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Three-dimensional (3D) modeling provides benefits for dam construction through enhanced visualization of the project during design; refinement of complex details within the Contract Drawings; modeling the anticipated construction sequence; and project visualization for the owner, public, and other stakeholders.

Contract Drawings are the backbone of every dam project, however, they are limited since they only present two-dimensional (2D) information. Designing in two dimensions and later translating into a three dimensional structure during construction presents opportunity for misunderstanding between the design engineers and the contractor, given multiple pages of the Contract Drawings are often required to detail and construct a single structural component.

This paper/presentation will discuss how a structure may be initially represented with 2D drawings and, as the design progresses, 3D modeling can be used to develop and refine 2D details within the Contract Drawings. An example of the benefits realized through 3D representation is the detailing of waterstops, particularly in complex structures such as labyrinth spillways. Waterstops required between labyrinth cycles, training walls, base slabs, and cutoff walls can be visualized using a 3D model and aid in the development of isometric views and refined details of the intricate connections to be added to the Contract Drawings. This provides additional details of critical waterstop connections before construction and allows the engineer's design intent to be more clearly conveyed to the contractor.

3D modelling can also be used for constructability reviews, construction sequencing, on-site inspection, and to capture changes to the Contract Drawings as the project progresses. The structure can be built piece by piece using the 3D model to simulate construction and track construction progress.

3D renderings and scaled physical models (created using 3D printing) can also be produced from the 3D modeling, which allows enhanced visualization of the project prior to construction. These are particularly useful for presentations for the owner, public, and non-technical stakeholders to visualize the project prior to construction.

This paper/presentation will illustrate the value of 3D modelling for enhanced visualization, design, and construction of complex dam projects as well as the benefits to engineers, contractors, owners, the public, and other stakeholders.