportunities for improvements were proposed:

• Strengthen controls related to the audit and/or oversight of the works;

• Compliance with the legal obligation to inspect the execution of the works on an ongoing basis, checking whether they are being carried out in line with the plans and other contractual specifications, including those related to construction processes or to the quality of the materials being used, approving or rejecting their incorporation;

• Define and authorize the use of forms with conditional formats or formulas that instantly warn of non-compliance of established test frequencies;

• Require technical specifications that are sufficiently descriptive, so they can be executed normally, anticipating details and other aspects of the construction project in advance;

• Provide correction of problems identified or reimbursement of amounts paid unduly;

• Submit an action plan to address problems that are preventing the progress of the works;

• Permanently redefining schedules in response to random or unforeseen events that cannot be blamed on the parties and do not affect the final deadline. Deadline extensions must be requested in a timely fashion and suspensions must be based on justified extraordinary reasons;

• Ensure greater control over monitoring of compliance with construction and oversight contracts;

• Apply contractual sanctions in the case of delays attributable to the contractor;

• Change regulations to enable application of penalties to the supervising companies, in addition to the fines already provided for in the contract, in case of contractual breaches; and

• Establish sanctions to be applied to the supervising companies in tax inspection advisory contracts in case of any inadvertence in controlling the quality of the works correctly.

II. 4 Criteria related to the oversight/audit of the works

In the oversight/audit phase of the works, two criteria were evaluated:

• Oversight/audit availability and capacity: based on this criterion, the auditors checked whether supervisors/inspectors were duly assigned and whether they possess the capacities, competencies and experience defined by the Administration to ensure the correct execution of the works; and

• Actions of supervisors/inspectors: based on this criterion, the auditors checked whether the supervisors/inspectors are actually active and contributing to the correct execution of the works.

Conclusions about the oversight/audit of the works

The evaluations carried out in the execution phase of the works resulted in audit findings in 8 of the 11 projects evaluated, as detailed in Table 4 below.

Criterion evaluated		Percentage of works with audit findings
Criteria related to the oversight/audit phase of the works	**8**	**72.7 %**
Oversight/audit availability and capacity	1	9.1 %
Actions of supervisors/inspectors	7	63.6%

Table 4 - Percentages of works per finding in the audit/oversight phase

In all the audited works, it was found that audit/oversight roles had been duly assigned to professionals with the required capacity, competence and experience in relation to the complexity of the project.

The finding related to this aspect was not due to faults in the criteria set out in the contract specifications, but rather to the non-observance of the standards when a professional was replaced during the execution of the contract.

However, audit shortcomings were recurrent in 7 of the 11 works. These included:

• Shortcomings in the execution of services:

»» non-execution of planned services (inspectors failed to require the execution of the services).

• Shortcomings in service quality control:

»» no tests were not conducted or they were conducted at a lower frequency and number than provided for in the regulations;

»» approval of audit plans and tests inconsistent with the elements to be evaluated;

»» testing of materials with results inconsistent with the materials actually used;

»» approval of services that failed to meet acceptance criteria; and

»» lack of warnings to the Project Execution Unit about non-compliance with technical specifications.

• Quantity shortcomings in measuring executed services:

»» approval of spreadsheets with errors in the calculations of the average transportation distances of materials; and

»» service measurements in quantities not consistent with those of actually executed services.

• Shortcomings in schedule control:

»» lack of schedule control and monitoring benchmarks;

»» failure to require the construction company to comply with the schedule;

»» repeated failure to adopt necessary measures and actions to improve the pace of execution of the works timely; and

»» lack of appropriate links between investment flows and the programming of the works.

• Shortcomings in design evaluation:

»» no identification of design errors; and

»» incomplete reporting of budget additions.

There is a strong relationship between the findings related to the execution phase and to the audit phases. This is because execution shortcomings materialize when a corresponding audit action fails to identify an execution problem. Effective audit identifies execution shortcomings and requires them to be corrected.

Therefore, it is important that measures be taken to improve the audit of road works to ensure their quality, considering, among other reasons, that their oversight is often carried out by companies hired to assist the contracting entity in this task. For this reason, these measures must be intended to improve the actions of the officials in charge of inspecting the works and to provide them with the necessary tools to require more efficient and effective actions on the part of the supervising companies.

Probable causes

The causes identified for the audit finding are the following:

• Oversight/audit availability and capacity:
»» non-observance of the criteria set out in the terms of reference by the administration when approving changes in the staff of the supervising company.
• Actions of supervisors/inspectors:
»» oversight and audit control shortcomings;
»» shortcomings in the on-site oversight of the supervising company and inadequate communication of instructions and management of the work log; and
»» shortcomings in complying with contractual oversight provisions.

Opportunities for improvements in the oversight/audit of the works

The following opportunities for improvements were proposed:

• In case of changes and/or replacements in the supervising company's personnel, requiring that the experience initially defined be maintained;

• Applying greater control to the monitoring of compliance with the project and oversight contracts;

• Adopting appropriate methodologies for monitoring and physical and financial control of projects;

• Requiring those involved in the analysis and approval of audit and testing plans to be more diligent in their reviews;

- Making sure that the highest authority implements the required controls to ensure compliance with the roles of the contract administrator;
- Developing specific procedures for on-site oversight of the works by the supervising company;
- Clearly defining the project oversight scope;
- Establishing control mechanisms and economic penalties for approving works that were not implemented or were poorly implemented; and
- Promoting regulatory changes that allow for penalizing supervising companies that fail to comply with the project contract.

II. 5 Criteria related to design modifications

Based on this criterion, the auditors check whether design modifications during the phase of execution of the works was duly justified and analyzed, whether the competent authority approved them and whether or not they affected the quality of the project.

Conclusions about design modifications during the phase of execution of the works

The evaluations made regarding design modifications in the phase of execution of the works resulted in audit findings in 5 of the 11 projects evaluated.

In some cases, the need or opportunity for design reviews resulted from the same flaws in the original designs. In addition, the causes of the shortcomings identified here include certain repeated circumstances that contribute to problems in the original designs.

It is an antagonistic situation, since the design reviews in the evaluated cases were intended to correct faults in the original designs, but in some situations, they led to other shortcomings.

For this reason, the proposals made to avoid the occurrence of problems in design reviews end up resembling those described in relation to the preparation of the initial designs.

Probable causes

The causes identified for the audit finding are the following:

- Shortcomings in design reviews;
- Technical criteria do not prevail over political decisions, impacting the final cost of the project;
- Shortcomings in the original executive design, which lacked studies of soil mechanics, a hydrology study, and a population density study; and
- Shortcomings in reviews of additional works and extensions of the execution deadline by the supervisors and inspectors of the works.

Opportunities for improvements in design modifications during the phase of execution of the works

The following opportunities for improvements were proposed:

- The contracting entity must apply appropriate controls to the designs;

• When there is a need to make relevant changes in the design, the entity must have several alternatives and discuss them to ensure their economic feasibility based on measurable objectives to improve traffic flow;

• Check whether the studies carried out to support the executive design are those required according to the geographical location, complexity and magnitude of the works;

• Improve the review of files, allocating more specialized personnel of the entity for this purpose; and

• Promote regulatory changes that allow penalizing supervising companies that fail to comply with the project contract.

III. Conclusion

Regarding the results of the joint work, the audit findings resulting from the procedures contemplated in the Consensual Planning Matrix were distributed according to the phase of the project.

Criterion evaluated		Percentage of works with audit findings
Contracting phase 1 9.1%	**1**	**9.1 %**
Company hired for project design 0 0.0%	0	0.0 %
Company hired for project execution 0.0%	0	0.0 %
Quality and delivery criteria 0 0.0%	0	0.0 %
Obtention of permits and licenses 1 9.1%	1	9.1 %
Design phase 9 81.8%	**9**	**81.8 %**
Design up-to-datedness 3 27.3%	3	27.3%
Technical studies for the design 5 45.5%	5	45.5%
Design completeness 7 63.6%	7	63.6%
Treatment of environmental factors and Interferences 3 27.3%	3	27.3%
Analysis and approval 3 27.3%	3	27.3%
Execution phase 7 63.6%	**7**	**63.6%**
Execution of services 6 54.5%	6	54.5 %
Provisional and final delivery 2 18.2%	2	18.2 %
Schedule compliance 4 36.4%	4	36.4 %
Oversight/audit 8 72.7%	**8**	**72.7 %**
Availability and capacity 1 9.1%	1	9.1 %
Actions 7 63.6%	7	63.6%
Design modifications 5 45.5%	**5**	**45.5%**
Design modifications in the phase of execution of the works	5	45.5%

Table 5 - Percentages of works per group of audit findings

Considering these findings, the following needs were identified:

• Strengthen internal controls, including training the personnel of the responsible entity and adopting instruments to facilitate its performance and make it more efficient in the audit of the works and in monitoring the performance of the contracted companies - construction and supervising companies;

• Apply the penalties already provided for in the contracts and the refunds for poor execution of services, inadequate measurements or unjustified delays;

- Ensure corrections are made in case of defects in already completed phases of the works; and
- Establish mechanisms of control and economic penalties for approval of services not performed or with shortcomings, including regulatory changes to enable application of penalties to supervising companies in case of contractual breaches or inadvertence in controlling the quality of the works correctly.

Therefore, the improvement opportunities proposed refer mainly to providing tools and training to the officials in charge of auditing the contracted companies, to correcting certain behaviors that contribute to weak audits, and to applying harsher penalties to companies that fail to fulfill their duties.

Finally, it can be said that the external control of public road infrastructure works in the region has become more robust and consistent. On the other hand, in light of the mandates of each SAI and of the particularities of each participating country in the Coordinated Audit on Road Works, we expect the results to actually contribute to promoting improvements in the performance of public entities involved in planning and executing road works and to avoiding shortcomings such as those identified by the auditors. All this to ensure good quality road works.

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