
AVEVAWORLD
PARIS

Veolia Near & Middle East Smart Engineering

K-Box principle

Knowledge Box / Thinking in the Box

Digital Twin for Design in Demeter Tender & Project

2024 September - VNME Engineering Department Zen Engineering Rev 04 *HBO*

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Digital Twin for Design in Tender & Project

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Digital Twin for Design in Tender & Project

Challenges

Engineering Design **Plus** for specific markets in fast time

Design for : Tender, Project, Operation phase

Generate all the documents in automatic mode

All the generated documents must be pre validated by Paris HQ

Speed up the tender process with accurate Capex & Opex

Speed up & Secure the project construction phases

Help and improve the commissioning and operation

Improve our design in permanence with real time information

Get Return of experience in real time

Get trust from our HQ Paris management

Solution

Aveva CALM : Client Activated License Management

Aveva Connect

Aveva Unified Engineering

Aveva Diagrams (P&ID)

Aveva E3D Design

Aveva Engineering

Aveva Extended Reality

Aveva Asset Information Management

Aveva Dynamic Simulation

Aveva PI System portfolio

Benefits

Increase our quality of our documents for tender and project

Speed up our processes tender & Project

Increased our productivity for tender and project

Optimise and help Operational teams with efficiency

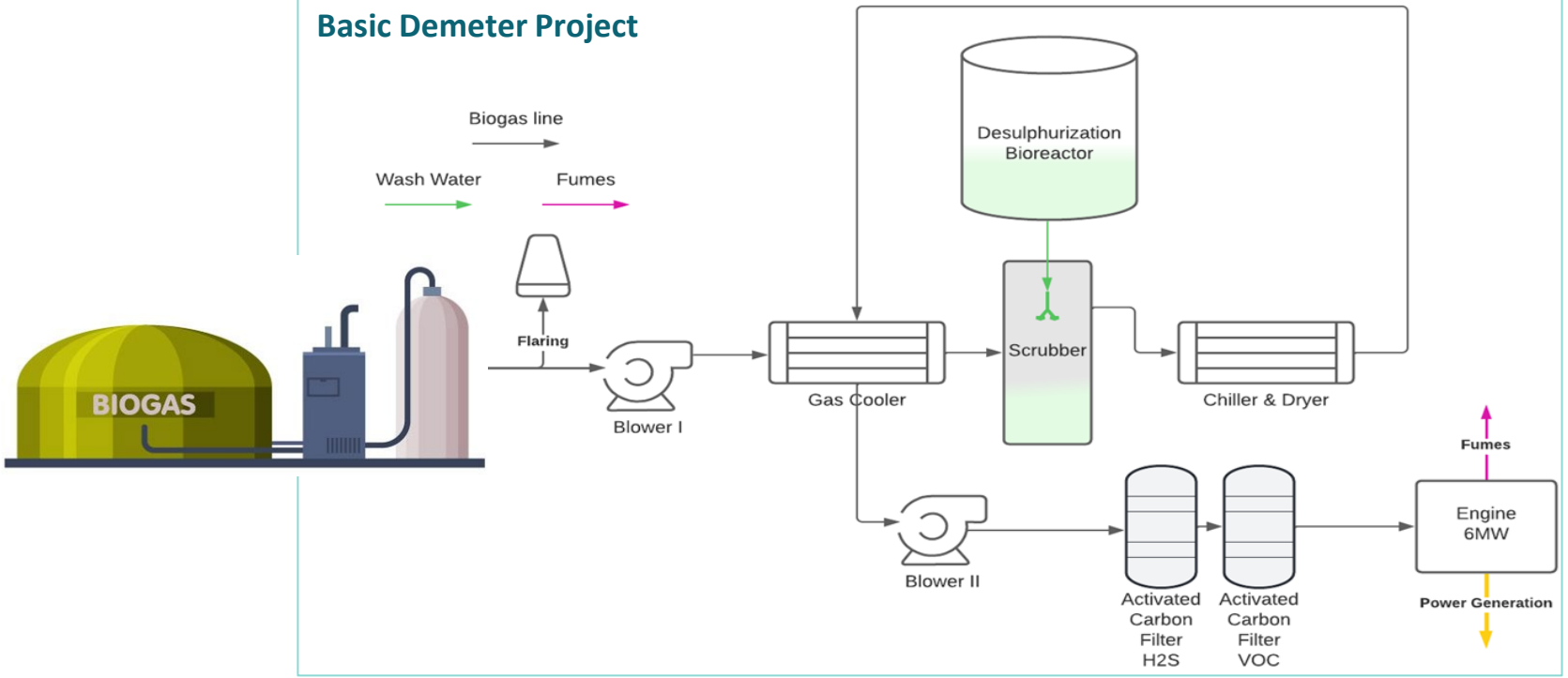
Optimise our costs

Live technical sensitivity analysis for tender and project

Increase trust and happiness of our Clients

Increase trust from our HQ Paris management

Basic Demeter Project



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The concept of K-Box is Thinking in The Box

Knowledge Box

It is more than 25 years experience to reach to this concept.
It is an aggregate of different concepts done separately.

- ✓ **1999 & 2008 Genesis 1st Part**
- ✓ **2010 Genesis 2rd Part**
- ✓ **2016 Genesis 3th Part**
- ✓ **2018 Genesis 4th Part**

- ❑ **2023 Forecasting 5th Part Testing**
- ❑ **2025 Forecasting 6th Part Study**

We will reach the goal in 3 steps :

1. Digital Twin
2. Digital Twin with Aveva Dynamic Simulation
3. Digital Twin with Aveva Dynamic Simulation & Aveva PI System

First Step

Digital Twin

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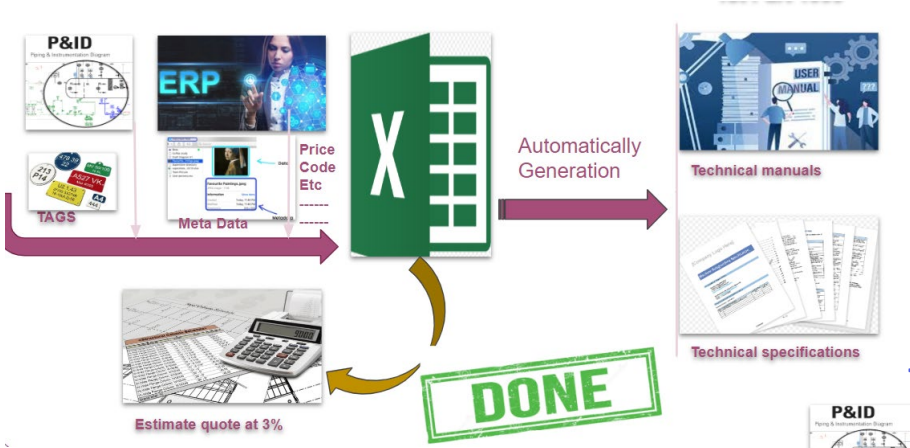
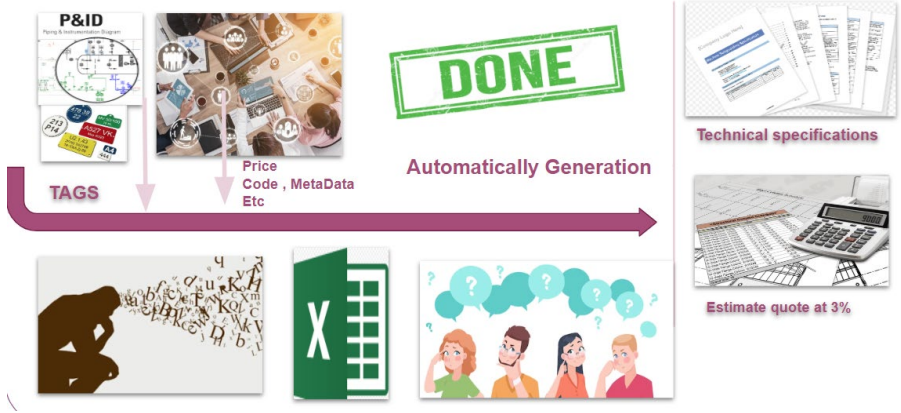
1st Part 1999
1st Part 2008



1999

Tender Software



2008

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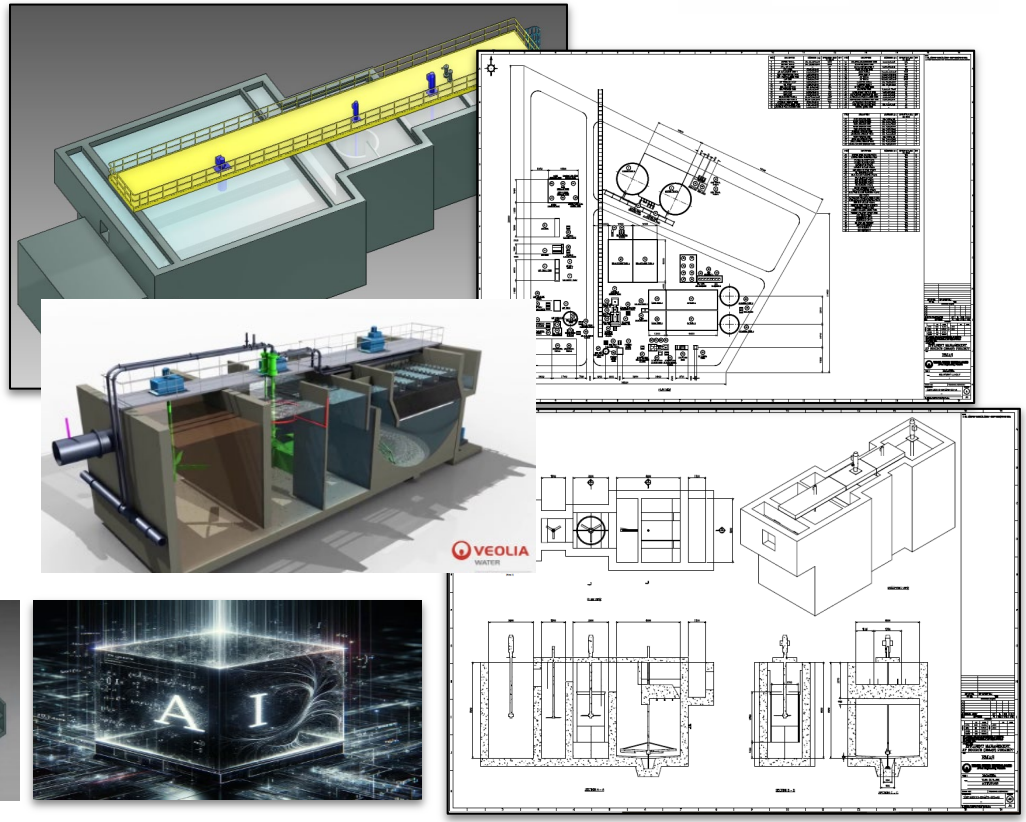
2rd Part 2010

- Create and design Multi-discipline 3D :
  - Piping
  - Equipment
  - Structure
  - Civil
  - Electrical
  - HVAC
  - etc.
- Clash-free, consistent design
- No limit to project size or details
- Compare and update between Aveva Diagram P&ID Aveva E3D & Aveva Engineering.



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2rd Part 2010

80% decrease of design time

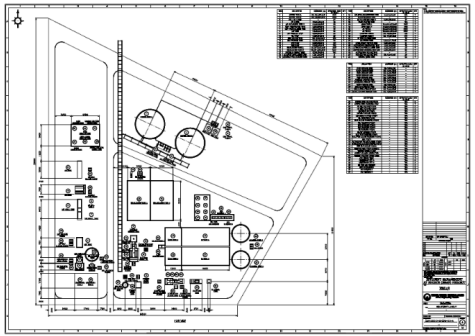
The Powerful of Parametric Design

Automatically generates documents for Tenders and Projects

- 2D drawings
- Layouts
- GA
- Civil drawings
- Etc

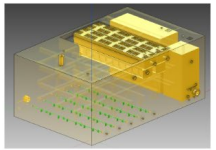
Design Time

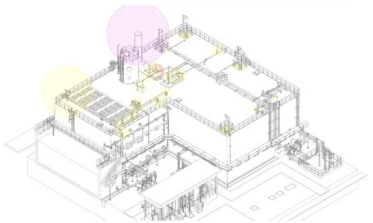
- Conventional 3D Design : 80h
- 3D Parametric Design : 2h

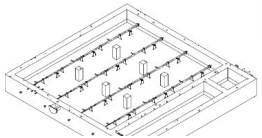


Design Time

- Conventional 3D Design : 120h
- 3D Parametric Design : 4h





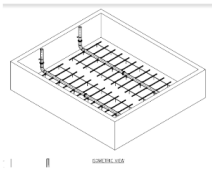


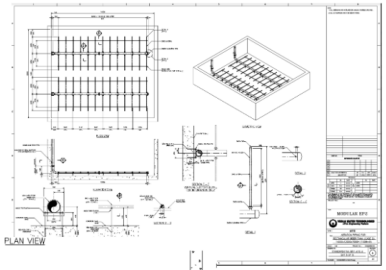
UASB Parametric (Link to Video)

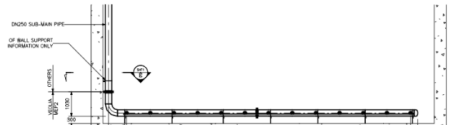
MBBR Parametric (Link to Video)

Design Time

- Conventional 3D Design : 40h
- 3D Parametric Design : 1h

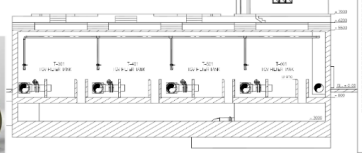


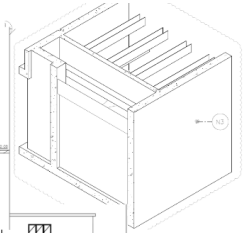




TGV Parametric (Link to Video)

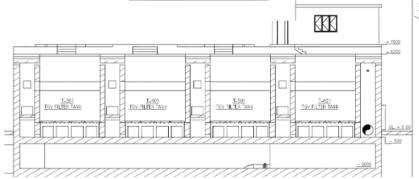
Very High Velocity Filter





Design Time

- Conventional 3D Design : 80h
- 3D Parametric Design : 2h



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Digital Twin for Design in Tender & Project

We have reduced by 80 % time CAD design

Challenge

- Design for specific markets in fast time
- Design for Tender , Project
- Generate all the documents in automatic mode for all the phases

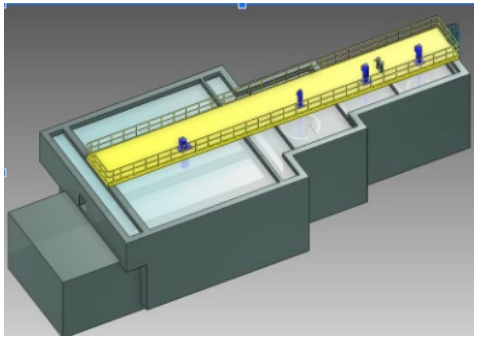
Solution

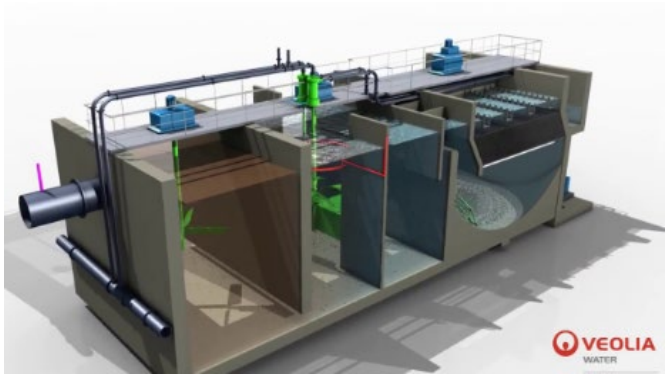
- Aveva Unified Engineering Aveva Diagrams (P&ID) Aveva E3D Design ,Aveva Engineering

Results

- Generation 3D model automatically from Engineering sheet calculation
- We have used the parametric function of Aveva Tools
- In addition to speeding up the process, we have significantly increased the quality of the work.

The Power of Parametric Design





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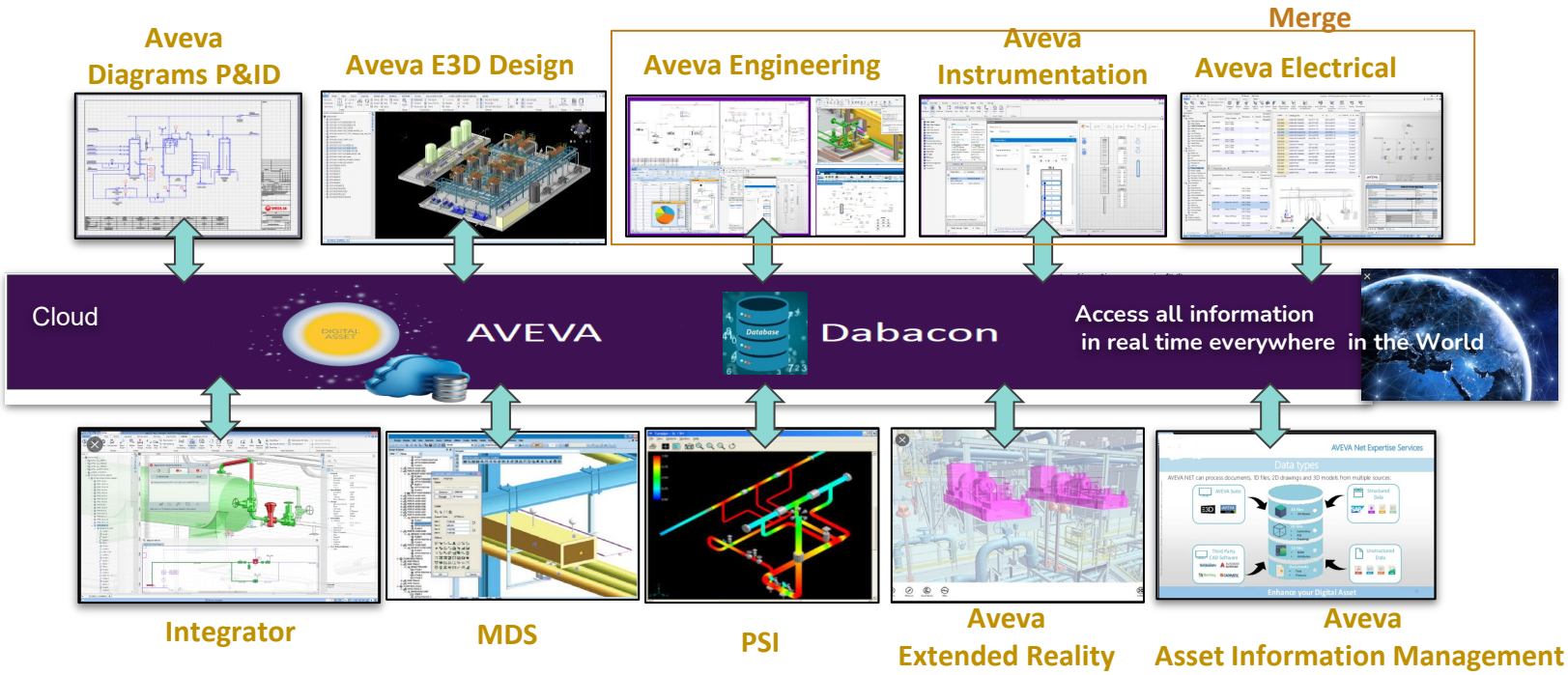
3th Part 2016



All the tools are on the cloud accessible to everyone from everywhere

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4Th Part 2018

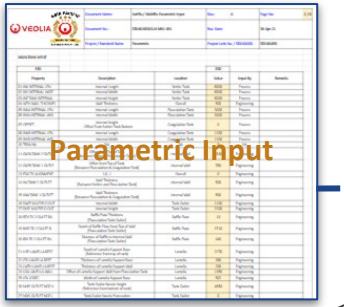
Generation Engineering Document Automatically

VEOLIA

INPUT

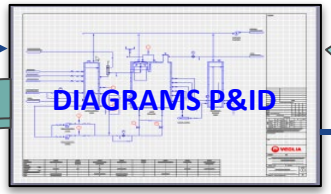
OUTPUT

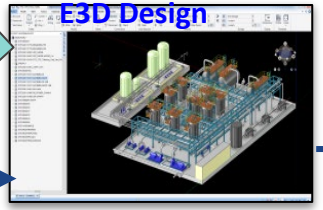

Master Design Package


Parametric Input

Tag, Type, Line No, Pipe Spec/Size

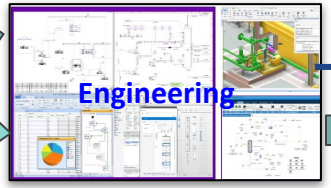
Tag, Type, Desc

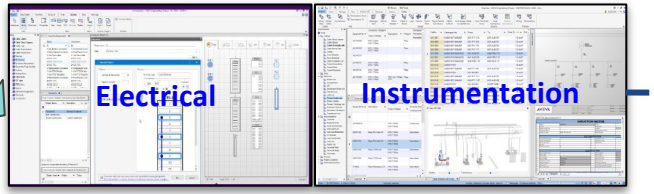

DIAGRAMS P&ID


E3D Design

Pipe Spec/ Size, Tag

Pipe Spec/ Size, Desc, Flowrate, Press, Temp


Engineering


Electrical

Instrumentation

- P&ID
- General Arrangement
- Civil Guide Dwg
- Layout Dwg
- Cable Tray 3D
- Cable 3D (TBC)
- Equipment List
- Line List
- Valve List
- Equipment Datasheets
- Instrument List
- Instrument Datasheets
- Load List / VFD List
- IO List
- Cable Schedules
- Termination Drawings
- Hook-Up Drawings
- Single Line Drawings

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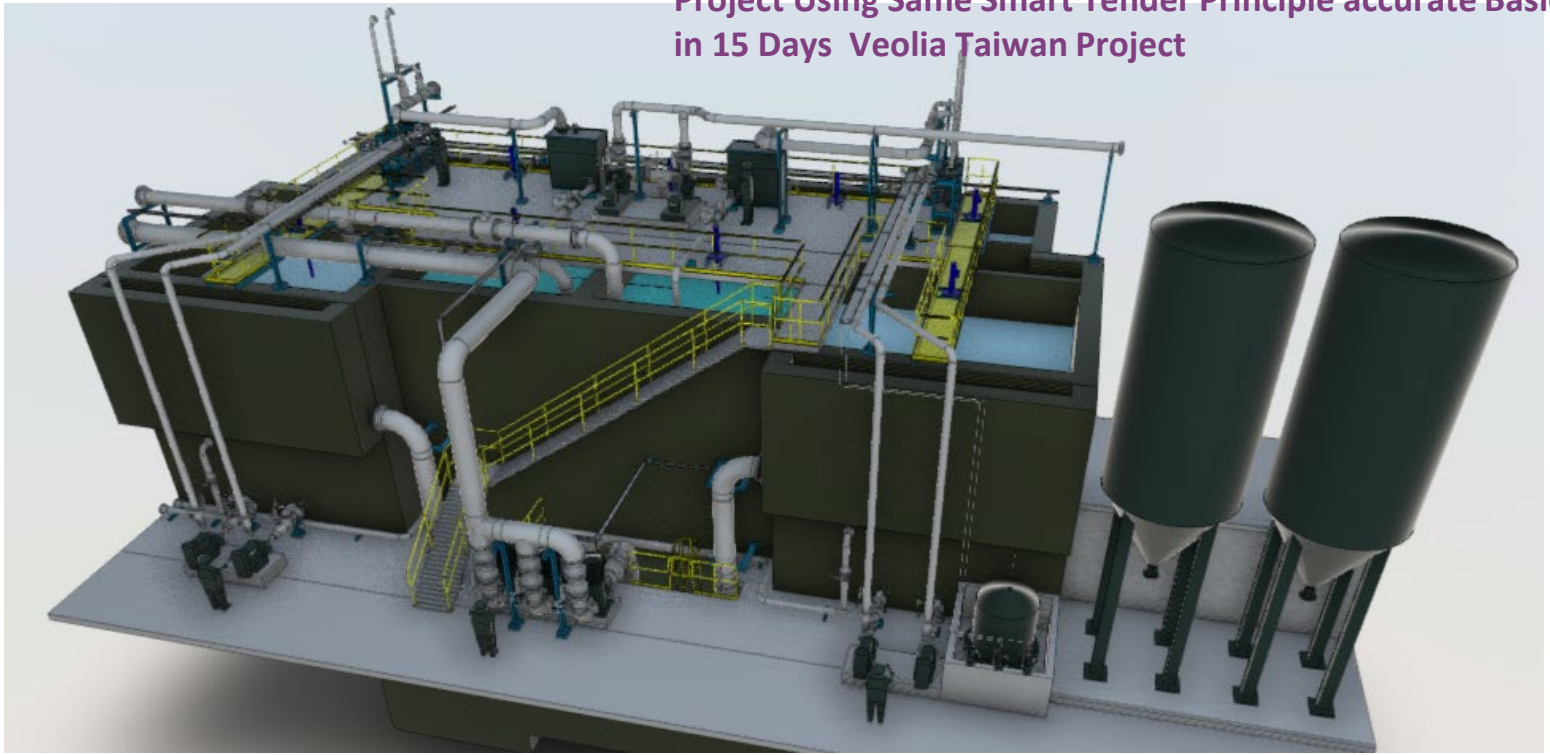
VEOLIA

Project Using Same Smart Tender Principle accurate Basic Design in 15 Days Veolia Taiwan Project



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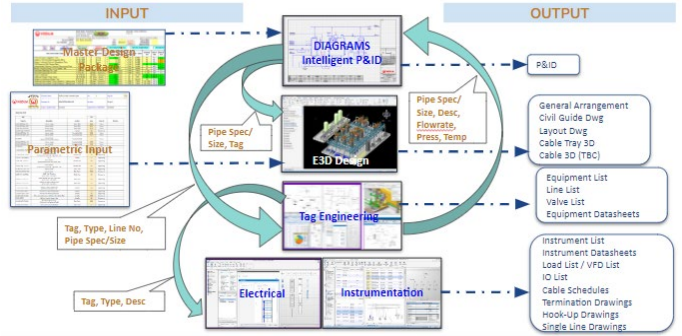
Full Engineering Design for tender done in 24 hours.



Challenge

- Speed up the tender process with accurate Capex & Opex
- Speed up & Secure the project construction phases

Solution

- Aveva Unified Engineering Aveva Diagrams (P&ID) Aveva E3D Design Aveva Engineering Aveva Extended Reality Aveva Asset Information Aveva Dynamic Simulation

Results

- On specific process and market we have done Full Engineering Design for tender in 24 hours.
- We usually need minimum 1 week to 4 week for the same result

Second Step

Digital Twin with Aveva Dynamic Simulation

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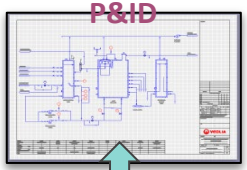
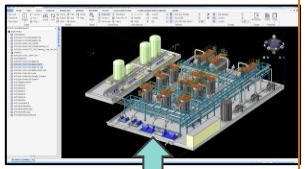
Forecasting 5th Part 2023-2024

Aveva Diagrams P&ID

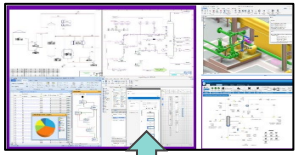


3D Model

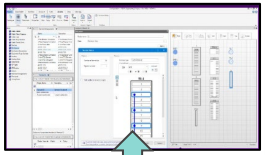


Merge

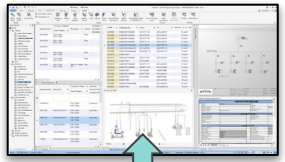
Aveva Engineering



Aveva instrumentation



Aveva Electrical

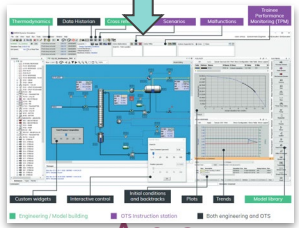


Cloud

AVEVA

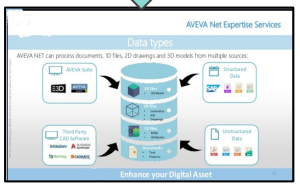
Dabacon

Access all information in real time everywhere in the World



Aveva Dynamic Simulation

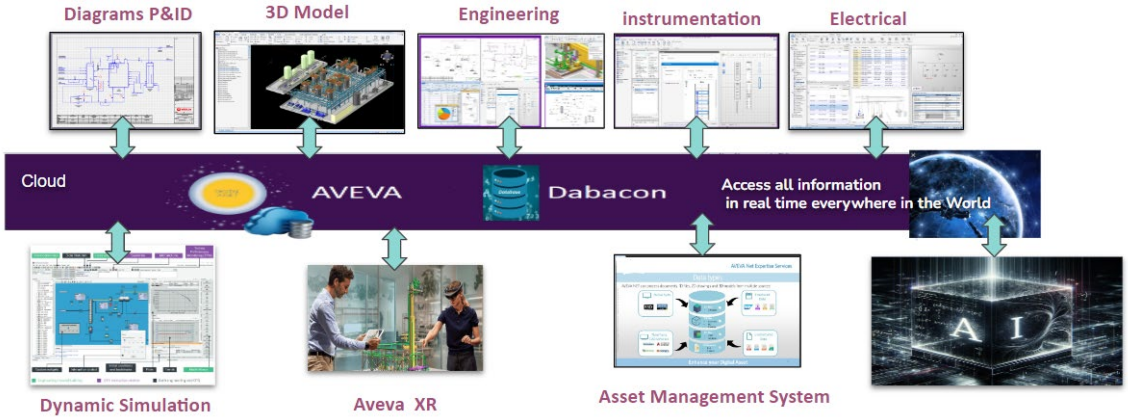
Aveva Extended Reality



Aveva Asset Information Management

Smart Tools with Aveva Dynamic Simulation and AI

Smart Tools Link with AVEVA PI System



All the tools are on the cloud accessible to Everyone from Everywhere

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Digital Twin for Design in Tender & Project

Tender Phase

Process Input

INPUTS

- Global radiation-G
- Aperture area A_{ap}
- σ,τ,ε,α
- Temperature(T_o, T_{g1}, T_{g2}, T_i, T_f & T_p)
- C_p of water
- Total time taken

Engineering Output

- P&ID
- General Arrangement
  Civil Guide Dwg
  Layout Dwg
  Cable Tray 3D
  Cable 3D (TBC)
- Equipment List
  Line List
  Valve List
  Equipment Datasheets
- Instrument List
  Instrument Datasheets
  Load List / VFD List
  IO List
  Cable Schedules
  Termination Drawings
  Hook-Up Drawings
  Single Line Drawings

With **Virtual Reality & Simulation** access all data on real time ,**R'evolution** for :

- ❑ Review with Veolia Teams and Clients
- ❑ Automatic generation Costing for Opex and Capex
- ❑ Live technical sensitivity analysis for tender and project

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Digital Twin for Design in Tender & Project

Process Input

INPUTS

- Global radiation-G
- Aperture area A_{ap}
- $\sigma,\tau,\varepsilon,\alpha$
- Temperature($T_a, T_{g1}, T_{g2}, T_b, T_f$ & T_p)
- C_p of water
- Total time taken

Project Phase

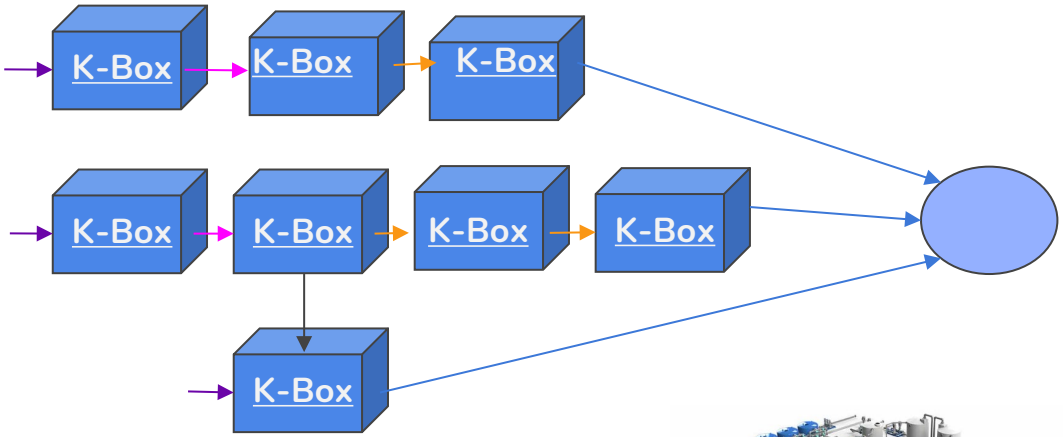
Output

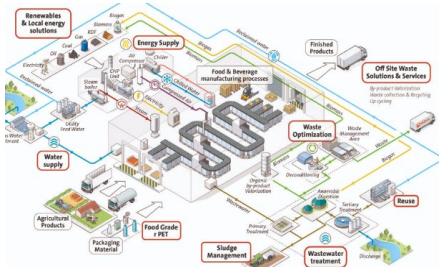
- ❑ Engineering Documents
- ❑ Pricing
- ❑ O&M Manuals

Optimisation Design with simulation on real time

- ❑ Training with Simulation and Extended Reality for :
- ❑ Internal Review
- ❑ External Review
- ❑ Commissioning
- ❑ Operation
- ❑ Maintenance
- ❑ Etc

K-Box can be used in parallel & K-Box our treatment:





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Third Step

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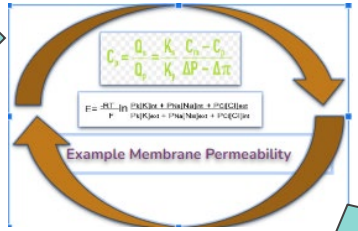


Advanced analysis via AI/ML platforms

Aveva Information Management : Static Data
Aveva PI System:Dynamique Data
Aveva Dynamic Simulation :Simulation

Return of EXperience (REX) from the different plant with Aveva PI System to improve our Model

Veolia Near & Middle East Smart Engineering
Digital Twin for Design in Tender & Project

Our expectation is to improve our electrical and chemical consumption:

- ❑ **Electrical 15% to 30%**
- ❑ **Chemical 10% to 25%**

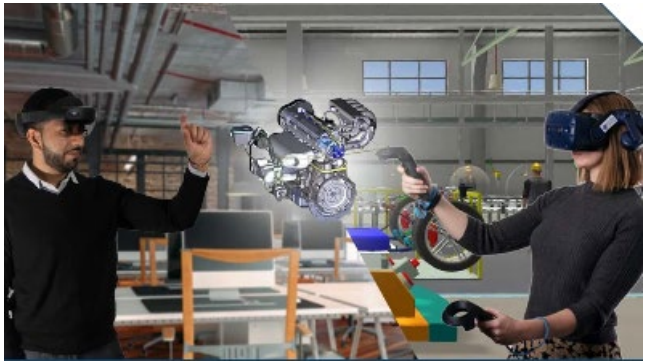
Improving our training in term of quality will improve our safety result on site

Challenge

- Help and improve the commissioning and operation management
- Improve our design in permanence with real time information from Aveva PI System
- Get Return of experience in real time & be sure to use for the improvement of our design

Solution

- Aveva Extended Reality Aveva Asset Information Management Aveva Dynamic Simulation Aveva PI System



Results

- We are expecting to improve our setting and optimize our electrical consumption and chemical consumption.
- Our expectation is to improve drastically our training in term of quality and simplification of use We should be able to give more happiness to ours clients and the system will help us to involved our specialite from worldwide.

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- ❑ Process
- ❑ Engineering
- ❑ Pricing
- ❑ Help Selling
- ❑ Commissioning
- ❑ ……
- ❑ O&M Manuals
- ❑ Operation
- ❑ Maintenance
- ❑ Training

Preserve Veolia Knowledge

Design Validated by Veolia experts and opertionals no more mistakes

- ❑ Decreasing All the risk by Veolia experts
- ❑ Parametric Model :
- ❑ Validated
- ❑ Tested
- ❑ All the REX integrated

Automatic Generation

Tender Engineering Documents :

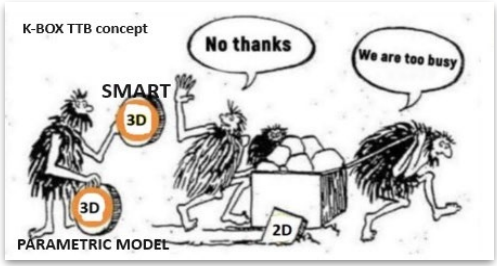
- ❑ RFP
- ❑ OPEX
- ❑ CAPEX

Project Engineering Documents

- ❑ Basic Design
- ❑ Feed
- ❑ Details design

For Tender Phase # For Project # For Commissioning # For Operation.

Veolia Near & Middle East Smart Engineering
Digital Twin for Design in Tender & Project



Process Input

INPUTS

- Global radiation-G
- Aperture area A_{ap}
- $\sigma,\tau,\varepsilon,\alpha$
- Temperature($T_\infty, T_{g1}, T_{g2}, T_i, T_f$ & T_p)
- C_p of water
- Total time taken

Design with Smart Tools a KBox for specific design

- ❑ Full design for tender ==========> Automatic generation of all engineering documents + Capex & Opex
- ❑ Full design for project ========== Automatic generation all engineering documents
- ❑ Full Commissioning Documents ==> Automatic generation all commissioning documents
- ❑ Full Document operation ========> Automatic generation all operation documents

Tools:

Aveva Dynamic Simulation ,Aveva Diagrams P&ID, Aveva E3D ,Aveva Engineering ,Aveva Extended Reality, Aveva Asset Information Management, Aveva PI System

- ❑ Speed up the Tender & Project process
- ❑ Secure our Design the Tender & Project phases
- ❑ Help and improve the commissioning and operation management
- ❑ Improve our design in permanence with reel time information from Aveva PI System System
- ❑ Get Return of EXperience in real time to improve our Engineering Design
- ❑ Show to our client their futur plant in 3D with Extended Reality
- ❑ Avoid to Reinvent the Wheel !!! Just Improve
- ❑ To reassure our High Management Paris and show our Engineering design is under control.

May the Smart Tools and Digital Twin Design be with you

Old Conventional Design

Design with Dynamic Digital Twin

Resourcing the world VEOLIA

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