

REMOVE AND REPLACE AT THE EXPENSE OF THE CONTRACTOR: THE CASE OF THE ABRA-ILOCOS SUR ROAD CONCRETING PROJECT

With Abra being a landlocked province, the role of the Abra-Ilocos Sur Road is crucial. It is the only road network that connects the province to the rest of the country. It is the life vein of the province. The security and development of the province hinges on this road network.

The Project Profile

In October 1989, a contract was awarded to the D & D Construction for the concreting of the Abra-Ilocos Sur Road from Km. 386+046 to Km. 390+561 (San Quintin Section) and Km. 401+750.54 to Km. 402+135.24 (Pidigan Section) with the original contract amount of P8,335,107.98. The project contract commenced on October 24, 1989 and would expire April 2, 1990 (160 calendar days). The project was implemented by the Cordillera Administrative Region-DPWH under the direct supervision of three engineers of the Abra Engineering District: Romualdo Gandeza, Project Engineer; Adamson Gumangan, Resident Engineer; and Leo T. Mustard, Materials Engineer.

The Complaint and the first inspection team

The Concerned Citizens of Abra for Good Government (CCAGG), a non-government organization (NGO) that has taken the role of a watchdog since 1986, lodged a complaint at the Department of Public Works and Highways (DPWH) regarding the substandard implementation of the Abra-Ilocos Sur Road concreting project. A group of young CCAGG volunteers (college students residing at Janssen Hall dormitory) stayed at the contractor's batching plant to observe the preparation of the concrete mix. They found out that the workers were putting lesser quantity of cement in the mix than what was subscribed in the program of work. The workers denied this when this was brought to the attention of the Project Engineer. The young volunteers challenged the workers to count the number of cement bags to prove their allegation but this fell on deaf ears.

Prior to this project contract with the DPWH by the D & D Construction, the Engineering Brigade of the Philippine Army had just implemented a similar project with the DPWH adjoining that of the D & D Construction project. Many Abreños saw the big difference. The road constructed by the Engineering Brigade was smooth and sturdy while that of the D & D Construction had bulges and cracks. The feedbacks coming from many Abreños (commuters) pushed the CCAGG to monitor the project.

Particularly, the CCAGG complained of: 1) poor sub-base preparation; 2) oversized aggregates; 3) dowel bars missing/not placed on some portions; and 4) transversal and longitudinal cracks. The CCAGG called for the suspension of the project.

This prompted the DPWH National Office to send a team to verify/inspect the subject of the complaint. The team was composed of Engineers Felino B. Tria and Armando Z. Manabat.

The inspection was done on February 14-16, 1990. The report was submitted on February 27, 1990.

The First Inspection Report

The report consists of 7 parts: 1) project profile; 2) work description; 3) the complaints (from the CCAGG); 4) findings and observations; 5) comments/ recommendations; 6) other development; 7) overall conclusions/recommendations.

In the project profile, the team noted that as of day of inspection, there was only 15.60% accomplishment hence incurring a slippage of -60%.

The project involves scarifying of existing asphalt pavement to be replaced by Portland cement concrete pavement. Items of work involved are as follows:

Item No.	Description	Quantity
105	Subgrade preparation (riprap of previously constructed road)	4.9 kms.
201	Aggregate base course (shoulders included)	6,223 cu.m.
311	PCCP	28,890 sq.m.

It is contained in the inspection team's report that as per site inspection, there are some portions of the road section where the in-placed base course material is thinner than what is programmed for the project, which is 10 centimeters. The CCAGG complained of poor base preparation. According to the Project Engineer (PE) and Materials Testing Engineer (MTE), after scarifying the existing asphalt, some portions of the road were already hard and stable and no deeper excavation was done to maintain the existing base. What they put is only leveling course, the reason why this is thinner than what is programmed.

On compaction, the MTE assured that necessary field density test was conducted prior to the pouring of concrete pavement. It was observed that compaction is limited and concentrated only on the roadway. The shoulders were not compacted simultaneous with the roadway base preparation. The base of the shoulder cannot be compacted anymore once the concrete pavement was already poured or laid.

On oversized aggregates, the team saw that there really are some oversized aggregates used or inadvertently incorporated in the concrete mix which the team thought can be due to improper grading of the aggregates as evidenced by the presence of honeycombs on section of the concrete pavement.

On CCAGG's allegation that some dowel bars were not used or missing, the team found out that said dowel bars were only buried in the concrete pavement. When the team instructed one of the laborers to chip/break the edge of the pavement, the missing dowel bars were located. This usually happens particularly when dowel bars were not properly placed on the side forms. When hit by the concrete vibrator during the spreading of concrete mix on the side forms, this would be enough to displace the dowel bars from their original position due to insufficient support to hold them in place.

Transversal and longitudinal cracks were also verified in the field by the team and they saw these to be true and correct. But according to the report, further evaluation of said cracks particularly the longitudinal crack showed that it is only superficial and this can be due only to delayed curing of concrete slab, and seems to be not enough to affect the strength of the pavement. The same is true on the transversal cracks except on one crack at Sta. 390+322 where the crack is through and through. The team learned from the Project Engineer of both the contractor and the government side that the crack was caused by a passing vehicle truck which accidentally hit the side form when the concrete was still in process of settling.

The team observed that the project has already incurred a slippage of -60%. According to the Project Engineer, this was due to cement shortage during the months of November and December of the preceding year. Actual starting date of the project was October 1989 but concreting work started only in January 1990 because of the said shortage of cement. It was also learned that the contractor was requesting for time suspension due to this reason.

Recommendations

According to the team, an as-built plan should be prepared by the Project Engineer to determine the actual in-placed volume of item 201 (aggregate base course including shoulders). The volume obtained from the as-built plan should be the basis of collection by the contractor and not the quantities reflected on the program of work. In compaction work, the Project Engineer should require the contractor to include the preparation of the shoulders simultaneously with the roadway which is the correct procedure of construction since the shoulder is supportive to the roadway.

To avoid recurrence of oversized aggregates, the Project Engineer should instruct the contractor to screen their aggregates properly so that proper grading of aggregates can be attained. And, if necessary, the contractor should find another quarry pit where base course material is more suitable.

To avoid chipping/breaking the edge of the pavement just to make those dowel bars resurface, the Project Engineer/contractor should see to it that those dowel bars placed on the side forms should be secured tightly enough in order that during the process of pouring the concrete mix, the dowel bars will not be displaced from their original position.

The Project Engineer or his representative should observe diligently the said cracks that were seen, particularly when the pavement would be open to traffic to determine the extent of its damage. When said cracks worsen or pose threat to the strength of the pavement, necessary remedial measures or replacement should be required from the contractor.

The Project Engineer should require the contractor to submit catch-up plan to eliminate their slippage. And if warranted, accelerated action prescribed by Department Order No. 102 series of 1988 should immediately be instituted.

Other developments

It was also contained in the report that, in view of the complaints lodged by the CCAGG, a meeting was held between the representatives of the CCAGG led by its chairperson, Ms. Pura Sumangil, the DPWH led by CAR Assistant Director Duarte and the contractor

represented by its manager, Mr. D. Valerio. It was agreed during the meeting that a joint inventory by the CCAGG, DPWH and contractor will be conducted to determine all the defects and deficiencies of the project, and necessary correction/remedial measures or replacement if necessary will be done by the contractor. The Assistant Director assured the complainants that the 10% retention fee of the contractor will not be released if the contractor will not abide by what they had agreed upon.

The team concluded that in as much as the project is still ongoing, where any corrections and/or remedial measures are still feasible and the contractor has not yet collected any partial billing, not to mention the willingness of the contractor to correct their work at their own expense, suspension of work as requested by the CCAGG is not the proper solution. Coordination between the concerned parties should be done so as to ensure smooth and continuous flow of the project. Though the complaints are meritorious in some aspect according to the report, the contractor can still cope/make up for their deficiencies considering the project is just 15% accomplished.

In view of this, the team strongly recommended for the contractor to just abide by what has been agreed upon by the parties concerned during their meeting, and that the CCAGG should assign one of their members to be always present on the jobsite whenever there is ongoing activity on the project so that there would be early prevention of other deficiencies.

Also the CCAGG held community meetings along the San Quintin Section and Pidigan Section of the road project, with the barangay officials and residents where the project was located. This was to explain to the people about the project and to rally them to get involved in the monitoring of the project.

New inspection team

Interestingly, Jose H. Espiritu, Director IV of the Bureau of Research and Standards of DPWH National Office, who was asked to comment and make recommendations on the report of the inspection team issued an endorsement dated March 9, 1990 that further verification of the alleged complaint be made by a new team composed of representatives from Bureau of Construction (BOC), Bureau of Research and Standards (BRS), RDO of DPWH National Office, and contractors in order to have a more conclusive report.

On March 16, 1990, a Memorandum was issued by DPWH Undersecretary for Technical Services Teodoro T. Encarnacion directing Tirso R. Perlada, Jr. (Engineer III, Bureau of Construction), Samson P. Coloma (Engineer IV, Bureau of Research and Standards) and Imelda D. Manuel (Engineer III, Bureau of Maintenance) of the Quality Assurance Unit (QAU), DPWH Manila to proceed immediately to Cordillera Administrative Region (CAR) DPWH Regional Office, Wangal, La Trinidad Benguet on March 26 to April 7, 1990 to conduct project assessment of the ongoing and completed projects particularly the Concreting of Abra-Ilocos Sur Road Project, km. 386+046 – km. 390+561 (San Quintin section) and km. 401+750.54 – km. 402+135.24 (Pidigan section).

The 3-person team was authorized to solicit assistance from the CAR DPWH Regional Director like service vehicle, project documents and other assistance needed to undertake the said assignment. Likewise, they can solicit the assistance of the Regional Director of

DPWH Region I, San Fernando, La Union for necessary laboratory testing equipments and technical personnel related to the said verification/investigation.

The team was further directed to submit their report within five (5) days upon completion of their assignment.

The Second Report

The second report, the Assessment/Verification Report, was submitted on April 27, 1990. They have indicated in the report that they conducted core boring test and test pitting on portions pinpointed by the representatives of the CCAGG along the 1.5 kilometer concrete pavement, half lane intermittent sections accomplished by the contractor. Through the Young CCAGG who painstakingly stayed in the project site to observe, they were able to identify the exact location where the concrete mix was faulty and substandard. The CCAGG engineers plotted these into a straight line diagram pinpointing the exact location for the core boring test and test pitting that were conducted.

The QAU was always accompanied by the Project Engineers of the CAR DPWH Regional Office, Materials Engineer of the Region, the contractor and representatives of the CCAGG.

The report reflected that as of March 31, 1990, the project was just 16.22% accomplished, a slippage of -79.5%.

The second team found out that the concrete mix used in the pavement is of poor quality or has low compressive strength. This was confirmed by the test results of the core samples taken by the QAU. The samples met the required thickness but failed miserably in compressive strength. The highest compressive strength attained by individual core samples is 11.82 MPa (1,715 psi) while the lowest is 4.89 MPa (709 psi). The required average compressive strength for concrete pavement should be equal to 24.12 MPa (3,500 psi) or more, and no individual sample should be deficient by more than 15%. The table below shows the results of the core boring tests.

Core Sample No.	Stationing	Lane	Average Thickness (cm.)	Remarks	Actual compressive strength, psi (MPa)		Deficiency in %	Remarks	
1	390+377	Left	23	PASSED	1,349	9.29	-61.46	FAILED	
2	390+012.7	Right	24	PASSED	900	6.20	-74.28	FAILED	
3	389+838	Left	20	PASSED	1,676	11.55	-52.11	FAILED	
4	389+862.8	Left	23.67	PASSED	1,715	11.82	-51.00	FAILED	
5	389+722	Right	26.33	PASSED	709	4.89	-79.74	FAILED	
6	389+486.4	Left	CORE SAMPLE NOT TOTALLY DRILLED						
7	389+336.2	Right	25.83	PASSED	1,290	8.89	-63.14	FAILED	
8	389+263	Left	28	PASSED	1,154	7.95	-67.03	FAILED	
9	389+076	Right	28.83	PASSED	1,204	8.30	-65.50	FAILED	
10	388+913.5	Left	24.92	PASSED	1,411	9.72	-59.68	FAILED	
11	388+771	Right	26	PASSED	1,201	8.27	-65.68	FAILED	
12	388+561	Left	24.83	PASSED	1,512	10.42	-56.80	FAILED	
13	388+285	Right	25.5	PASSED	1,431	9.86	-59.11	FAILED	

Requirements per specifications: Thickness – 0.23 m.; Compressive strength of concrete – 3,500 psi (24.12 MPa)

The low compressive strength of the concrete may be attributed to the use of oversized coarse aggregates, and unwashed and unscreened fine aggregates in the mix. This was noticeable in the contractor's stockpile of aggregates.

However, per records of the Regional Office, set of beam samples were taken from the actual mix tested at the laboratory in San Nicolas, Ilocos Norte, DEO, Region I. The test results on file reveal that they have met the required strength.

The test results of the above-mentioned beam samples together with the Certificate of Inspection and Acceptance were used as basis of payment. A Xerox copy of a voucher dated March 6, 1990 reflected a partial payment of P1,054,798.66 for 15.21% accomplishment.

Honeycombs as well as scaling were found on several blocks.

Likewise, three (3) major cracks were found.

Bulging of forms was also noticed in some edges and center line of the pavement which is caused by inadequate bracings/support on the forms.

Almost 70% of the dowel bars were spaced more than 1.00 meter. The required spacing per approved program of work and detailed estimate is 0.75 meter.

Shoulders were not compacted/constructed simultaneously with the roadbed making it difficult to compact the shoulders using road roller especially on sections where the roadway is already paved.

The roadbed in some sections is poorly compacted. This was evident on sections near core hole no. 2 as water from the core seeped to the test pit on the pavement edge. Water seeping from the core hole washed away fine aggregates to the test pit.

Base materials (Item 201) were not placed or used in some portions of the roadbed when the concrete was poured in the pavement.

The presence of unsuitable materials such as chunks of scarified asphalt, roots of dead trees and clayey soil were noticed in some portions of the shoulders.

Recommendations

The QAU recommended that the contractor should remove the concrete pavement with low compressive strength on the entire 1.5 kilometers, half lane intermittent sections and replace the same at his own expense, with concrete of required compressive strength in accordance with the approved plans and specifications.

To avoid occurrence of defects of the same nature, the Materials Engineer of the project should redesign or make trial mixes of concrete that meets the required compressive strength.

The Materials Engineer should explain in writing why the core samples taken from the in-placed concrete pavement tested attained very low compressive strength while per records

of the Regional Office reveals the beam samples taken from the actual mixes had met the required flexural strength.

The Project Engineer should explain in writing why above-mentioned defective works were allowed to occur.

The Chief of the Construction Division should also explain in writing how come the contractor was allowed to incur a slippage of -79.5% as of March 31, 1990 and that no calibrated action plan (catch-up plan) was required to the contractor in accordance with Department Order No. 102, series of 1988. A slippage of more than -20% generally merits the termination or rescission of the contract according to the DPWH Bureau of Construction.

This substandard construction of the Abra-Ilocos Sur Road made DPWH Secretary Fiorello Estuar to pen a memorandum requiring the project engineer to explain the deficiencies that occurred in the project despite his presence. He was also tasked to observe how the contractor performs regarding the portions that failed to meet the required comprehensive strength. The Secretary ordered that if any failure in comprehensive strength occurs within the warranty period (usually one year), the contractor should remove and replace the portions at his own expense.

After the issuance of the memorandum by the Secretary, no immediate action was taken by the department. The CCAGG pushed the DPWH to act and come up with sanctions. D & D Construction pressed CCAGG to withdraw its complaint but the CCAGG referred the matter to the DPWH pressing the department to decide on the issue. Finally, the DPWH ordered D & D Construction to remove and replace at its own expense those portions of the road found to be substandard. The road was finally completed early part of 1991.

ANALYSIS

This case showcases the determination and unrelenting spirit of the Concerned Citizens of Abra for Good Government to exact the delivery of public service due to the people from the government's Department of Public Works and Highways. Evident also in the case is the technical capability of the CCAGG in monitoring the project (the CCAGG knows what it is saying) from which a sound and valid complaint was based that warranted an immediate and no-nonsense response from the concerned government agency. The DPWH was not contented of sending one team to validate the complaint; it commissioned two teams with the latter using a more technical approach, boring of core samples for laboratory testing to determine the compressive strength of the concrete pavement constructed. This approach made the report difficult to be undermined and questioned.

The case also provides a basic course (Monitoring 101) on how a concreting road project should be implemented. Materials for the concrete mix should be well prepared (no oversized, unwashed and unscreened aggregates) so that the required average compressive strength of 24.12 MPa or 3,500 psi for concrete pavement is met. The dowel bars should be spaced 0.75 meter as per approved program of work and detailed estimate and should be well secured. The roadbed has to be well prepared (asphalt has to be well removed, enough

base materials have to be placed) before the pouring of the concrete mix to the pavement. It has to be compacted using a vibrator to make it sturdy. While this is being done, the shoulders of the road also has to be taken cared of (no twigs of trees, clayey soil of the base before the pouring of concrete mix, has to be compacted) because these are important support structures to the road. If well implemented, all of these would make a good road project. Honeycombs, cracks and moving dowel bars are signs of a substandard project. Nobody can hide from these signs.

This case also presents to us how lax and complacent the implementing agency is (DPWH-CAR) in supervising the project and how flawed the check-and-balance system of the said government agency is. Very interesting to note is the discrepancy of the testing results of the beam samples taken by the Materials Engineer in the actual concrete mix and the core samples taken by the second inspection team (the QAU engineers). The beam samples have met the required flexural strength while the core samples miserably failed. How can this happen? And how did it happen that the contractor was able to get a payment of P1.54 million despite the very high slippage rate of -79.5% and the poor quality of work that it had accomplished? Has there been collusion between the engineers and the contractor?

Recommendations

Drawing lessons from the case, the following are recommended as courses of action:

1. The DPWH has to strengthen its check-and-balance system by instituting a structure (a composite team from the implementing agency, civil society organization and local community) to inspect infrastructure projects before any release of payment;
2. For DPWH to make it a pre-requisite the conduct of boring tests for road concreting projects; and consequently for the agency to establish laboratory testing facilities in all its provincial offices;
3. For DPWH to ascertain the capability (technical, financial, human) of the contractor to implement the project before awarding the contract;
4. For the DPWH to make the contractor that have failed in its contract accountable for the delay of the delivery of public service (in this case, one year) by imposing a fine equivalent to the length of time public service has been delayed.
5. For the CCAGG to expand its mass base by involving and enhancing the capacity of the local communities in monitoring projects being implemented in their own locality.

Conclusion

The commitment and vigilance of the CCAGG pushed the DPWH to be responsive, gave a hard lesson to the contractor and resulted to a good concrete road although delivery of public service has been delayed for a year.

References:

1. Memorandum for the Director, Bureau of Construction, DPWH Manila dated February 27, 1980, from Felino B. Tria, Engineer IV, PRET I; and Armando z. Manabat, Engineer II, PRET I on Verification / Inspection of Telegram Complaint of Concerned Citizens of Abra for Good Government Re Concreting of Abra-Ilocos Sur Road;
2. Memorandum to Tirso R. Perlada, Jr., Engineer III, Bureau of Construction; Samson P. Coloma, Engineer IV, Bureau of Research and Standards; Imelda D. Manuel, Engineer III, Bureau of Maintenance of the DPWH Quality Assurance Unit dated March 16, 1990 to conduct project assessment of the ongoing and completed projects particularly the concreting of Abra-Ilocos Sur Road Project Km. 386+046 – Km. 390+561 and Km. 401+750.54 – Km. 402+135.24;
3. Memorandum dated April 27, 1990 for the Honorable Secretary of DPWH through the Undersecretary for Technical Services, from the Quality Assurance Unit; Assessment/Verification Report on the Concreting of Abra-Ilocos Sur Road Km. 386+046 – Km. 390+561 and Km. 401+750.54 – Km. 402+135.24, San Quintin and Pidigan Sections, Abra;
4. Results of Core Boring Tests dated April 2, 1990 tested by Wilfredo P. Hufama, Laboratory Technician II, Materials Quality Control Division, DPWH, Office of the Regional Director, Region I, San Fernando, La Union;

5. Disbursement Voucher, DPWH CAR dated March 6, 1990;

6. "The Long Unfinished Abra-Ilocos Sur Road", Mary Jane N. Real, Philippine Human Rights Monitor, October-November 1990 issue.

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