

Contract of ____ 2022
on “Supply of electric trains (electric multiple unit trains – EMU),
spare parts and equipment necessary for their
maintenance, training of personnel
and a source of loan-based financing”

Annex No.7

PROCEDURE OF DESIGN SUBMISSION AND REVIEW

1. The Supplier shall develop the design process according to a top-down approach as per international system engineering processes (EN 50126 or any equivalent standard suggested by OTY shall be used by the Supplier as guideline for the identification of the design steps).
2. The Supplier shall include an Integral Design Plan (IDP) in the offer wherein the following subjects are addressed and identified:
 - 2.1. Organization and execution of:
 - 2.2. Phase 1) Concept phase;
 - 2.3. Phase 2) System Definition and Operational Concept;
 - 2.4. Phase 3) Risk Analysis and Evaluation;
 - 2.5. Phase 4) Specification of System Requirements;
 - 2.6. Phase 5) Architecture & apportionment of system requirements;
 - 2.7. Phase 6) Design and Implementation;
 - 2.8. Phase 7) Manufacture;
 - 2.9. Phase 8) Integration;
 - 2.10. Phase 9) System Validation;
 - 2.11. Phase 10) System Acceptance
3. In the IDP plan, a clear differentiation must be made in performing design activities and the production. Phase 7) Manufacture shall be initiated only after formal approval from OTY of all the documents submitted from Phase 1) to Phase 6).
4. An overview of the documents to be produced in the different project phases shall be submitted with the offer JSC OTY is entitled to amend the list.
5. All design submissions from the Supplier shall be made under a numbering system submission process. E.g. <Contract No.>/<Subject Code>/<Stage Code>/<Sequence No.>/<Revision No.>. Submission process shall be consolidated by the Supplier in Phase 1) Concept phase.
6. Each phase is subject to a Go/No-Go judgment from JSC OTY. JSC OTY will provide feedback on each phase based on the documents delivered by the Supplier. Feedback will be provided 30 days after submission of last document foreseen in the IDP for the

specific phase. In case of design review expected for that phase, feedback will be provided 30 days after the completion of the design review. A review or acceptance point is not finished until all finding/open items in the relevant documents have been addressed by the Supplier and judged by JSC OTY. As soon as the criteria have been met, JSC OTY will send a close-out statement where this is formally confirmed. A review or acceptance point shall be considered automatically rejected if not close-out statement is provided. JSC OTY may accept transmitting Open Items (OIs) to the following phase (with the assumption that the phase is conditionally approved). All the design Open Items must be closed before the manufacturing phase with no exception.

7. For the following phases: Phase 2) System Definition and Operational Concept, Phase 5) Architecture & apportionment of system requirements and Phase 6) Design and Implementation -- a design review (DR) shall be held in JSC OTY offices with not additional cost for JSC OTY. All the documents expected for the design review according to the IDP shall be submitted 15 days before DR starts.
8. At least one review on the manufacturing site shall be organized during the execution of Phases from 7) to 9) to supervise the manufacturing of the electric train. In case of concerns/open items/ or any other issues connected to the manufacturing of the electric trains, JSC OTY will be entitled to schedule additional reviews and claim the Supplier for the additional cost.
9. In Phase 2) System Definition and Operational Concept the Supplier should address at least the following:
 - 9.1. The Supplier shall demonstrate that:
 - 9.1.1. interfaces and interactions with physical environment (e.g. climatic conditions, mechanical conditions, altitude) and with other systems have been identified,
 - 9.1.2. interfaces and interactions with other technological systems have been identified
 - 9.1.3. human Factor interfaces have been identified
 - 9.2. interface and interactions with others railway/vehicle have been identified (if applicable) and the requirements to be achieved to cope with these interfaces are properly identified and stored in the requirements register.
 - 9.3. The Supplier shall create exhaustive requirements register containing all the sources of requirements. It is Supplier responsibility to identify all the possible sources of requirements and provide evidence to JSC OTY that all the sources are considered. Requirements register shall be submitted for approval to JSC OTY and will be used as mean to provide evidence of the design progress. The requirements register shall indicate for each requirement the correspondence phase in which satisfaction argument to demonstrate the requirement achievement will be provided. Requirements management process shall be defined and shall be submitted for approval. JSC OTY is entitled to ask for process improvement.
 - 9.4. RAMS documentation delivery plan shall be submitted. JSC OTY is entitled to ask for plan improvement.
 - 9.5. The Supplier shall provide a Vehicle Breakdown Structure (VBS), subject to JSC OTY approval, to be used as baseline for the following design phases.

- 9.6. The Supplier shall provide a Functional Breakdown Structure (FBS), subject to JSC OTY approval, which shall include all the function that are going to be executed by the electric train. JSC OTY is entitled to ask for FBS template improvement.
10. Documents produced in Phase 5) Architecture & apportionment of system requirements should address at least the following aspects of the design:
- 10.1. Define the system architecture.
 - 10.2. Identify the requirements for integration of subsystems/components.
 - 10.3. Identify how the functions from the FBS are executed and the contribution of each subsystems/component in the function execution.
 - 10.4. Update the FBS according to the result of the point above.
 - 10.5. Define acceptance criteria and processes for subsystems/components.
 - 10.6. Allocate RAM requirements to subsystems/components.
 - 10.7. Allocate safety requirements to subsystems/components.
 - 10.8. Updated the requirements register
11. Documents produced in Phase 6) Design and Implementation should address at least the following aspects of the design:
- 11.1. Design subsystems/components.
 - 11.2. Prepare operation and maintenance procedures.
 - 11.3. Define training measures for operation and maintenance.
 - 11.4. Define and establish manufacturing process for producing subsystems and components.
 - 11.5. Define and establish system integration process.
 - 11.6. Prepare installation and commissioning procedures.
 - 11.7. RAMS documentation should be updated to reflect the design status.
 - 11.8. Updated the requirements register
12. Before shipping the electric train to JSC OTY site, Factory Acceptance Test (FAT) shall be performed by the Supplier. FAT procedure shall be submitted to JSC OTY for approval 30 days before the execution of the test. FAT can be executed after formal approval of the submitted procedure. JSC OTY is entitled to supervise the FAT.