

Laser Scan to BIM Services

With COBie & Facilities Management



pinnacleinfotech.com



**Pinnacle
Infotech**

Construct
Certainty, with
Technology

Mission

Help the AEC industry optimize resources, cost and quality through innovative use of technology for:

- Sustainable and efficient design
- Collaborative pre-construction planning
- Agile construction process
- Reliable facility management

Vision

Lead the global AEC industry to certainty and efficiency using technology.

Associations:



Our Values

- E Excellence**
We take pride in our passion for excellence. It is a way of life for us.
- A Agility**
We are always at the edge of technology and driven by agile transformations.
- R Reliability**
We have ISO-certified processes and workflow to produce consistent and reliable performance.
- T Teamwork**
Pinnacle provides an environment where teams collaborate effectively to excel.
- H Honesty**
We win the trust of our stakeholders through integrity, straightforwardness, and transparency.

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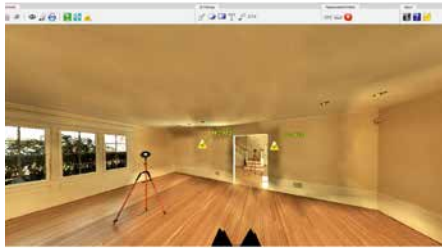


1. Laser Scan to BIM services

Pinnacle is the most preferred option for Scan to BIM services. We capture detailed information about an element in its physical space and allow precise and accurate modeling and coordination. We have executed several projects at the renovation or extension stage for Scan to BIM for international clients, including major construction companies. Our 3D scanning helps the different stages of construction like 3D model creation, visualization, animation, rendering, and quality inspection. With this, we were able to create new designs by coordinating with existing models created from the scanned visuals of the actual site.



True view site map



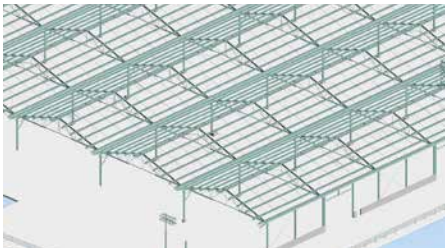
True view reference



Recap tag view



Architectural model of entire building, imported as point cloud



Steel structure generated from point cloud file



True view link

2. Benefits of Building Information Modeling (BIM)

- Accurate 3D model creation of individual trades for renovation and extension work from scan data, allowing more reliability and quality assurance
- During renovation, construction scan to BIM model provides a better platform for preparing further detail of design work
- As Built Drawing Preparation from Scan for Plan, Elevation & Section Sheet for Architectural, Structural & MEP
- Improve transparency and streamline communication with 3D visualization for quick decision-making during renovation and extension Phase
- Eliminate RFI's, work stoppage and rework by checking the accuracy and completeness of 3D Model from scan data

3. Application of Laser Scan in Various Trades

Laser Scan to BIM Service is required by major construction companies, builders, architects and contractors for preparing various models of Architectural, Structural and MEPF (Mechanical, Electrical, Plumbing, Fire Protection) elements like exterior & interior walls, doors, windows, ceiling, curtain walls, floor, roof, major furniture & fixtures, structural column, wall, beam & slab, bracing, trusses, floor & roof framing, duct, pipes, cable tray, light fixture, electrical outlet and other equipment.

4. Deliverables From Point Cloud to BIM Services

4.1 3D BIM Model Creation at LOD 400 Level for Architectural, Structural and MEPF Services based on Cloud Scan Data used for Renovation & Extension Work

4.2 As Built Drawing Preparation from Scan for Plan, Elevation & Section Sheet for Architectural, Structural & MEPF

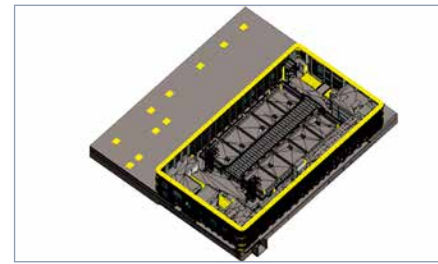
4.3 Data Rich BIM Model

4.4 COBie Extension Sheet 2.4 for FM Analysis

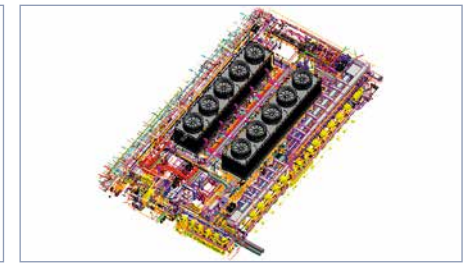
4.5 Room Polyline for Space Information

4.1 3D BIM Model Creation at high level of detail for Architectural, Structural and MEP Services based on Point Cloud Scan Data used for Renovation & Extension Work

3D Models are generated using BIM based on point cloud scan data to improve transparency and streamline communication for quick decision making during As-Built Phase. High quality Revit models ensure that Revit components are built intelligently with the practicality to serve the purpose. The parametric families contain real world product information or performance models, necessary for running calculation analysis and simulations.



Scan to BIM-Central Plant Civil Model Snap



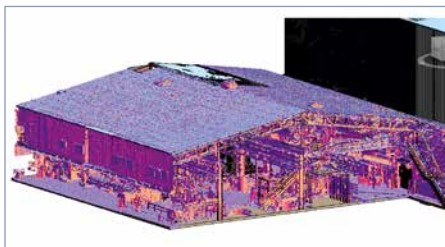
Scan to BIM-Central Plant MEP Model Snap



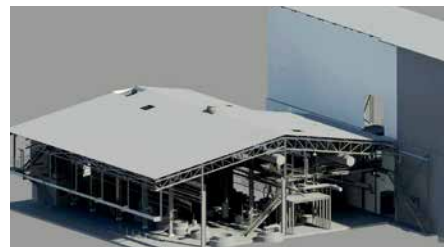
Point cloud file



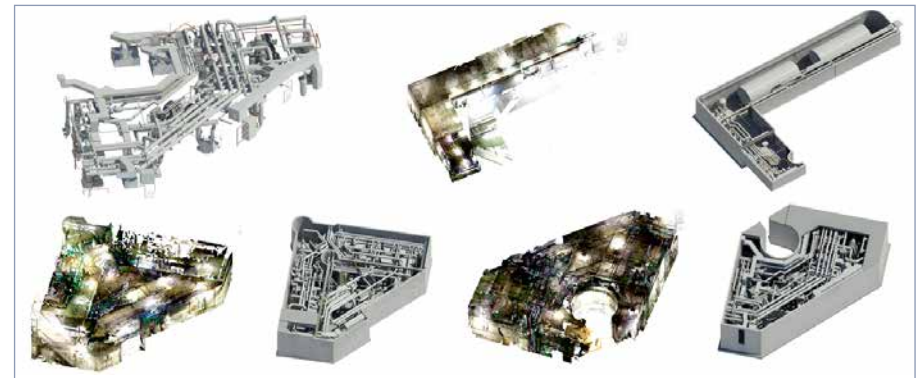
Sample of revit model with point cloud file



Point cloud file



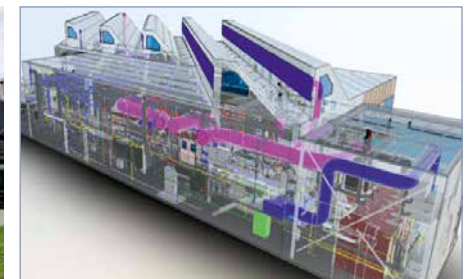
Sample of revit model with point cloud file



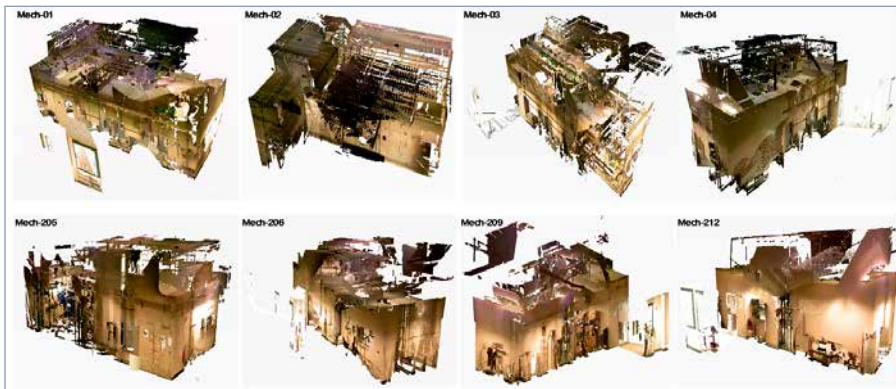
Scan to BIM model – Boiler & Chiller Plant - Model Snap



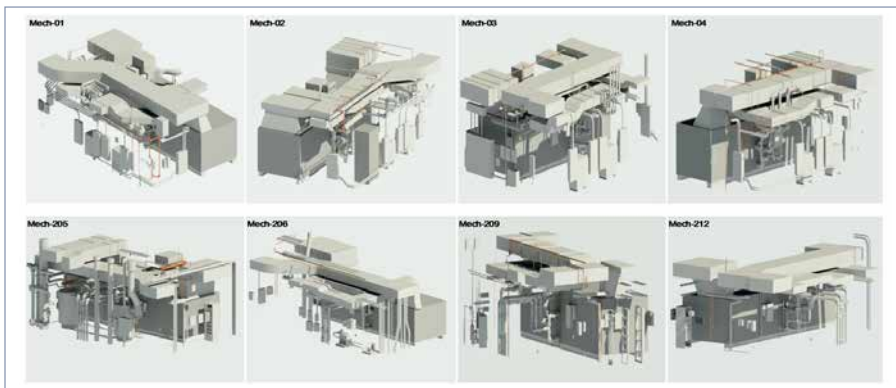
Laser Scan to BIM model Project Sample



Point cloud file (Recap view-rcs & rcp format)



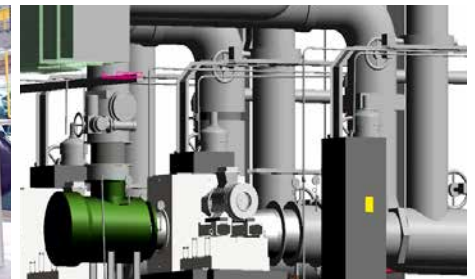
Scan to BIM model Mechanical Rooms



Scan to BIM model Mechanical Rooms



Scanned - Real View



As-Built Model View



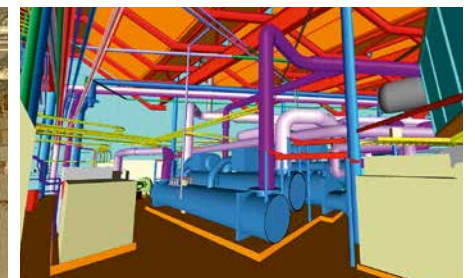
Scanned - Real View



As-Built Model View



Input Scan Recap View



Output BIM 3D Model



Input Scan Recap View



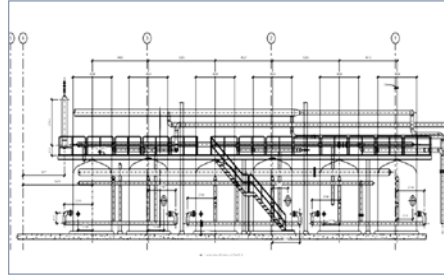
Output BIM 3D Model

4.2 As Built Drawing Preparation from Point Cloud for Plan, Elevation & Section Sheet for Architectural, Structural & MEP

As-Built Drawing Preparation from 3D BIM Model serves as a comprehensive reference tool facilitating future project planning including extension, renovation and redevelopment from point cloud data. Since all details pertaining to the building dimensions, erection, fabrication, elevation, materials, location, etc. can be obtained from the As-Built Drawings, they can be used for resolving disputes about insurance claims.



Input point cloud file



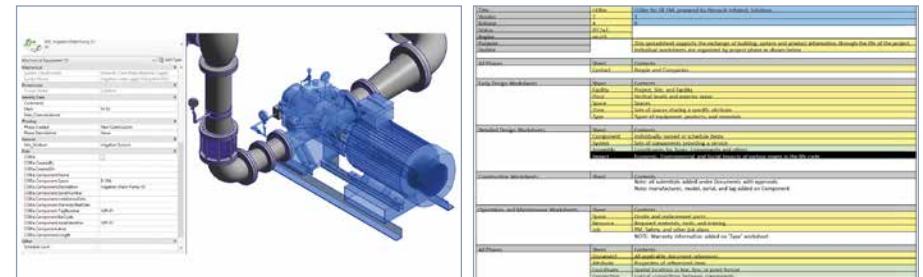
Output 2D sample

4.3 Data Rich BIM Model

- All required COBie parameters to be available
- System Connection is established in between Source and destination of all services
- Asset or Equipment families are modeled as per MBS
- Detail connector is provided in individual Equipment Families
- COBie extension Sheet 2.4 is linked in the model itself

4.4 COBie Extension Sheet 2.4 for FM Analysis

- Pinnacle facilitates project stakeholders to organize approved electronic submittals from point cloud scanned data during renovation and extension through facility management.
- Complete contact records of every project are managed including accurate data for essential fields. The BIM files, drawings and the PDFs are organized to be easily accessed through secure server directories.
- BIM engineers follow COBie (Construction of Building Information Exchange) process for managing facility assets. They change the format of existing deliverables from paper documents to an open international standard format, streamlining process for eliminating waste and enhancing profitability.
- Revit helps to export data, execute dynamic zone management and facilitate element selection by specifying family, types & exported elements.
- Parameter mapping is done and complete control is maintained over each data exported from Revit to spread sheet.



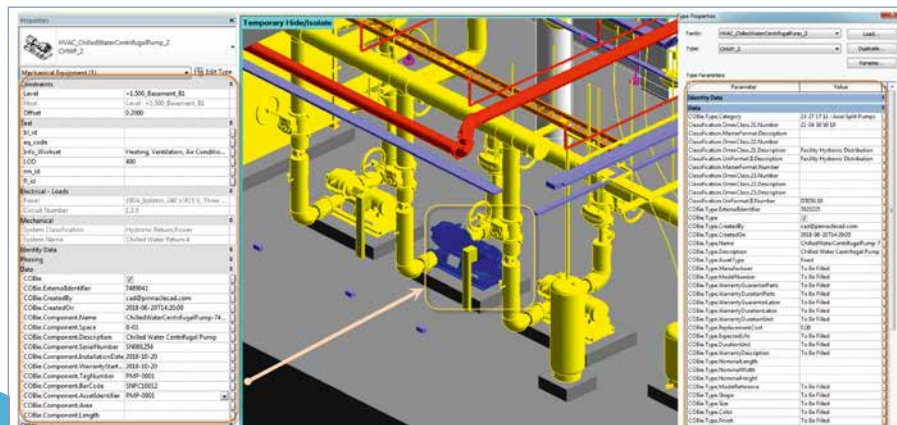
Examples of COBie parameters

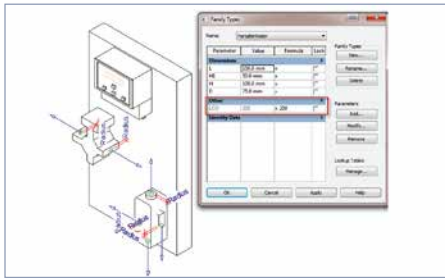
A. Family Parameter (Shared Parameter)

- Material
- LOD

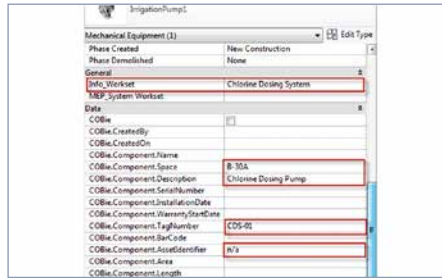
B. Project Parameter

- COBie Component Space
- COBie Component Asset identifier
- COBie Component Description
- COBie Type Category Info Workset
- COBie Component Tag Number





Family Parameter



Project Parameter

4.5 Room Polyline for Space Information:

In order for FM Software to integrate and link its alphanumeric data with 2-dimensional entities drawn in an AutoCAD environment, a polylined object will be created to define the shape, size and location of that particular space or area; also provide unique entity tag to be created that will be assigned to its corresponding record in the FM software database.

Room	Room ID	Room Name	Room Description	Room Type	Room Category	Room Subcategory	Room Material	Room Color	Room Height	Room Area	Room Volume	Room Length	Room Width	Room Depth	Room Perimeter	Room Surface Area	Room Volume	Room Weight	Room Cost	Room Value	Room Status	Room Date	Room User	Room Location	Room Notes
R-01	001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001	Room 001

5. Laser Scan to BIM work process in Revit

5.1 Input Requirement for BIM Modeling & Drawings

5.2 Raising RFIs for Various Trades

5.3 Supporting Laser Scan Software

5.4 3D Laser Scanning to Revit BIM: Service Delivery Process

5.5 Quality Checking

5.1 Input Requirement for BIM Modeling & Drawings

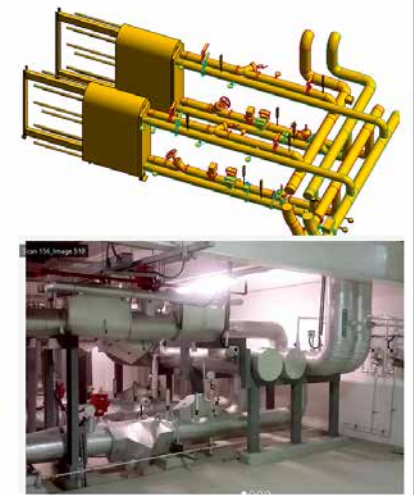
- Scan data (RCS/RCP)
- Real view in LGS/Matterport/Faro Viewer/StructionSite
- Asset Tag
- As-Built Drawings
- O&M Manual
- Method Statement-Installation process, RFIT etc.
- Material Submittal
- Spare parts list
- All Stake holders information: for Contact sheet
- Complete Equipment/Asset List

5.2 Raising RFIs for Various Trades

Mismatches are often found in point cloud, where scan data are not sufficient. Hence, we need to prepare RFI. Reasons for RFIs:

- Discrepancy in two or more point clouds
- Areas hidden by equipment/elements
- Difficulty in measuring the diameter of Insulated duct/pipes
- Inconsistency between point cloud and as-built drawing

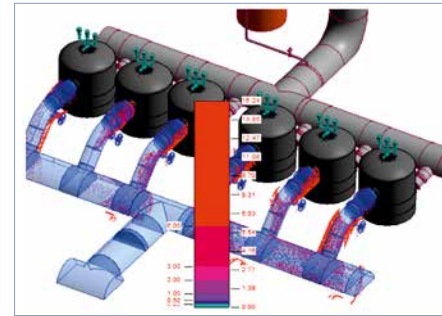
Discipline	HVAC-HVAC-07
RFI no	HVAC-HVAC-07
Description	Differential Pressure Control Valve & Control Valve(LOD 300) are covered by insulation. Please suggest for better understanding while family creation.
Room	Room Id-B2M007(located near grids 3-4, P-Q)
Element ID (for ref only)	8054305,8028506,7300083,7300086.
Drawing no	1848F-SD-05-60001-011_RZ.pdf cp6_scan_156.rcs



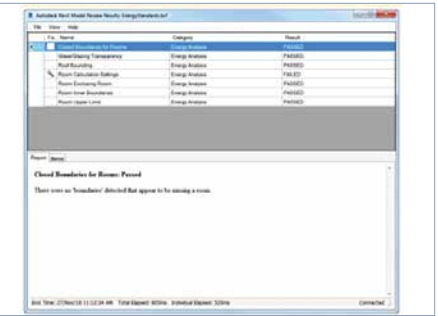
5.3 Supporting Laser Scan Software

Supporting Software Applications for Point Cloud help to visualize and navigate the point cloud files properly. Moreover, by using these software platforms, files can be compressed and dimensions can be easily obtained for BIM model.

- True View
- Autodesk ReCap Pro
- Autodesk AutoCAD
- FLS Viewer
- Scan to BIM (For Deviation)
- Autodesk Revit

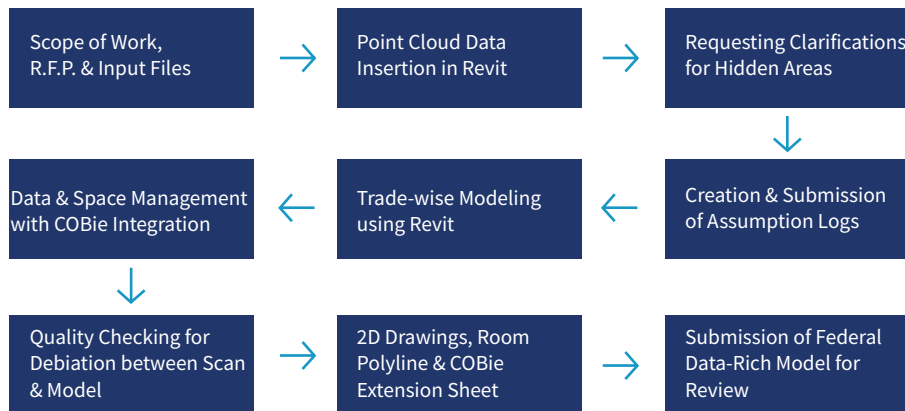


Example of deviation checking in Scan to BIM



Example of Project standard checking in Model Review add-in

5.4 3D Laser Scanning to Revit BIM: Service Delivery Process

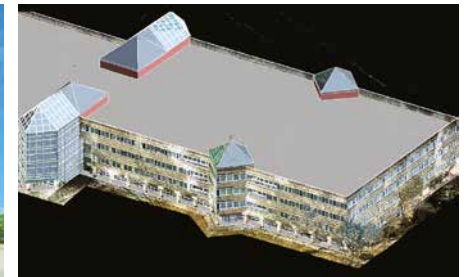


6. Scan to BIM Projects Executed

The major Point Cloud to BIM projects executed by Pinnacle include Bag House Building, Pier Structure, Central Plant, Power Plant, Residential, Commercial and Airport.



Sample Rendered model with point cloud file



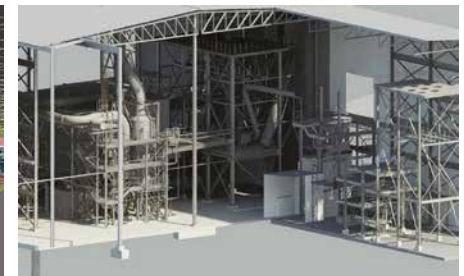
Sample Rendered model with point cloud file

5.5 Quality Checking

- Model Review Add-in followed for project standard checking
- Standard checklist followed for 3D Model QA/QC
- Section views prepared in Revit for checking deviations
- Clash detection and coordination among trades
- “Scan to BIM” applied for measuring deviations



Interior view of grocery store with point cloud attachment



Structural & MEP (industrial) model from point cloud file

7. Why Pinnacle

Each of our employees has ingrained in themselves the core values - 'EARTH' of our organization.



Excellence



Agility



Reliability



Teamwork



Honesty

Excellence

Excellence is a way of life for us. Our commitment to hard work, creativity, and innovation allows us to reach our full potential in approach, operations, and collaborations. We foster a culture of excellence from the ground up within our organization to achieve operation at the highest industry standards.

Agility

We understand that every business is different. We are highly agile and can adjust quickly to changing market conditions and client requirements. In addition, we offer a variety of business models to suit your specific needs at competitive prices.

Reliability

Pinnacalites rely on trusted processes to consistently produce excellent results. We have over 30 years of experience in the AEC industry, and our work processes are ISO-certified.

Teamwork

We work together to scale every challenge. We understand that it is only through teamwork that we can provide the best possible results for our customers. Pinnacle fosters a team-oriented culture where everyone is valued, and their contributions are encouraged and recognized.

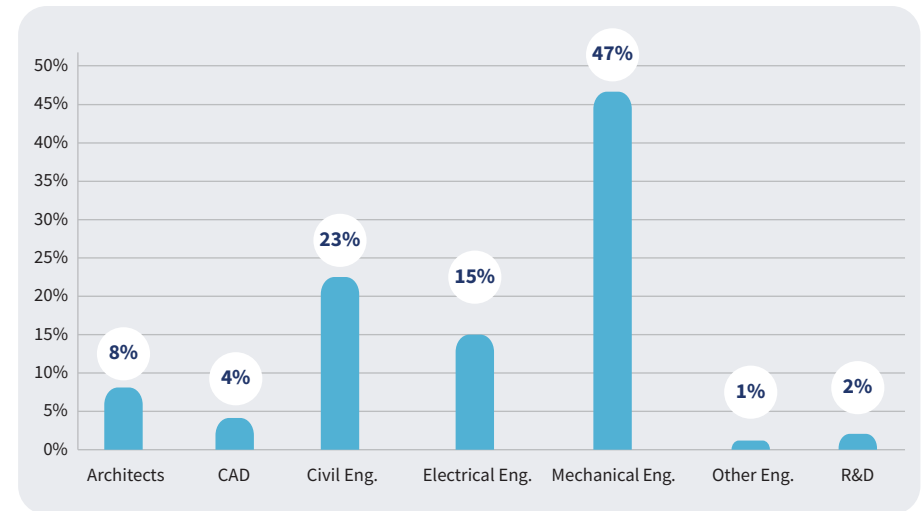
Honesty

Honesty is our key value, and we hold ourselves to the highest standards of integrity. We strive to be transparent and clear in our communication to ensure that our clients get the best value for the money.

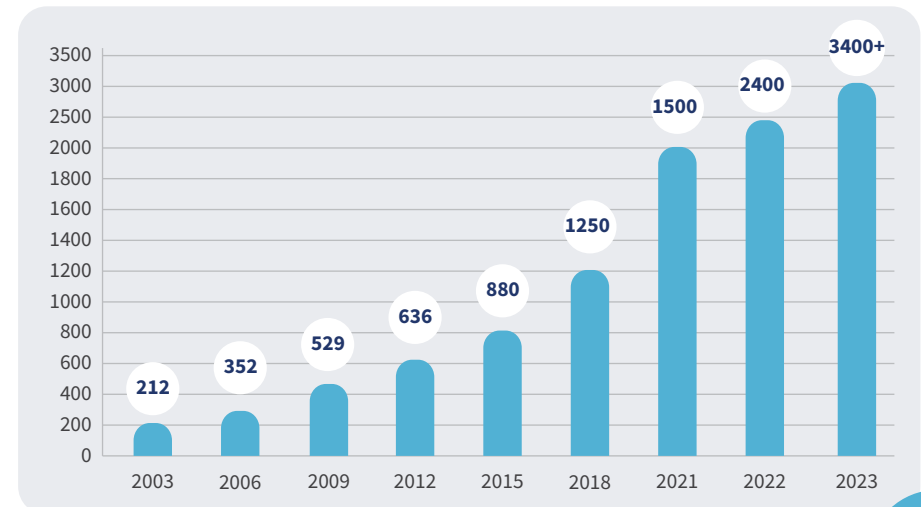
8. Our Team

Pinnacle's significant contribution to Building Information Modeling is made possible by its highly qualified and experienced workforce, including engineers, architects, and other experienced professionals. All our employees are well-versed in handling international construction codes and standards. We are proud of the diverse team and their global experience.

Employee Background



Workforce Growth



9. Our Infrastructure

Pinnacle has large state-of-art campuses in Durgapur, Jaipur, Kolkata & Madurai, comprising facilities like High-speed Bandwidth, Blade servers, an R&D center, a Datacenter, recreational zones, playgrounds, and more.

We also have equipped global delivery centers in the US (Houston and Atlanta), Canada (Toronto), UK (London), UAE (Dubai), Singapore, Germany (Munich), and Japan (Tokyo) that allow our employees to work in the same time zone as our customers.

Pinnacle's *Construct-ability Installation Lab* gives construction site experience to employees, integrating theoretical learning with practical experience. It enables our employees to deliver BIM solutions on time and with accuracy.



10. Our Work Processes

We strongly emphasize the significance of efficient work process management and consistent communication in the context of outsourcing services. Our process orientation and quality control are per ISO standards – 9001:2015, 27001:2013, 19650-2, 19650-3, and 19650-5, plus EMS 14001:2015. As holders of **ISO 19650-5**, the esteemed international certification for BIM services, we ensure adept data management and transparent collaboration. On orders, we assign a dedicated Relationship Manager, a competent Project Delivery Head, and Project Managers for focused execution.

Relationship Management

Our relationship managers are co-located with customers, ensuring clear communication, managing timelines, and handling deliveries promptly to surpass customer expectations. They advise customers on the services Pinnacle provides and build long-term business relationships.

Production Process

Project teams report to Project Delivery Head (PDH). The PDH provides technical leadership to the team and ensures standard work processes (as per ISO norms) are followed. They oversee project delivery. Project Delivery Heads periodically communicate with the client to get regular feedback and ensure the successful completion of the project.

Project Managers handle small teams for a customer and are responsible for understanding project requirements, project standards, invoicing processes, and communication protocols. They prepare project templates per project specifications, plan resources and align project delivery schedules.

Auditing Process

The COE team is an independent body in the company for Process and quality management and monitors the process and quality through various audit parameters, sets up feedback management processes, carries out investigations in case of any complaints/concerns, and provides action items. This way, Pinnacle ensures consistency in the final deliverables throughout the company.

Quality Control Process

Pinnacle's efficient processes and stringent quality control mechanisms have added certainty to 15000+ projects worldwide. Our process orientation and quality control are per ISO 9001:2015, ISO/IEC 27001:2013, ISO 19650-2, ISO 19650-3, and **ISO 19650-5** standards and are managed by an independent QC team.

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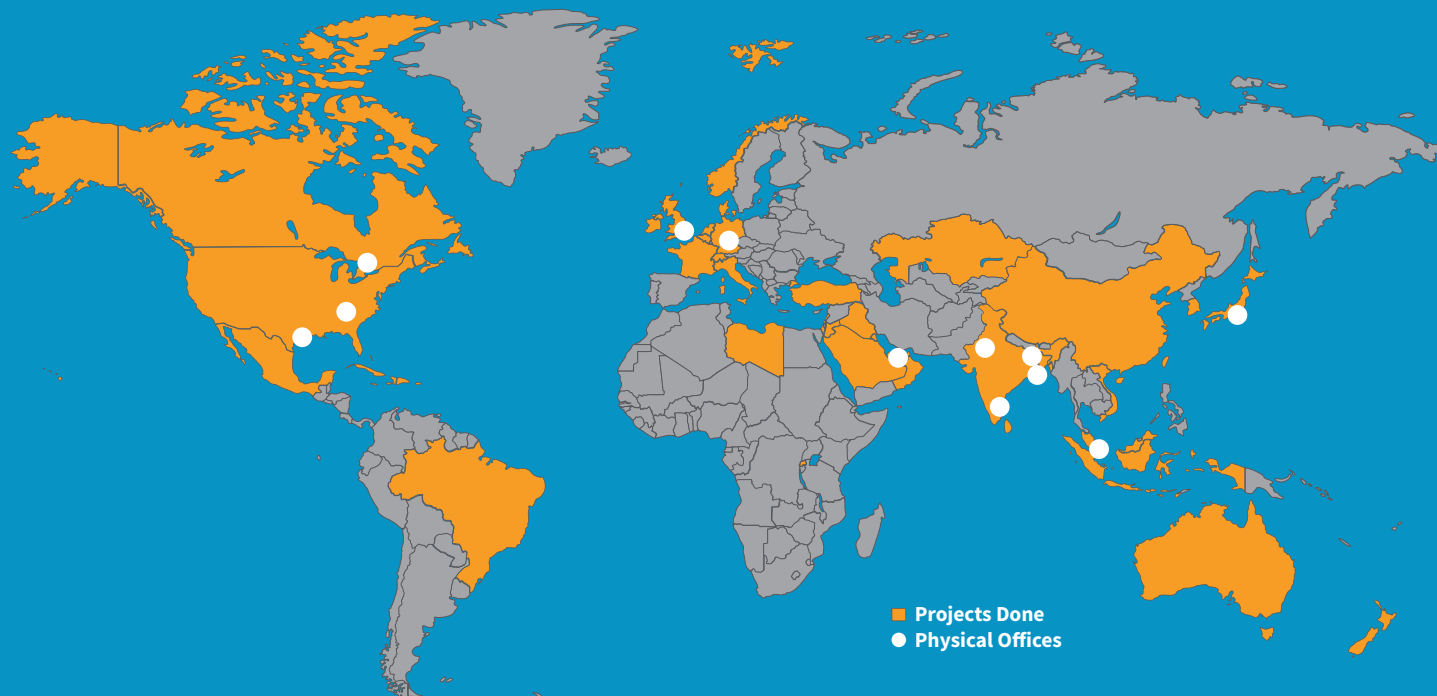
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