

REPUBLIC OF BOLIVIA
BOLIVIAN NATIONAL RAILWAYS
RAILWAY REHABILITATION PROJECT, EASTERN LINE
(PIAS-ROBORE)

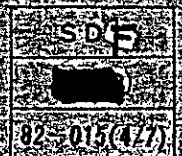
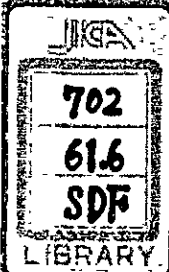
- Vol. 1. Instructions to Bidders
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4. Technical Specifications
5. Bill of Quantities
6. Basic Designs

Vol. 3. General Specifications

January, 1982

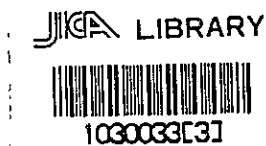
JAPAN INTERNATIONAL COOPERATION AGENCY

(JICA)



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GENERAL SPECIFICATIONS

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GENERAL SPECIFICATIONS

GS. 01 Definitions

Abbreviations used in these General Specifications and Technical Specifications as well as Conditions of Contract are listed below.

AASHTO	– American Association of State Highway and Transportation Officials
ACI	– American Concrete Institute
AREA	– American Railway Engineering Association
ASTM	– American Society for Testing and Materials
JIS	– Japanese Industrial Standard

GS. 02 Description of Works

This work relates to the rehabilitation work for territories with a total working track length of about 9 km out of the territories where a disaster occurred between IPIAS and ROBORE on the line between Santa Cruz and QUIFERRO. This rehabilitation project must be carried out after surveying, geological survey and detailed design in accordance with the technical specifications and Basic design drawings supplied as part of tender documents from the Employer.

This work is roughly divided, depending on the methods of work adopted, into; the execution territory, by temporary line (8 territories with a track length of about 3 km), new line construction by route relocation (5 territories with a track length of about 5 km), and places under live lines (16 places with a track length of about 1 km).

The quantities of work estimated based upon the basic design drawings are shown in the bill of quantities in Volume 5 of the tender documents.

These quantities are outlined below.

- (1) Surveying of the track center line and profile survey for the tracks for about 65 km between IPIAS and ROBORE, and cross leveling survey and river survey for construction territories.
- (2) Geological survey for confirming the bearing soil for specified structures.
- (3) Detailed design of structures, preparation of drawings, and estimation of quantities of work separately for each each work item.
- (4) Each work item listed below related to the rehabilitation project after a disaster.
 - (a) Earthwork for new lines for route relocation with a total track length of about 5 km.
 - (b) Earthwork for temporary lines with a total track length of about 3 km (8 territories).
 - (c) Execution of earthwork under live line adjacent to 351 K 419 M.
 - (d) Reinforced concrete box culverts at 21 places.
 - (e) Reinforced concrete open drainage at 1 places and plain concrete open drainage at 4 places.
 - (f) Steel railway bridges at 11 places (total length of 366 m).
 - (g) Clearing and grubbing of riverbed at 14 places.
 - (h) New construction of Engineers' field office.
 - (i) New construction of Engineers' lodgings.

- (j) New construction of communication facilities.
- (k) Furnishing and delivering of track materials.
- (l) Furnishing and delivering of 7 track motor trollies.
- (m) Furnishing and delivering of 11 track flat trollies.

Details of quantities for each place of work are indicated on the basic design drawings.

GS 03. Work to be executed by the Employer

The work of this project is performed not only by contract but also by the Employer himself. The portion of the work which will be performed by the Employer is outline below.

- (1) Laying, removing, relocating and switching of tracks for temporary lines, and the maintenance and control of tracks during the period of use of temporary line.
- (2) Removal of main line tracks in the territory of temporary lines, laying of main line tracks after completing the work, and maintenance and control of tracks.
- (3) Laying and switching tracks for new line by route relocation, and maintenance and control of tracks.
- (4) Excavation, backfilling, assembling and removing of track tie crabs and girders to support tracks, laying and removing of tracks, and maintenance and control of tracks during the period of work for the places listed below for which the works is to be executed under the live line.

(a) 346 K 211 M	(b) 348 K 330 M	(c) 351 K 100 M
(d) 353 K 328 M	(e) 353 K 930 M	(f) 354 K 430 M
(g) 355 K 793 M	(h) 356 K 907 M	(i) 357 K 032 M
(j) 357 K 536 M	(k) 358 K 700 M	(l) 358 K 869 M
(m) 358 K 980 M	(n) 359 K 300 M	(o) 362 K 128 M
- (5) Laying and removing of material sidetrack or spur required by the Contractor in contractor's base.
- (6) Relocation of ENFE communication cables which obstructs the execution of the work, and maintenance of this communication cables.

GS. 04 Natural Conditions

The construction site is subject to tropical weather which can be divided into a rainy season between October and March and a dry season between April and September. The annual mean rainfall is about 1,200 mm which mainly concentrates in the rainy season according to observations at ROBORE Airport. The annual mean air temperature is 20° but it occasionally exceeds 30°C in daytime in both rainy and dry seasons. The air temperature sometimes drops considerably during the dry season but is always above zero.

The town of CHOCHIS at which the base of this work is located has the population of about 4,000. There is no gasoline station in this town and food is not sufficient there but electric power and water supply are available. However, existing electrical and water facilities have not sufficient capacity for the present work. The town of ROBORE approximately 40 km away from CHOCHIS has a population of about 15,000, and has schools, churches, airport, stores, hospitals, hotels and electric and water services required by the town. However, both towns have no public telephone service, and new installation of radio communication equipment will be the most effective for communication with other cities and towns.

There are almost no permanent residents settled in the areas along the railway between IPIAS and CHOCHIS. However, in the areas between CHOCHIS and ROBORE, some stock farms are scattered and a few permanent residents are living there.

At present, there is no road that can be used for the present work between IPIAS and ROBORE and thus materials, equipment, and others required for the work must be transported solely by the existing line.

GS. 05 Preparation of Scheme of Execution and Working Drawings

(1) Scheme of execution

The Contractor shall submit, prior to the execution of work, the scheme of execution (including field organization chart, work assignment chart, employees' arrangement plan, workers' job schedule, schedule for using main equipment and tools, schedule for using principal materials, method of construction work, schedule for various equipment for construction work, schedule for main temporary installations, accident prevention plan, land use plan, detailed construction time schedule, etc.) to the Engineer and obtain approval by the Engineer.

The Engineer may specify the completion date for the Administration building.

The Contractor, if it becomes necessary to revise any important items in the scheme of execution, shall submit the revised scheme of execution every time such a revision is made to the Engineer for approval.

(2) Preparation of working drawings and design change documents

- (a) The Contractor shall prepare the working drawings and shop drawings for the structures basing upon the detailed design in accordance with these general specifications and technical specifications, and submit them to the Engineer for approval.
- (b) The Contractor shall submit the working drawings (including structural calculations if specifically designated) for direct temporary installations specified by the Engineer to the Engineer and obtain approval for the drawings prior to the commencement of the work.
- (c) The Contractor shall prepare the design calculations, drawings, estimate of quantities and, if required, petition for design change (including basic estimate of prices) which are all required for the design revision after completion of detailed design in accordance with the instructions of the Engineer and shall submit these documents to the Engineer for approval.

GS. 06 Preservation of Existing Facilities near the Site

The Contractor shall preserve all existing electrical, communication, water supply and other facilities both underground and aboveground near the site for the execution of the work in order to protect them from being damaged or endangered. If work is to be performed near these facilities, the Contractor shall himself secure approval for it from persons who are in charge of maintenance for these facilities.

GS. 07 Prevention of Accident

If the Contractor uses explosives, gasoline or electricity, he shall make every effort to prevent accidents when storing and handling them in accordance with the applicable laws and regulations of Republic of Bolivia.

The Contractor shall not disturb the railway and roads traffic near the site during the period of execution of the work. However, if required, the Contractor may construct bypasses for the road traffic after obtaining the approval of the Engineer.

The Contractor shall assure the safety and convenience of the residents living in adjacent areas. The Contractor, if required, shall install proper safety facilities or protection equipment after obtaining approval from the Engineer.

When performing work on tracks, the Contractor shall have watchmen at both ends of the work area in order to inform the workers of approaching trains, to assure the smooth and safe passing of trains, and to prevent any injury to workers. When trains are passing, the operation of construction machinery must be stopped.

GS. 08 Records of Construction Work

The Contractor shall make daily reports and, monthly reports for the work, a record of inspections of work, photographs of work, and other records designated by the Engineer using forms designated by the Engineer and shall submit them to the Engineer.

The record of inspections of work shall contain inspection confirmation sheets signed by the representative of the Engineer for the field inspections prescribed in the general specifications, conditions of contract and technical specifications. And, if the Engineer request any evidence of the contents of the record of inspections, the Contractor shall submit such evidence to the Engineer. If any questions are raised with respect to the contents of the record of inspection of work, or the Engineer recognizes the necessity, he will perform inspection in the presence of the contractor or sampling inspection.

The photographs recording the work shall be neatly arranged at all times to allow the confirmation of work progress and execution at a glance, and the Contractor shall submit them to the Engineer if they are requested by the Engineer.

GS. 09 Meteorological Observation

The Contractor shall perform meteorological observations twice daily at predetermined times in the morning and afternoon and measure the atmospheric pressure, air temperature (maximum and minimum), rainfall, relative humidity and wind velocity.

The records of meteorological observations shall be well kept at all times and the Contractor shall submit them to the Engineer if so requested.

GS. 10 Substitution and Storage of Materials

(1) Substitution of materials

The Contractor may use alternative materials which are equal in quality and shape to, or superior degree, those specified in the technical specifications if this substitution is notified to an approved by the Engineer in advance. The Contractor shall submit documents such as certificate of quality of materials, test report, manufacturer's description and so forth to the Engineer for approval.

(2) Storage of materials

The Employer will have proprietary rights over materials and equipment approved by the Engineer for which payment has been made by the Employer. The Contractor shall be responsible for properly storing these materials and equipment and all other materials and equipment used for the work. The method of storage of materials and equipment

shall be approved by the Engineer. The Contractor shall not remove these materials or equipment from the site or dispose of them without the permission of the Engineer.

GS. 11 Transportation of Construction Machinery, Equipment and Materials

The Contractor may use the railway service for transporting equipment, materials and other required for the work in accordance with the provisions described below. The Engineer will not unreasonably reject the contractor's requests for the use of trains.

- (1) Transportation of equipment, materials and others from outside the site to the contractor's base in the site shall be made by ordinary ENFE commercial trains or special construction trains. Track motor trollies (with track flat trollies) shall be used for transportation within the job site.
- (2) The Contractor shall prepare the scheme of transportation for construction equipment and others required for the work and obtain the approval of the Engineer two weeks before the scheduled date for transportation. The scheme of transportation shall clearly indicate the following items:
 - (a) Method of transportation.
 - (b) The point of departure and destination.
 - (c) Kinds and rough quantities of items to be shipped.
 - (d) Places and method of loading and unloading of the items to be shipped.
 - (e) Time required for loading and unloading.
 - (f) Date of shipping.

(3) Transportation by ordinary ENFE commercial trains or by special construction trains.

The Contractor shall conform to the provisions of Clause 33 of the Conditions of Contract and also to the provisions described below when transporting equipment, materials and others required for the work.

- (a) Method of transportation for longer rails and steel girders shall conform to the technical specifications, and they shall be carefully loaded and unloaded without damaging the quality and shape of the these rails and girders.
- (b) The Contractor may be able to load or unload at stations between IPIAS and ROBORE. However, in this case, the Contractor shall submit documents stating the names of stations, items to be transported, and method and time required for loading and unloading to the Engineer in advance for approval.
- (c) The costs required for transporting equipment, materials and others for the construction work by ENFE ordinary commercial trains or special trans shall be paid by the Contractor to ENFE on the basis of freight rates set out by ENFE. Also, the costs of loading and unloading shall be borne by the Contractor.

(4) Transportation by track motor trollies

When transporting the equipment, materials and others for construction work by track motor trollies, the Contractor shall prevent any loosening and falling off of goods being transported by the track flat trollies and shall be responsible for and compensate for any accidents or damages resulted from such loosening or falling off.

- (a) Control, operation and management of track motor trollies, track flat trollies and related facilities such as switches shall be performed by the Employer.

- (b) The Contractor may use track motor trollies and track flat trollies which were purchased in accordance with the contract at no cost to the Contractor for the purpose of the contractor's construction management and transportation of construction materials, equipment and workers within the site.
- (c) The Contractor shall prepare a detailed scheme of use for track motor trollies and others for every week and submit it to the Engineer. If any change is necessary for this scheme, it should be notified to and approved by the Engineer every time such a change is made.
- (d) When preparing the scheme of use, the Contractor shall select a person to be in charge of the use of track motor trollies and others and report it to the Engineer.
- (e) The Engineer will make the operation schedule based upon his own use schedule and the scheme of use submitted by the Contractor and will notify the Contractor of the operation schedule. The operation of the track motor trollies shall be performed by operators of ENFE, and the operators' wages will be borne by the ENFE.
- (f) The Contractor shall perform maintenance and repair work for the track motor trollies and truck flat trollies during the period of construction work and also bear the costs for fuel, oil, replacement parts, etc. and the costs required for loading and unloading the items to be transported.

GS. 12 Maintenance and Management of the Administration building

The Contractor shall construct the engineers' field office, loadings and construction communication facilities in accordance with the provisions of TS9 and TS10, shall hand them over to the Employer after keeping them in good conditions, and shall maintain and control them until the completion date of the work of this project in accordance with the following provisions:

(1) Engineers' field office and lodgings.

- (a) The Contractor shall requirely patrol and inspect the buildings to maintain their normal functions, and any damages or defects, if found, shall be immediately repaired or corrected by replacing the parts.
- (b) The Contractor shall furnish and supply the required amount of all stationery used by the Engineer and staff during the period of work.
- (c) The Contractor shall, upon completion of the work of this project, repair the engineers' field office and lodgings, keep them in good conditions and hand them over to the Employer.

(2) Communication facilities

- (a) The Contractor shall manage and maintain the communication facilities after handing them over to the Employer during the period of construction work for the convenience of use by the Employer, Engineer and his staff.
- (b) The Contractor shall always inspect the communication facilities to maintain the proper functions and, if any faults are found, shall immediately repair or replace the defective part.
- (c) If it is required to obtain assigned radio frequency band, the Contractor shall

make the necessary application for the assignment.

- (d) The Contractor shall provide communication rooms for communication facilities at both Santa Cruz and CHOCHIS, and provide qualified resident radio operators to secure the necessary communication.
- (e) The Contractor shall manage and maintain these communication facilities during the period of the work in order to assure good communication at all times.
- (f) The Contractor shall perform all necessary repair work for the communication facilities and maintain in good condition and upon completion of the work, return them to the Employer.

GS. 13

Contractor's Base and Temporary Construction Buildings

The Contractor shall perform the grading and leveling of the site which is furnished by the Employer and shall construct the contractor's base.

The Contractor shall construct temporary structures on this base such as office, lodgings, clinic, laboratory, communication room, store, machine repair shop, wood shop, shop for fabricating reinforcing bars, warehouse, storage for explosives, storage for oil, pit for inspecting track motor trollies, material yard and so forth required for the execution of the work in accordance with the following provisions:

(1) Workers' lodgings

The Contractor shall build lodgings with sanitary facilities for the workers. The scale, quantities and locations of these lodgings shall be reported by the Contractor to the Engineer. The Contractor shall construct these facilities and maintain them during the period of work of the project.

(2) Clinic

The Contractor shall provide a clinic within the contractor's office for giving first aid to the workers. The area of the clinic shall be greater than 16 m² and one qualified resident nurse shall be employed in the clinic. Medicines and medical equipment for the treatment shall conform to the general labor laws of the Republic of Bolivia and the requirement of CNSS, and the contents of these medicines and medical equipment shall be reported to the Engineer.

(3) Laboratory

The Contractor shall provide the laboratory with adequate testing equipment to perform the tests prescribed in the general specifications, conditions of contract and technical specifications.

With respect to the testing machines, tools, facilities and equipment for the laboratory, the Contractor shall submit the scheme of facilities describing their performances, capacities, types and others to the Engineer in advance for approval.

The Contractor shall select a qualified person to be in charge of testing with full knowledge and ability of field and laboratory tests, and shall report it together with his personal history to the Engineer.

All tests shall be conducted under the control of this person. The Contractor shall

always maintain and adjust the testing machines and tools in good conditions. The Contractor shall keep records of these maintenance and adjustment at all times and submit them to the Engineer if so requested.

The records of test results in the field and laboratory shall be properly filed and arranged in accordance with the forms approved by the Engineer and be quickly submitted to the Engineer if so requested.

(4) Machine repair shop

The Contractor shall provide a machine repair shop with proper repairing facilities and electric power supply for the maintenance and repair of the track motor trollies track flat trollies, and construction machinery and tools.

The Contractor shall select a person to be in charge of repair and maintenance of machines and employ mechanics and repairmen.

The Contractor shall provide sufficient spare parts and consumables such as oil necessary for repair in accordance with a plan.

(5) Material yard

The Contractor shall construct a material yard with proper drain facilities for collecting and storing the construction materials.

The Contractor shall make a scheme for a materials sidetrack to the material yard if needed and submit the scheme to the Engineer. The Contractor may be able to use this materials sidetrack during the period of work but shall maintain the sidetrack during this period.

GS. 14 Electrical Power and Water Supply for the Base

(1) Power for the base

The Contractor shall install electric power generating facilities within the Contractor's base and shall supply the power required for the Engineers' field office and lodgings and Contractor's facilities.

The electric power to be supplied to the Engineers' field office and lodgings shall have a capacity greater than 100 kW with the following specification:

- (a) Frequency: 50 Hz
- (b) Voltage: 220 V
- (c) Fuel for generator: Diesel oil

The Contractor shall perform management and maintenance work for both power generating facilities and electric facilities in the Engineers' field office and lodgings during the period of work.

(2) Water supply

- (a) The Contractor shall supply sufficient potable water and other water for other purposes for use by the Engineers, their staff, contractor's employees and workers. Water to be supplied for the Engineers and staff shall be greater than 6,000 liters per day.

- (b) The Contractor shall install facilities such as water supply pipes, water tanks and pumps required for the water supply as well as other facilities necessary for settlement, filtration and sterilization or for other methods in order to secure the water quality necessary for the potable water.
- (c) The Contractor shall perform the management, maintenance and repair for all water supply equipment and facilities during the period of work of this project.

GS. 15 Materials Generated from the Work

The Contractor shall dispose of all materials generated during the work in accordance with the instructions given by the Engineer. Any materials generated which are designated by the Engineer and have some value shall be collected to a place designated by the Engineer and handed over to the Engineer.

GS. 16 Inspection and Test

The Contractor shall bear all the necessary expenses including travel expenses for round trip, per diem and accommodation for dispatching the Engineer or his representative outside the Republic of Bolivia to inspect steel girders and track materials. However, the Employer will bear the wages for the Engineer or his representative.

The Contractor shall provide all labor and equipment necessary for inspections and tests to be performed by the Engineer and his representative.

GS. 17 Works and Materials to be Covered by the Unit Price of Contract

Those work and tests required for which payment is not specifically set forth or is prescribed to be borne by the Contractor in the general specifications, conditions of contract and technical specifications shall be covered by the unit price of contract common for the execution of work of this project. In addition to the above, the unit price of the contract shall include, as the common costs for this project, the wages of contractor's employees, cost for construction machinery and equipment, ordinary expenses, profit, patent fees, cost for control of completed portion of buildings, cost for temporary drain facilities to protect the work during the period of work, transportation cost for materials and equipment, cost for temporary work, maintenance cost, and other costs required to complete the work.

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