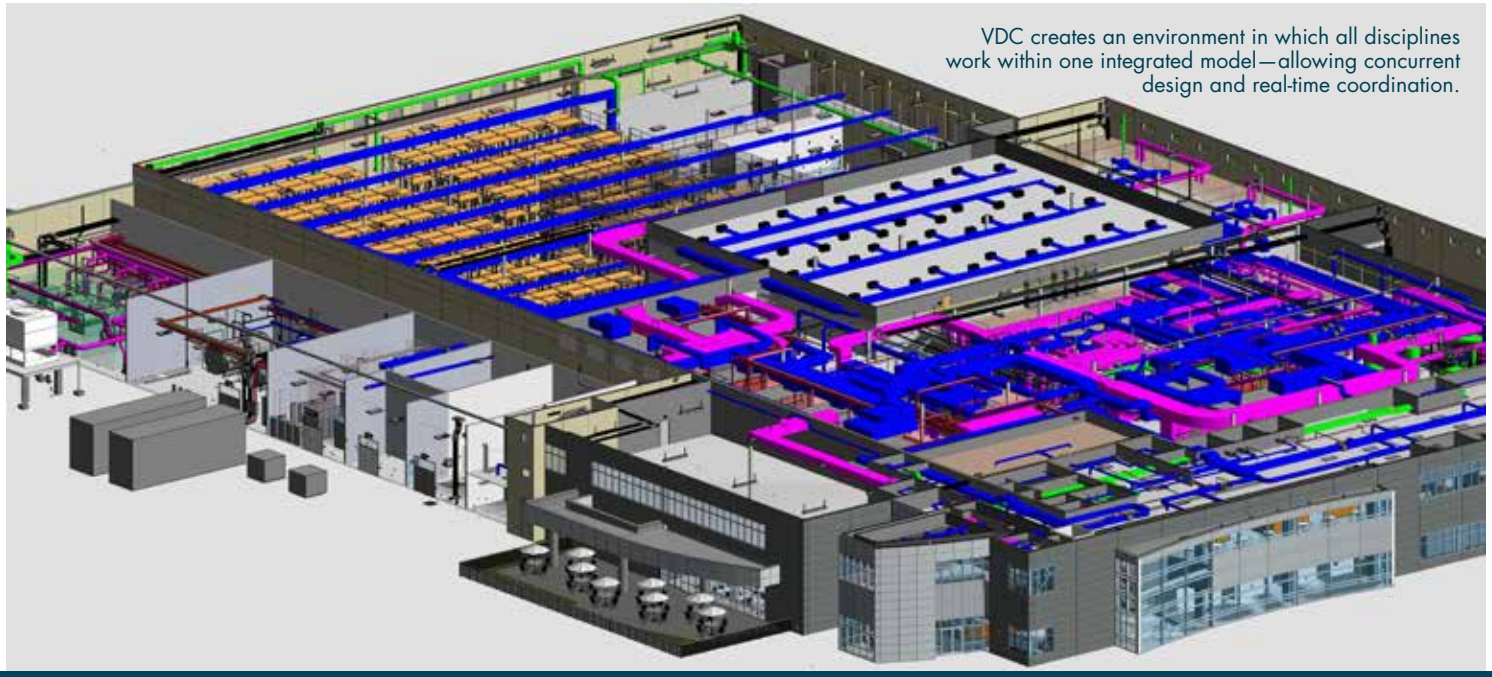
VDC: Virtual Design & Construction

SSOE®. making clients successful.



VDC creates an environment in which all disciplines work within one integrated model—allowing concurrent design and real-time coordination.

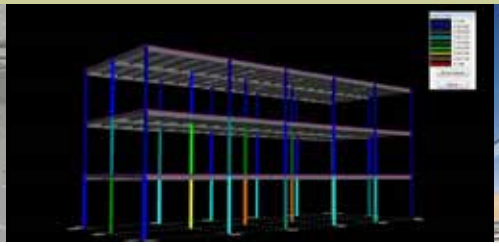
What is VDC? A revolutionary method of delivering a construction project that allows the designer, constructor, and owner to collaborate within an integrated model. VDC enables early decision making, better building trade coordination, and enhanced project execution, **saving you time, trouble, and money**.

By establishing a collaborative virtual environment, Virtual Design and Construction (VDC) transforms the sequential and separate work processes of designing, constructing, and operating a facility into a concurrent and fluid process. Rework and waste that stem from the handoffs of 2D drawings from one party to another are significantly reduced. Giving construction partners real-time access to the design model shifts critical path activities forward, which can significantly shorten the schedule. Features including enhanced detail and digital model delivery enable proven cost and schedule saving techniques such as pre-fabrication and modularization. In the field, precise VDC models reduce errors caused by construction documents that are open to interpretation, and the final deliverable is a model that can be used to manage operations on an ongoing basis.

VDC can be performed in varying degrees under any kind of delivery model EPCM, design-build, and design-bid-build. However because design is the single biggest factor impacting the construction cost, functionality, and usability of a facility or process, VDC delivers the most value when there is early collaboration between parties through a highly integrated delivery method. SSOE has built our VDC platform to accommodate this collaboration so that it can be used universally by all parties throughout the project. In addition to its many other benefits, utilizing a single platform across all parties results in a simpler process for clients.

Early collaboration and enhanced reviews by the users ensure the space will function as expected.

Calculations, such as the load analysis, can be performed within software and seamlessly transferred to the model, significantly reducing design duration.



Seamlessly integrate steel design, fabrication, erection, procurement, and CM.

Saving time, trouble, and money with Virtual Design & Construction

TIME: Integrated workflows move construction completion dates up by weeks

- Giving constructors real-time access to data and models moves critical path items forward.
- Eliminating the buffers, contingencies, and other hidden costs and wastes embedded in each hand-off compresses the schedule and optimizes the entire process from design through construction and operation.
- Reducing physical hand-offs and increasing direct communication between parties significantly lessens design and approval process times.
- Utilizing an integrated model for detailing makes responses to changes more efficient and avoids the potential cost and delays of rework late in the design process.

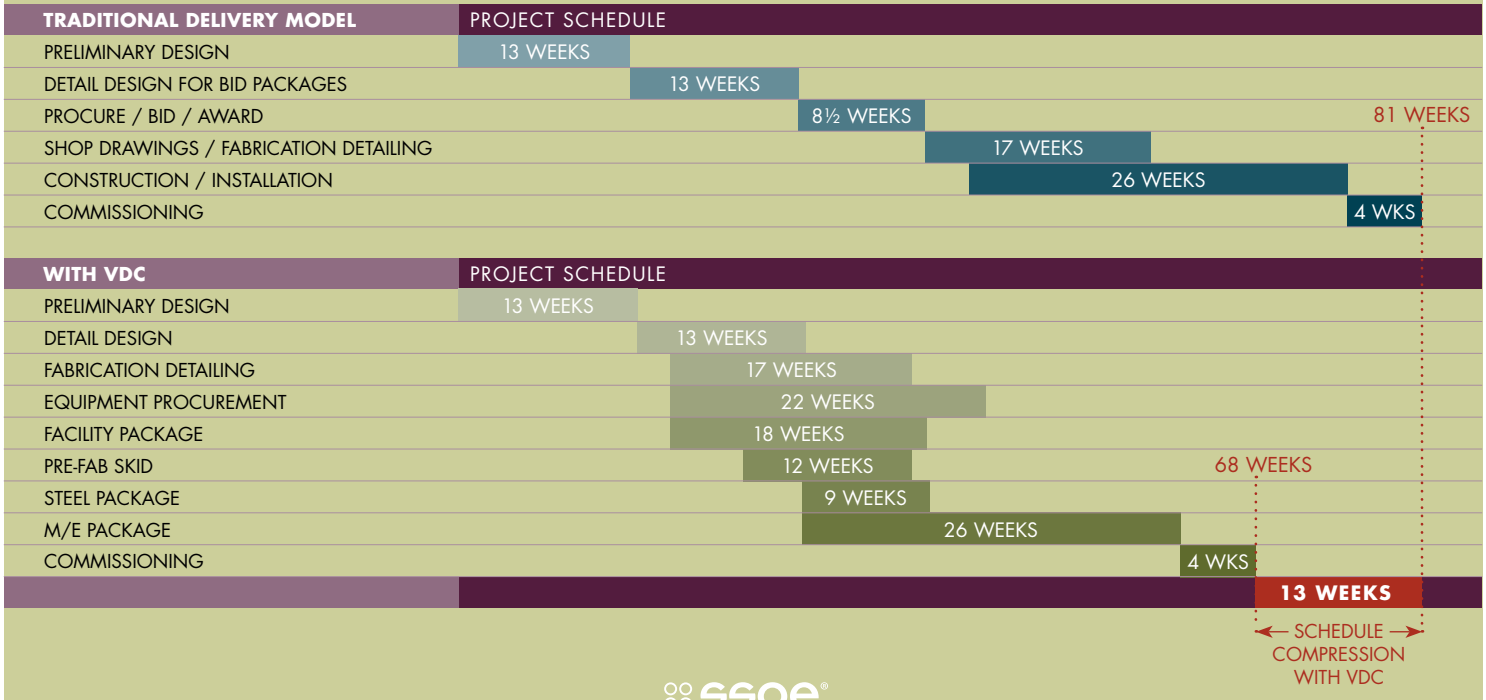
TROUBLE: New solutions to persistent problems

- When all parties work within one collaborative model, the difference is higher quality results than when using separate models, which have to be recreated or merged. VDC streamlines and eliminates hand-offs, rework, and backtracking by coordinating the separate software used for designing, detailing, and construction with one virtual environment resulting in construction-ready models.
- Field errors are greatly reduced by utilizing advanced and detailed clash detection and coordination practices from the start of the design phase through the entire construction process.
- VDC enables a more firm schedule and budget within a tighter range, allowing you to feel more confident in the capital appropriations and production start dates.
- Contracts, planning, and reporting can be tailored to you and your project's needs.
- VDC shifts interaction with supply chain forward to ensure feedback and requirements are incorporated in the original design.

MONEY: Complete projects significantly below market norm

- Eliminating the waste, rework, and inefficiencies of hand-offs reduces overall project costs.
- Revealing and avoiding failures in design removes common and costly waste in the field.
- Utilizing modularization and pre-fabrication reduces cost per unit while improving quality.

This schedule from a recent capacity increase project demonstrates how utilizing VDC can significantly compress a project timeline by moving from sequential to concurrent work processes.



SSOE

Locations

Albany, NY
Alliance, OH
Atlanta, GA
Birmingham, AL
Chandler, AZ
Chengdu, China
Cincinnati, OH
Columbus, OH
Hamburg, Germany
Huntsville, AL
Kalamazoo, MI
León, Mexico
Lima, OH
Midland, MI
Monterrey, Mexico
Mumbai, India
Nashville, TN
Omaha, NE
Penang, Malaysia
Portland, OR
Raleigh-Durham, NC
Riverside, CA
St. Paul, MN
Santa Clara, CA
Shanghai, China
Shenzhen, China
Toledo, OH
Troy, MI
Washington, DC

Markets

Energy
Life Sciences
Manufacturing / Process
Telecommunications

Services

Architecture
Construction management
Data / Fire / Security
Energy consulting
Engineering
Master planning
Procurement
Project / Program management
Site selection
Tool install
Virtual Design and Construction

Rankings

Engineering News-Record (ENR)

- Top 5 Automotive Plant Design Firm for the past decade
- Top 5 Semiconductor Design Firm for the past 5 years
- Top 10 Food and Beverage Design Firm for the past decade
- Top 10 Manufacturing Design Firm for the past 6 years

ENR Global Sourcebook

- Top 35 International Manufacturing Design Firm for the past 5 years

Building Design + Construction (BD+C)

- Top 10 Engineering / Architecture Firm for the past 5 years
- Top 10 Industrial Engineering Firm for the past 5 years
- Top 15 BIM Engineering Firm for the past 6 years

Named "Best AEC Firm to Work For"
(Building Design + Construction)

Named a "Great Workplace"
(Great Place to Work®)

SSOE Facts

- SSOE was founded in 1948 and currently has more than 20 locations worldwide.
- We are a global project delivery firm for architecture, engineering, and construction management, with projects in 40 countries.
- SSOE returned 105% of our fee to clients in projects savings over the last 5 years.
- Greater than 98% of clients surveyed would recommend SSOE to a colleague and 150 of our clients have worked with us for more than 20 years.
- SSOE offers program management services from design through construction, to commissioning and start-up, for seamless project delivery.
- SSOE's focus is using the appropriate project delivery method for your goals, including Virtual Design and Construction (VDC), which brings our clients better and faster results through more integrated teams and advanced technologies. Even when a more traditional delivery model is used, you'll see significant benefits from the collaboration strategies and technological capabilities our leadership in VDC necessitates.

SSOE®

www.ssoe.com/vdc

I-1017