052-12T-4152
Prepare a Design Specification Proposal for a Vertical-Construction Project
Status: Approved

Distribution Restriction: Approved for public release; distribution is unlimited.

Destruction Notice: None

Foreign Disclosure: FD1 - This training product has been reviewed by the training developers in coordination with the Ft. Leonard Wood, MO/MSCoE foreign disclosure officer. This training product can be used to instruct international military students from all approved countries without restrictions.
**Condition:** Given a construction directive and the following products; preliminary design sketch proposals, preliminary survey data, a soils technical report, and appropriate doctrine.

**Standard:** Prepare a vertical-design specification proposal as outlined in the construction directive in accordance with appropriate doctrine.

**Special Condition:** None

**Safety Risk:** Low

**MOPP 4:**

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**Task Statements**

**Cue:** Prepare design specification proposals for a vertical construction project.

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**DANGER**

IMPROPER DESIGN OF FOUNDATIONS, BEAMS, FLOOR JOISTS, WALLS (LOAD BEARING) RAFTERS, OR STAIRS CAN LEAD TO CATASTROPHIC FAILURE RESULTING IN SERIOUS INJURY OR DEATH. WORK CLOSELY WITH A QUALIFIED ENGINEER IN THE DETERMINATION OF BUILDING REQUIREMENTS/DESIGN. ASSUME NOTHING.

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**WARNING**

None

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**CAUTION**

None

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**Remarks:** None

**Notes:** None
Performance Steps

1. Review the construction directive, sketches, survey data, and the soils report.

   a. Identify the requirements from the construction directive. Include the following:

   MEMORANDUM FOR: 013 BN CO
   SUBJECT: Mission Directive 0107-0102-0001 (0107 Motor Pool)
   1. Purpose: Construct Motor Pool for 0107 BN CO
   2. Customer: 0107 BN CO
   3. Location: 365 LD 05544-00007
   4. Priority: 0 - POC Construction Non-emergency
   5. Estimated Start Date: TBD
   6. Estimated Completion Date: TBD

   7. Description: 0107 BN constructs their motor pool in accordance with the SCW according to the design provided.

   8. Plans and specifications, Attached (Motor Pool Layout with S-100 pool, fiber optic line, and beam locations; S-100 plan, S-100 pool, S-100 pool plan, S-100 pool plan)

   9. Mission Funding, Materials, and Rental Equipment:
   a. Funding Date: None
   b. Materials: See attached BCM
      1. Must submit BCM on a DA 31-01 to the S-4 NCOIC
      2. Once request is submitted through S-4 and approved the 0107 BN may draw materials from the Spalden Class IV Yard.
   c. Rental Equipment: None

   10. Point of Contact for this directive is the undersigned at Ysiper 242-1045.

   JEFFREY B. MURPHY
   MAJ, BN
   BN S-3

   052-12T-4152-01
   Example Construction Directive

   (1) Subject: Identify the mission directive number.

   (2) Purpose: Identify what the construction will be used for.

   (3) Customer: Identify the person/unit requesting the construction.

   (4) Location: Identify where the construction project is taking place (grid coordinate).

   (5) Priority: Identify the priority of the construction project to help determine duration.

   (6) Estimated start date: Identify the project start date.
(7) Estimated completion date: Determine if the estimated completion date is feasible according to the assigned engineering unit’s man power and capabilities.

(8) Description: Identify what is being constructed on the project site (road, airfield, building, etc.).

(9) Directive: Identifies that the assigned engineering unit will construct the project in accordance with the scope of work and the design provided.

(10) Plans and specifications: Review any plans, specifications, and sketches or drawings included with the directive.

(11) Mission funding, materials and rental equipment.

(12) Point of contact.

b. Identify the requirements from the sketches. Include the following:

(1) The composition of the structure.

(2) The size/square feet or capacity required.

c. Identify the possible site location from the survey data.

(1) Locate the site to minimize the clearing efforts.

(2) Locate the site to minimize the earthwork.

(3) Locate the site to minimize the drainage requirements.

(4) Locate the site that best supports the intent of structure (this consideration may override the previous considerations in efforts to minimize work effort).

d. Identify the possible site location from the soils report.

(1) Evaluate the site description.

(a) Consider existing facilities.

(b) Consider Topography, cultivation, and drainage.

(c) Consider the climate.

(2) Evaluate the geology.

(a) Consider the overburden.

(b) Consider the bedrock.

(3) Evaluate the existing site conditions.

(a) Review the field exploration.
(b) Review the field tests.

(c) Review the laboratory tests.

(4) Evaluate the fill and borrow materials.

(a) Review the field exploration.

(b) Review the field tests.

(c) Review the laboratory tests.

(d) Review the test results.

(5) Evaluate the conclusions and recommendations.

(a) Select final site.

(b) Determine economical design.

(c) Use minimum specifications.

2. Design the preliminary plans to support the project requirements.

a. Search the Joint Construction Management System (JCMS) database for existing plans that support the project requirements. If none exist, proceed to the next step.

(1) Identify the plans that require no modifications to meet the project requirements. Include them in the proposal.  
Note: When possible, do not expend effort modifying the plans until the changes are accepted by the approving authority.

(2) Identify the plans that meet the project requirements, but require modifications. Identify the required/suggested changes and include the plans in the proposal.

b. Search the existing files and the available sources for plans that support the project requirements. If plans are located, follow the same procedures as outlined above. If none are found, proceed to the next step.

c. Develop a completely new proposal if there are no existing plans that meet the requirements of the project. This is time-consuming and should only be considered after attempts to locate existing plans are exhausted.

Note: Consider the following when developing new plans (not all will apply):

(1) Footers. Include the width, the depth (for frost line consideration), the composition (concrete, block, wood), the reinforcing steel and its placement, and the method to tie into the foundation wall (key-way and/or extended steel). Also consider the requirements for the subsurface drainage and the soil bearing capacity.

(2) Foundation walls. Include the width, the height, the composition (concrete, block, wood), the method of tying to the footer, the reinforcing steel and its placement/spacing, and the method of fastening the structure to the wall. Also consider the subsurface drainage, the waterproofing, and the elevation relationship to the floodplain/local drainage.

(3) Floor system. Include typical western style platform framing, floor joist spans, the sheathing on center spacing (for example: T&G plywood, 1-inch boards), built-up girders, steel girders (the footers and posts), the fastening methods, and the transitioning between the floor levels (when stairs are involved) or concrete floors when on grade is permitted.
(4) Walls. Including the load bearing/non-load bearing, the spacing of framing members, the type of sheathing, the finish surfaces inside/outside (siding), and the window and the door placement (egress requirements).

(5) Roof systems. Include the rafters (see span tables), the prefabricated trusses, the on-center spacing of the rafters or the trusses, the type sheathing, the pitch of the roof (such as 4/12 or 6/12), the span capability of the sheathing, the roofing material (shingles, roll roofing, tin, tile composite), the fasteners, the roof drainage (usually not a concern in T/O construction), and the methods to fasten to the wall (rafter ties, hurricane clips, toe nail).

(6) Utilities. Include the electrical (ampere) requirements, the plumbing (supply to waste), the heating, venting, and air conditioning (HVAC). Each of these areas have special considerations and should be carefully designed for safety and performance.

(7) Design and construction. The availability of material, the availability of the equipment and personnel, the climate (desert, tropical, frigid), the seasonal considerations (rainy season), the live load, the dead load, the wind load, the snow load, and the time constraints.

3. Prepare the proposal for submission. The following is a recommended outline:

a. The general project information.

(1) Location of the project.

(2) Purpose and scope of the project.

(3) Project construction directive.

(4) Accessibility (route reconnaissance to site).

(5) Site description (such as existing facilities, terrain).

b. The proposed plans.

(1) Site plan.

(2) Plot plan.

(3) Foundation plans.

(4) Floor plans.

(5) Utility plans (electrical, plumbing, and HVAC)

(6) Elevation plans.

(7) Detail and cross sections.

c. The supporting annexes.

(1) Annex A.

(a) Design sketches.

(b) Preliminary surveys.
(c) Soils technical reports (used in footer design and determining suitable building location).

(d) Any supporting documents or papers that pertain to the design of the project.

(2) Annex B.

(a) Supporting design calculations (such as reference charts, tables, and calculations used to determine footer size, spans for framing members, joists, rafters).

(b) Supporting soils information.

(c) Supporting concrete information.

(3) Annex C. Any general supporting information not already covered.

(Asterisks indicates a leader performance step.)

**Evaluation Guidance:** Score the Soldier a GO if all the necessary steps are passed (P). Score the Soldier as NO-GO if any step is failed (F). If the Soldier fails any step, show him/her how to do it correctly.

**Evaluation Preparation:** Provide the Soldier with all the necessary data and doctrine listed in the conditions.

Brief Soldier: Tell the Soldier to prepare a design specification for a vertical construction project. Inform them this is a time consuming lengthy task and establish the time frame the task will be evaluated over.

<table>
<thead>
<tr>
<th>PERFORMANCE MEASURES</th>
<th>GO</th>
<th>NO-GO</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reviewed the construction directive and the supporting documents.</td>
<td></td>
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<tr>
<td>2. Designed the preliminary plans to support the project requirements.</td>
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<tr>
<td>3. Prepared the proposal for submission.</td>
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**Supporting Reference(s):**

<table>
<thead>
<tr>
<th>Step Number</th>
<th>Reference ID</th>
<th>Reference Name</th>
<th>Required</th>
<th>Primary</th>
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<tbody>
<tr>
<td>ATP 3-34.81</td>
<td>ENGINEER RECONNAISSANCE</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>TM 3-34.43</td>
<td>Materials Testing</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>TM 3-34.44</td>
<td>Concrete and Masonry</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>TM 3-34.47</td>
<td>Carpentry</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>TM 3-34.51</td>
<td>Construction Drafting</td>
<td>Yes</td>
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**TADSS :** None

**Equipment Items (LIN):**

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<th>LIN</th>
<th>Name</th>
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<tr>
<td>70209N</td>
<td>Computer, Personal Workstation</td>
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**Materiel Items (NSN):**

<table>
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<tr>
<th>Step ID</th>
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<tbody>
<tr>
<td>7420-01-182-8535</td>
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<td>Calculator, Electronic, Solar Cell, Hand-Held, LOG X, Standard Deviation</td>
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<tr>
<td>7030-01-E00-0242</td>
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<td>Software Operating System: AUTOCAD 2012</td>
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</table>
Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberative planning. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects. Refer to the current Environmental Considerations manual and the current GTA Environmental-related Risk Assessment card. Prior to class, instructors are to conduct an Environmental Risk Assessment IAW FM 3-100.4. The assessment should be recorded on the Risk Management Worksheet found in Appendix F of FM 3-100.4. During the assessment, instructors should be on the lookout for environmental hazards. Environmental hazards include all activities that may pollute, create negative noise-related effect, degrade archaeological, cultural resources, negatively affect threatened or endangered species' habitats.

Safety: In a training environment, leaders must perform a risk assessment in accordance with ATP 5-19, Risk Management. Leaders will complete the current Deliberate Risk Assessment Worksheet in accordance with the TRADOC Safety Officer during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection, FM 3-11.5, Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination. All operations will be performed to protect and preserve Army personnel and property against accidental loss. Procedures will provide for public safety incidental to Army operations and activities and safe and healthful work places, procedures, and equipment.

Prerequisite Individual Tasks:

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Title</th>
<th>Proponent</th>
<th>Status</th>
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<tbody>
<tr>
<td>052-243-3416</td>
<td>Determine Technical Project Support Requirements</td>
<td>052 - Engineer (Individual)</td>
<td>Approved</td>
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<tr>
<td>052-243-3412</td>
<td>Determine Drainage Requirements</td>
<td>052 - Engineer (Individual)</td>
<td>Approved</td>
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<td>052-243-3011</td>
<td>Conduct an Engineer Construction Reconnaissance</td>
<td>052 - Engineer (Individual)</td>
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Supporting Individual Tasks: None

Supported Individual Tasks: None

Supported Collective Tasks: None

ICTL Data:

<table>
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<th>ICTL Title</th>
<th>Personnel Type</th>
<th>MOS Data</th>
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<tbody>
<tr>
<td>12T40, Senior Technical Engineer NCO, Skill Level 4</td>
<td>Enlisted</td>
<td>MOS: 12T, Skill Level: SL4, Duty Pos: KIV</td>
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</tbody>
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