By 2007 the architectural, engineering, and construction (AEC) professions were developing 3D project models with specifically identified objects. These objects, such as HVAC equipment, are identified thru a 3D element placed within a model. The same element is displayed within the sheet plan views, sectional views, and composite 3D views. Each object has attributes about the manufacturers' model type and the selected instance of features in the procured model. The final distinction is the unique identification of each element 'instantiated' or placed within the composite model.

An object model provides the structure to track the addition, subtraction, and arrangement of standard elements to be included within a project. Objects are recognized thru standardized procurement patterns and organized within standardized categories. This functions for scheduling activity/tasks, scope inclusions/exclusions, and project substantiation invoicing. This technology, which provides the data structure and the element 'object' logic, allows the project team to input data values.

The Quality Control (QC) {think 'C' for contractual} mechanism for project submittals is by back checking data to a general ledger. Each project has a defined budget for the specific project scope that may be identified in a general ledger. The QC of the scope is further identifiable within the sheets of construction documents and the project specification. The projects' composite 3D model displays the scope by element within construction documents, the specifications, and is identified by category.

The Quality Assurance (QA) {think 'A' for accountability} process, within request for information (RFIs) from the contractor and subcontractors, ultimately leads to the architects' and engineers' QC approval. Architects and engineers have responsibilities for code and program compliance, in addition to their review for Accessibility, Health, Safety, and Welfare of occupants. The subcontractors' provide feedback and guidance on installation in the form of shop drawing submittals. Distinctive responsibilities contrast those of cooperative model coordination, which entails participation from the entire AEC team.

QA is typically confused with QC when coordination is not properly supervised by the project Architect of Record, the Mechanical, Electrical, Structural Engineers of Record, and the Licensed Contractor for the particular work being modeled. In cases of neglected oversight, the contractors' internal process of QA, referred to as a BIM signoff, is mistaken to be a contractual QC review. The QC process is at the end of the Architect and Engineers of Record review, for approval or rejection of the subcontractor submittals, based on conformance to the construction documents and specifications.

This confusion is compounded by field layout that conflicts with the BIM signoff. Successful Field installation is a combination of construction documents and of shop drawings, which in the case of a 'coordinated' set, allows for effective planning and execution of the work. Many subcontractor teams misunderstand the BIM signoff to be validation of their construction directives. Subcontractors whose models vary from the architects' and engineers' models invariably end up having conflicts with each other's 3D models. With no guiding documents the coordination BIM signoff models are invalidated.

Contractors submit their as-built documents during the close-out process so that the Architect and Engineers of Record may update their record construction documents to fulfill requirements for close-out documentation. While this close-out process is important, it does not negate the contractors' responsibility to provide document and modeled changes to the architect and engineers, for procured items, prior to construction. As-builts are for field installation changes, not planned or procured items.

-Lewis Matthew Miller, AIA
AIA WY TAP Representative