NCEES
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Suggested Guidelines for Building Information Modeling Use on Projects
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Purpose

The National Council of Examiners for Engineering and Surveying (NCEES) is providing these guidelines to assist the licensee in the proper signing and sealing of documents derived from building information modeling. This document is intended to offer guidance to design professionals who are using building information modeling. This guide may apply to any project delivery method employing multidimensional modeling software to virtually design and construct projects by a collaborative project team from conception through commissioning and/or owner acceptance.

Definitions

- **Building information model or modeling (BIM):** Model-based technology linked with a database of project information, using multidimensional, real-time dynamic modeling software to plan construction. The model encompasses at least geometry, spatial relationships, geographic information, and quantities and properties of components.
- **Execution plan:** A document prepared and mutually agreed to by the project team that clearly defines an overall vision for BIM use and implementation details, including but not limited to roles, responsibilities, actions, and interactions of the team and any external parties (such as building code officials, other permitting authorities, software systems to be followed, technology infrastructure needs, process maps, deliverables to be provided, documents to be produced, intellectual property control, model use, archiving, BIM model ownership, and turnover process to owner at project completion). The execution plan should clearly define the scope and responsible charge of all design professionals and model managers to the extent possible.
- **Model manager:** Responsible for ensuring that BIM is successfully implemented on a project in accordance with its execution plan, with the following key responsibilities:
  - Management of all BIM-related software systems
  - Preparation of BIM-related standards, templates, and deliverable formats in accordance with the execution plan
  - Reporting of BIM model status to the project team
  - Leadership in providing project-specific training to the project team members and in providing periodic model reviews by the project team
  - Assistance in modeling work and resolution of all conflicts/constraints
  - Communication of BIM model development and updates to the project team
  - The model manager may change during project execution, subject to approval of the project team and lead design professional.
- **National BIM standard—United States:** A consensus-based standard issued by the buildingSMARTalliance® under the sponsorship of the National Institute of Building Sciences so that end users can use BIM to efficiently access and use information necessary to design, construct, and operate a specific project. The latest issue is version 4.
- **Project team:** Leadership from each organization participating in the development of a BIM model, including the owner, project manager, design professionals (architects, landscape architects, engineers, surveyors, interior designers; also referred to as “licensees”), model manager, and contractors
- **Lead design professional:** Licensed design professional, responsible for coordinating and integrating the work of design professionals, model manager, and other members of the project team
- **Responsible charge:** Direct control and personal supervision of engineering or surveying work
- **BIM products:** Documents (drawings, lists, specifications, and other data) extracted from the BIM model

Guidelines and references

A. Use of BIM project execution planning guide

The project team should prepare a specific execution plan for any project using a BIM model. The referenced planning guide provides an overview of how to prepare such a plan including content and structure. Section B below contains recommended minimum topics to include in an execution plan, which is typically referenced in project contract sections related to engineering, procurement, and construction delivery.

B. Minimum topics to include in project-specific execution plan

Each project (e.g., building, bridge, road, power plant) is unique in terms of configuration, complexity, and development timeline. Similarly, the extent of BIM's use on a project will be different and interrelated with the project delivery method (such as integrated project delivery, design/build, or design/bid/build). This section addresses topics which are important to the successful use of BIM capabilities and products.

1. Model use

   How the BIM model will be used—from project inception to construction to the post-commissioning stage—must be defined up front and accounted for in the project cost estimate. Examples of usage topics include model ownership, turnover to the owner at project conclusion, involvement of the project team in model preparation/development through life cycle, use for structural detailing, cost/schedule inclusion, and products that will be produced (when and where).

2. Responsibilities of design professionals/licensees and scope definition

   Each design professional working with a BIM model will have responsible charge for a portion of the project. This includes aspects of project design that the professional will provide as input (e.g., data, 3D model input, specific discipline design) and BIM products that will be extracted at different milestones during the project life cycle to satisfy project needs (e.g., documents to obtain permits and regulatory approvals, to have a third party develop fabrication drawings, to procure equipment, for construction, and for as-built archive). It is imperative that each design professional clearly define his or her primary role and scope of responsibility, particularly where the professional's scope boundaries align with those of another discipline (such as building management system inputs).

3. Lead design professional's role

   Each project team should appoint a lead design professional to oversee the BIM model development to ensure that communication channels are effective, that schedule milestones are achieved, and that the model manager is efficiently and effectively completing his or her responsibilities. This person should have a working knowledge of the scope of all design professionals, documents to be produced, and project design and goals in total.

4. Model manager's role

   Reporting to the lead design professional, the model manager serves an important role in coordinating the development of the BIM model and data import consistent with the execution plan's stated needs. The lead design professional will ultimately have a role of ensuring that all design professionals have participated in the BIM model to the extent of their responsible charge and scope.

5. Owner's role and responsibilities

   The owner should designate a representative who should be able to communicate owner's requirements to the project team; serve as a primary liaison for all BIM-related issues; have oversight on BIM requirements in all project phases; and receive, review, and approve BIM deliverables (see *National BIM Guide for Owners*).

6. Changes to model overtime/communications

   The BIM model is a dynamic tool that constantly develops throughout the design phase of the project and typically matures at the time when issued-for-construction products are produced. The model will also be affected by the evolution of construction, and changes to the BIM model will occur until project commissioning and owner acceptance. The lead design professional and model manager need to stay involved in the project execution through the construction phase to ensure that construction-driven changes are reviewed and approved by the affected design professional(s) in advance of actual construction.

7. BIM products
   The execution plan should define expected products to be extracted out of the BIM model at different points in time during the overall project schedule (phase) and the design professionals responsible for their preparation and issuance. The products of each project will be different; as a result, the execution plan should define initial products with said listing subject to change as the project design continues forward. The execution plan should also provide an overview of how quality reviews are to be completed, as well as BIM model reviews throughout the project life cycle.
8. Archiving
   The execution plan should clearly define the host document control system to be used and best practices associated with storing project records, including the BIM model and products (including all documents) both to demonstrate that milestones have been achieved and to confirm the design professional's scope of work and responsibility have been accomplished.

C. Sign-and-seal deliverables

At a point in project development agreed to by the owner's team and per the owner's agreement with the project team members, the licensee shall affix a seal/signature to only that part of the products from the BIM model for which the licensee is responsible, as stated in the NCEES *Model Rules*.

A digital archive of the design professional's final product at the completion of each project phase shall be retained in the BIM model archives.