

Modular Approach to Design

模块化工程设计

2009 International Forum of Pharmaceutical Engineering and Generic Drug R&D

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About NNE Pharmaplan

关于恩宜珐玛

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Global reach - local knowledge

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全球的服务 - 本土的精华



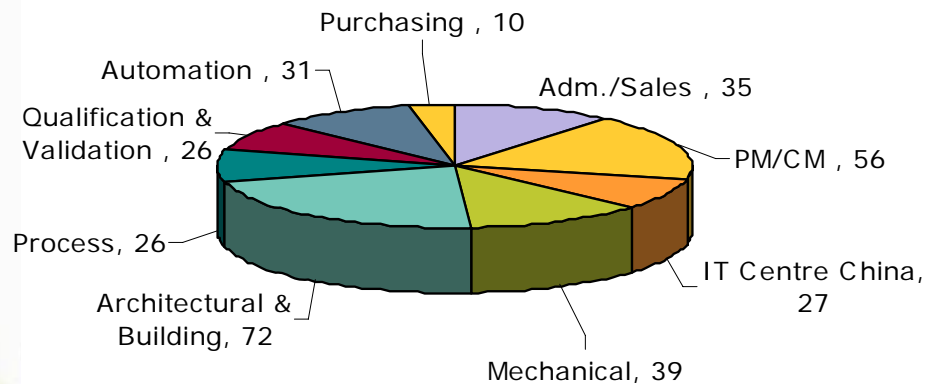
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NNE Pharmaplan in China

恩宜珐玛在中国

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- NNE Pharmaplan (Tianjin) Co., Ltd. is a whole foreign owned company established in 1995
恩宜珐玛（天津）有限公司是于1995年建立的全外资公司
- Over 320 employees and growing
320多名员工, 人数不断增加
- All employees master English
公司全体员工熟练掌握英语
- Over 90 of our local engineers has been for training in Europe/US
我们有超过90名国内员工参加过在欧洲/美国的培训
- 32 expatriates
32名外籍人员

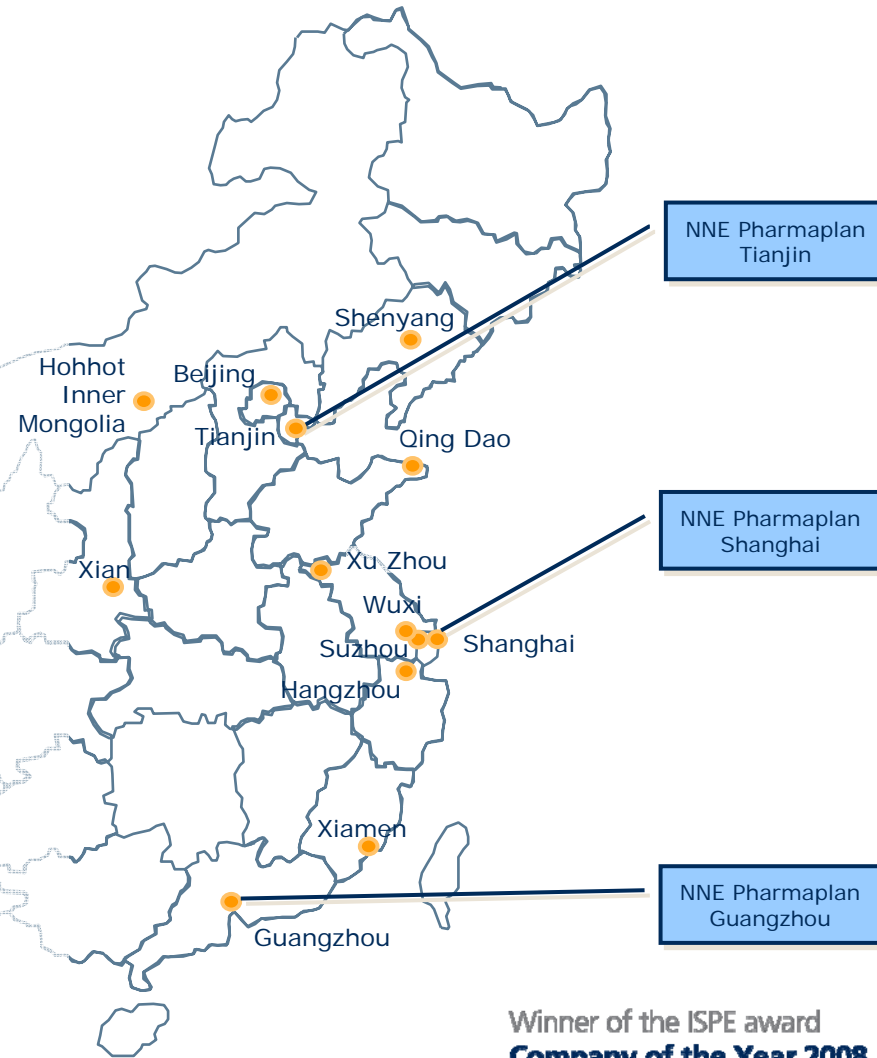


Clients and Projects in China

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中国的项目和客户

Novo Nordisk, China 诺和诺德, 中国
Novozymes Tianjin, China 诺维信, 天津
AstraZeneca Wuxi 阿斯利康, 无锡
AMO (Hangzhou) Co., Ltd. 眼力健, 杭州
Beijing Novartis 北京诺华
Suzhou Novartis 苏州诺华
GlaxoSmithKline, Tianjin 葛兰素史克, 天津
TSK&F 中美史克
Baxter, Tianjin 百特, 天津
Beijing Fresenius-Kabi 北京费森尤斯卡比
Shenzhen Sanofi-Pasteur 深圳赛诺菲巴斯德
Beijing Vigoo (Vaccine) 北京微谷 (疫苗)
CPC Tianjin 西比西 (天津) 精细化工有限公司
China Worldbest Pharmaceutical 华源药业
Shanghai Seeinglong Bio-tech 上海曦龙生物
Topsun Pharmaceutical Group 东盛制药
World Courier Shanghai 世递国际, 上海
Suzhou Hongda Enzyme 宏达制酶有限公司
Novozymes Shenyang 诺维信, 沈阳
AATBT Tianjin 关节动力安达, 天津



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Modular approach to Design

模块化工程设计

A brief intro to the NNE Pharmaplan modular methodology

恩宜珐玛模块设计方法的简介

Fast Track execution

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- **Fast track means that we can build pharmaceutical plants 2 ½ times faster than normal.**
- **The worlds largest Insulin production plant in 24 months**
- **A Hemophilia drug plant in 18 months**
- **A Vaccine production plant in 11 months**

This without any compromise of quality

Advantages:

- **Saving one year ore more**
- **Speeding up a markets product entrance**
- **Decisions can be taking later**

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Fast Track execution

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- How to do Fast Track execution

The key word is Modular Engineering

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This is how to think modular

这是我们对模块的理解

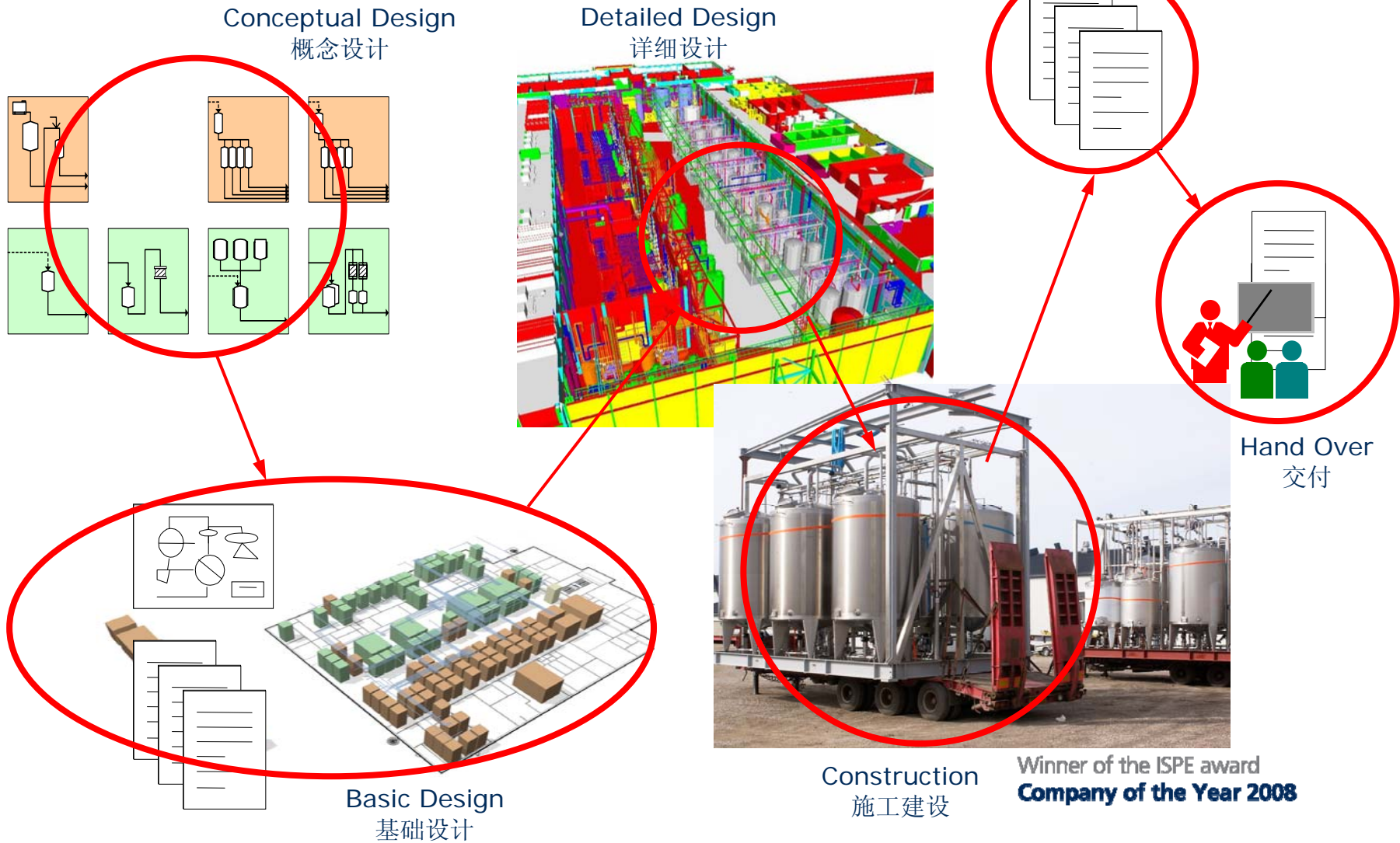
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This is how we think - the design and construction phases

这是我们在设计和建设阶段如何思考的

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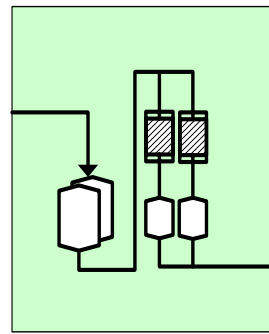
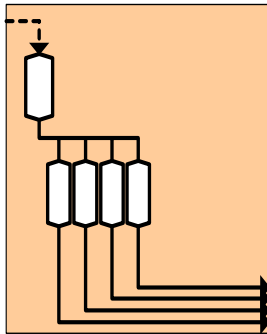
This is how we think

这是我们如何思考的

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- The approach is to break the project into a **structure** of de-coupled, physical, functional modules:

方法是把项目分成一个结构上，物理上的和功能上独立的模块组成的架构



- Which can be handled in **parallel** throughout the project.
这些模块可以在项目中并行建造
- For which **concepts** for all major project activities can be established and then repeated module by module.
建立对于所有主要项目活动都适用的概念，然后逐一通过模块重复实现
- Which can be used for a high resolution **project control**.
可以实现高度严格的项目控制

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Key Drivers for modularisation

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模块化的主要驱动

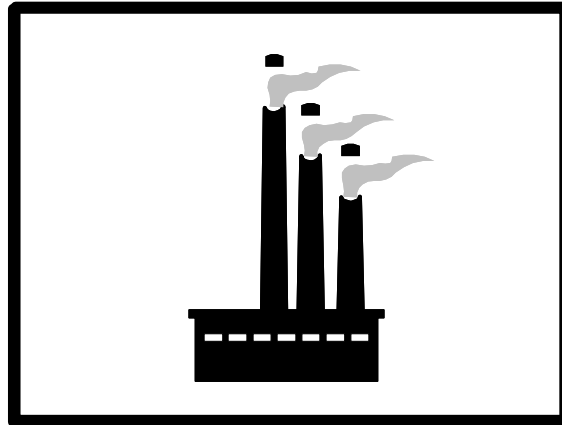
- Reduce project execution time
缩短项目执行时间
- Maximize reuse effect within projects and between projects
在一个项目内和不同项目之间实现重复利用最大化
- Increase quality
提高质量
- Speed up learning cycles
加快培训周期
- Reduce risk
减少风险
- Reduce cost
降低成本
- Enable technology transfer
实现技术转移

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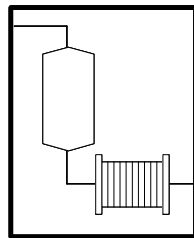
Design break down - sizing the Modules

设计分解-模块规模

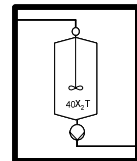
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Plant
工厂



Process modules
工艺模块



Equipment
modules
设备模块



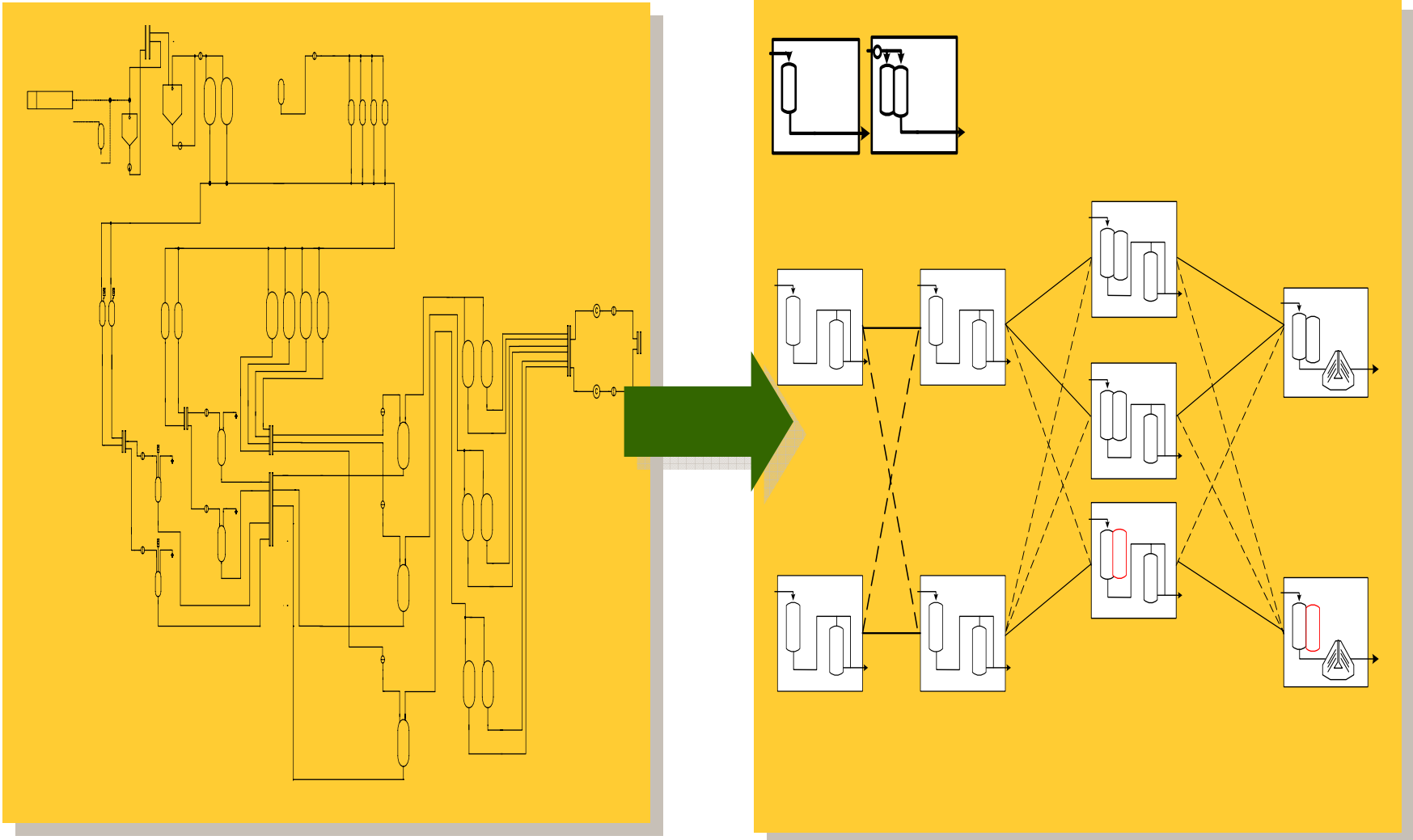
Components
部件

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Design break down - defining the modules

设计分解-模块定义

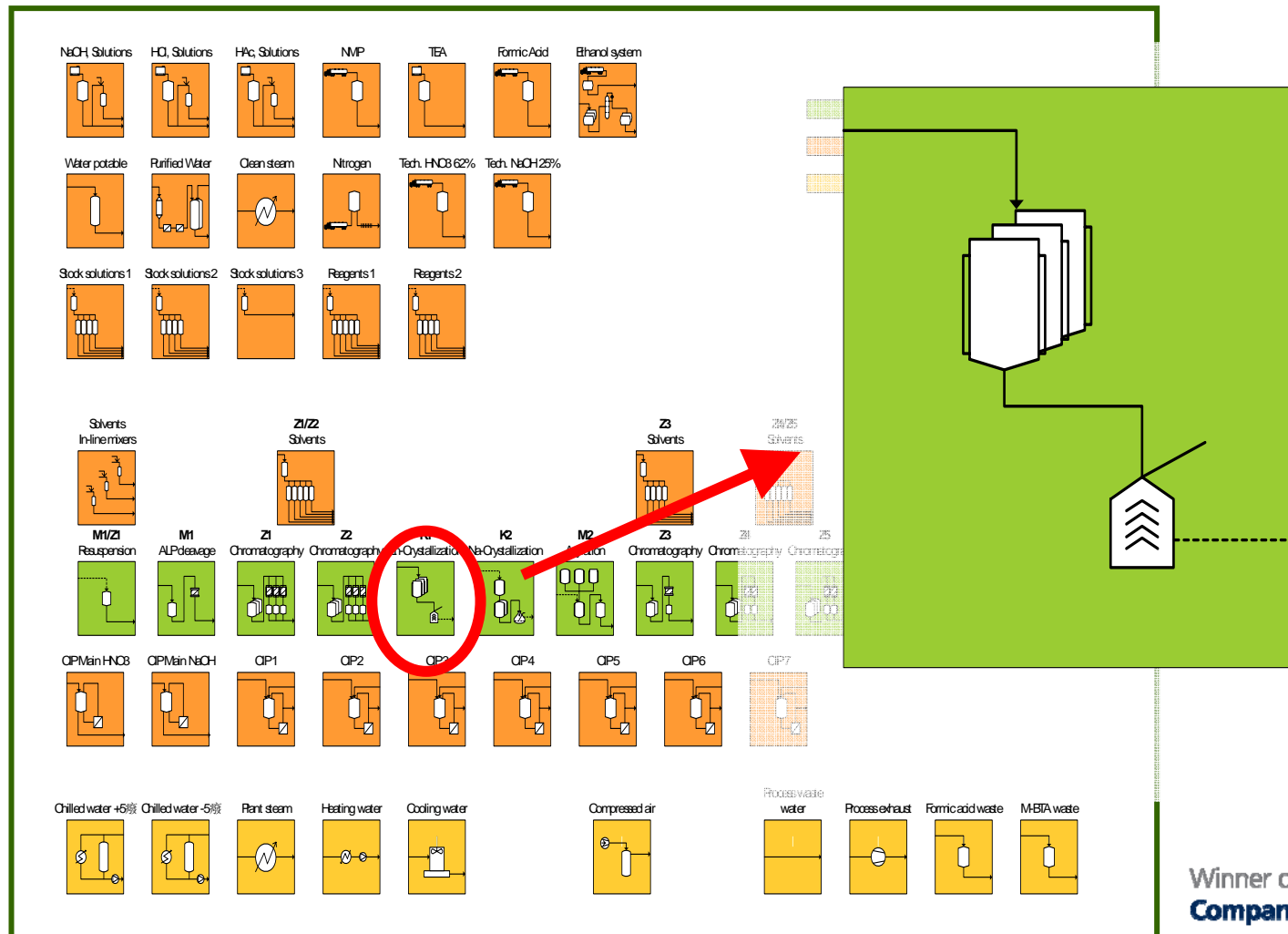
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Design break down - the process on module level

设计分解-模块化的工艺

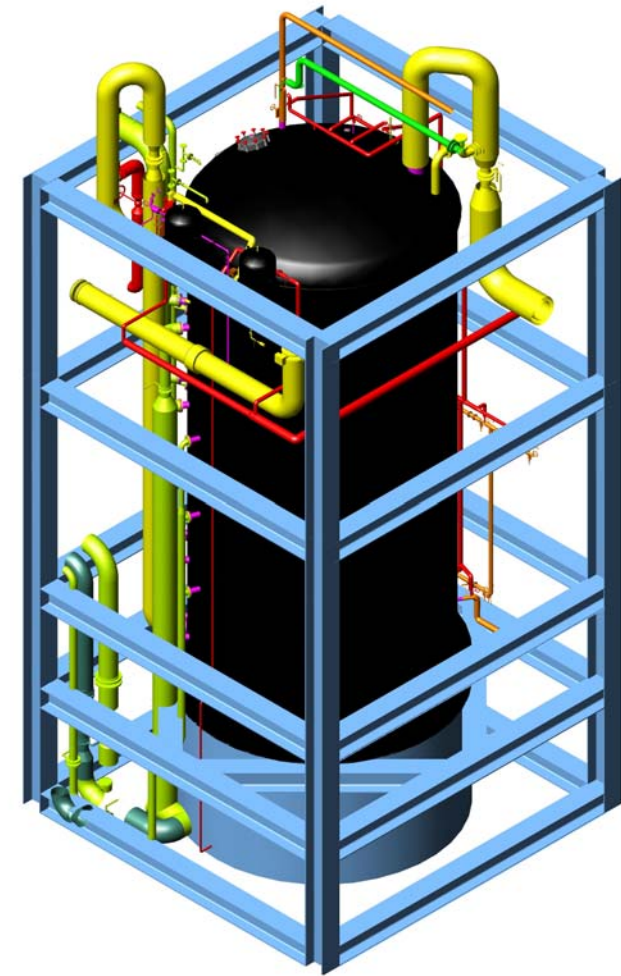
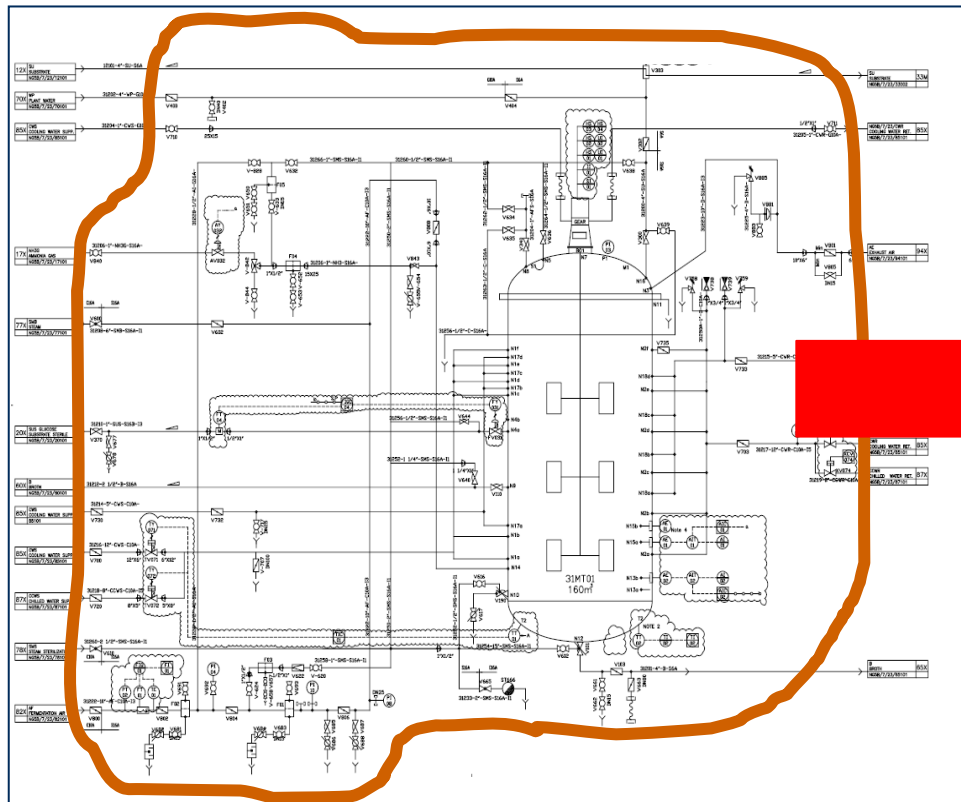
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Modularisation example Transformation to Unit's 模块化设计举例-转化到单位

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Brush up 问题

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*We design modular to save cost, reduce time and improve quality.
Not just for the sake of modularity!*

设计模块是为了节省成本，减少时间和提高质量。不仅仅是为了模块化。

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This is how to design modular

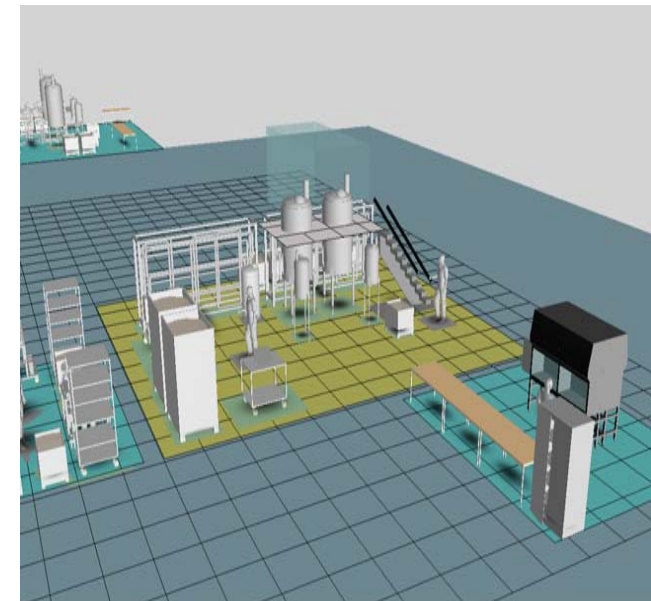
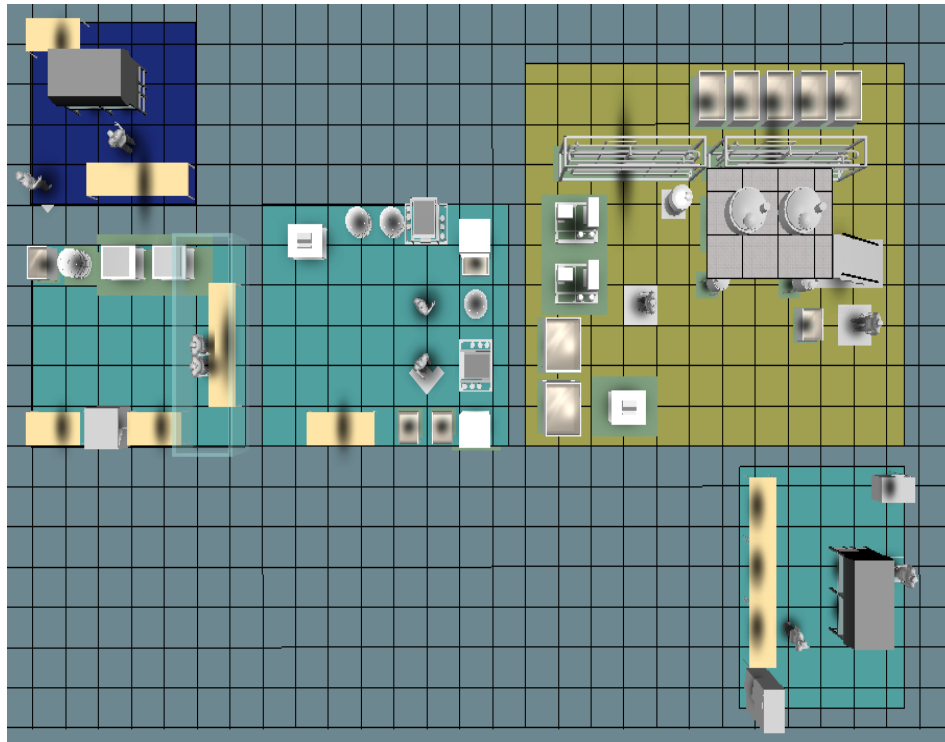
这是我们如何设计模块

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Example during Conceptual Design: nne pharmaplan® 在概念设计阶段的例子

- For many modules we have a configurable module model to be put into an easy to use configuration 3D-modeller
对于很多模块, 我们的模块配置模型能很方便的进行三维模块配置

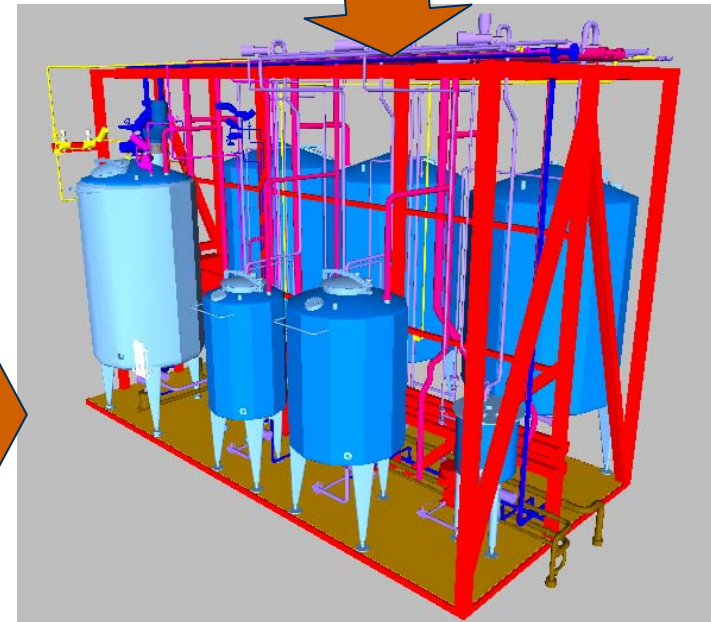
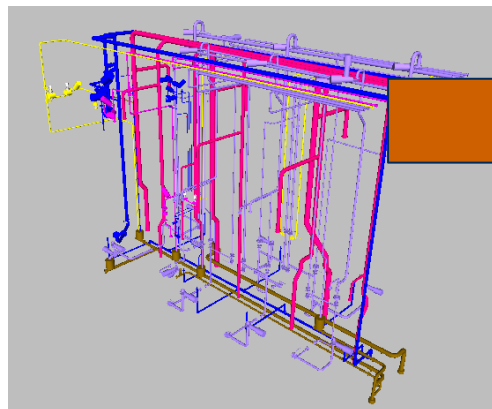
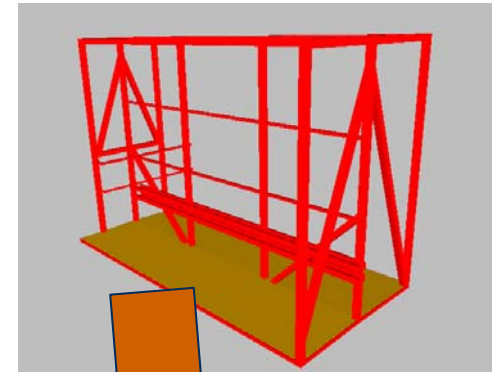


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Example during Detailed Design: 详细设计中的例子

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- Full 3-D design
全套3-D 设计
- Assembly of all 3-D digital models: Process, Utility, Building etc.
组合所有3-D数字模型：工艺，公用设施，建筑物
- Full collision control
整体冲突控制
- Superb project clarification for user
为用户做的高质量的项目澄清
- Fast and accurate export to vendors and contractors
对承包商进行快速精确的交付

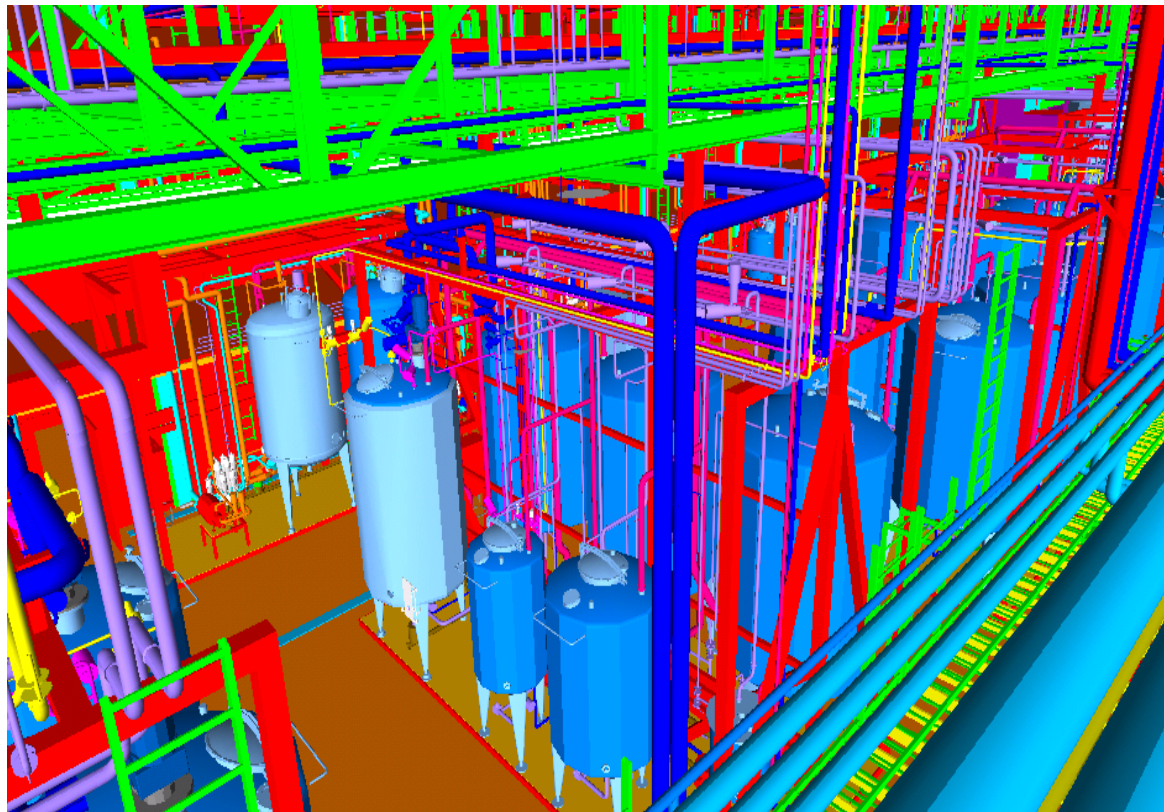


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Example during Detailed Design: 详细设计中的例子

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- Complete 3-D design digital model of the entire facility
完成整体设备的3-D设计数字模型



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This is how to construct modular 这是我们如何建造模型

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This is how to construct

这是我们如何建造

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Traditional:

传统上

- All kinds of traditional construction methods tailored to local environments
所有的传统的建筑方法根据当地环境进行调整

Modular:

模块

- **Traditional** buildings with prefab process, piping and utility modules
带有预制工艺，管道和公用设施模块的传统的建筑物
- Prefab modules for process, piping and utility to function as structural building members.
预制的工艺、管道、和公用工程模块作为结构建筑物的组成部分（单体建筑）
- **Fully prefab** modules incorporating the entire building and process, piping and utility modules (98% complete at arrival to site)
全套的预制模块加入到整个建筑物和工艺，管道，和公用设施模块中（在抵达现场时已完成98%）

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Traditional with Prefab Function Modules

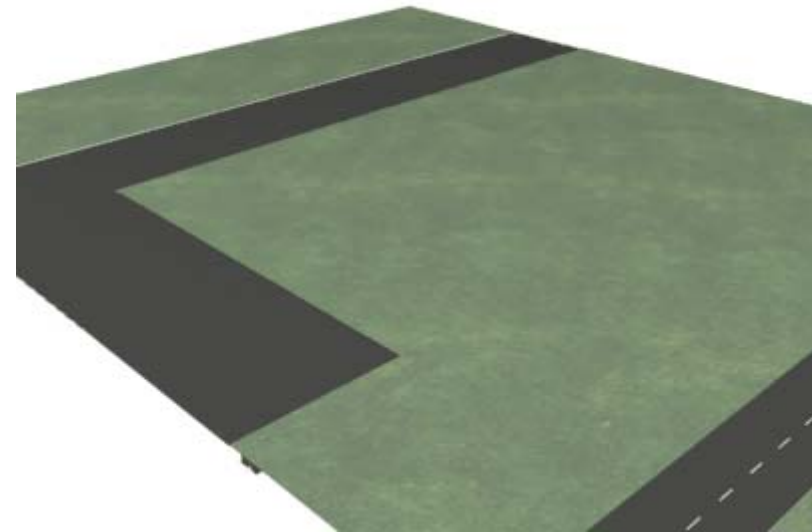
传统并带有预制功能的模块

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Features:

特点

- Traditional precast concrete building elements (walls and slabs)
传统的预制混凝土建筑构件（墙和平板）
- Prefab piping bridges
预制的管道桥
- Prefab tank systems
预制的储罐系统
- Prefab CIP-systems
预制的CIP系统
- Prefab process modules
预制的工艺模块



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Traditional with Prefab Function Modules

传统并带有预制功能的模块

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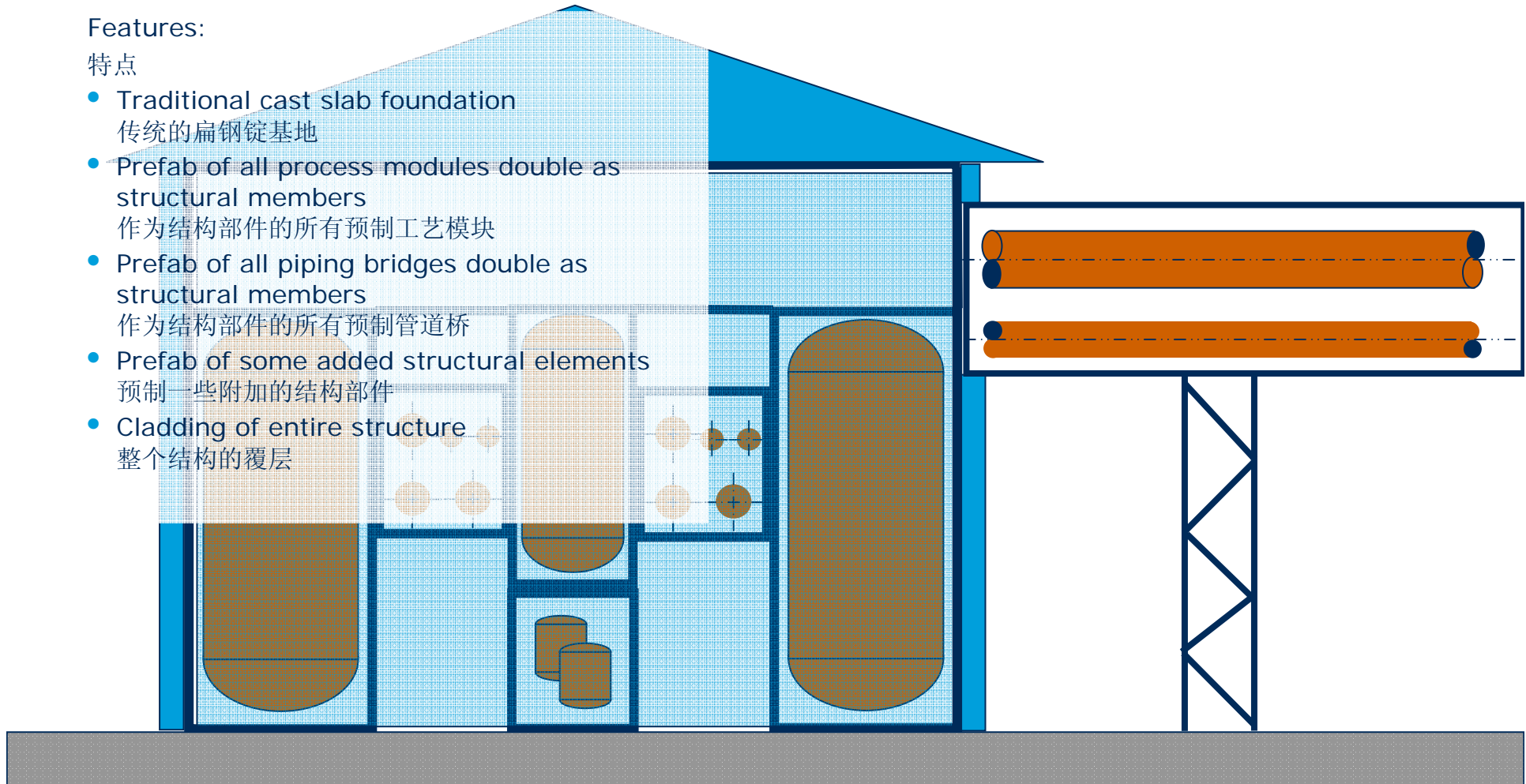
Monocoque 单体建筑

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Features:

特点

- Traditional cast slab foundation
传统的扁钢锭基地
- Prefab of all process modules double as structural members
作为结构部件的所有预制工艺模块
- Prefab of all piping bridges double as structural members
作为结构部件的所有预制管道桥
- Prefab of some added structural elements
预制一些附加的结构部件
- Cladding of entire structure
整个结构的覆层



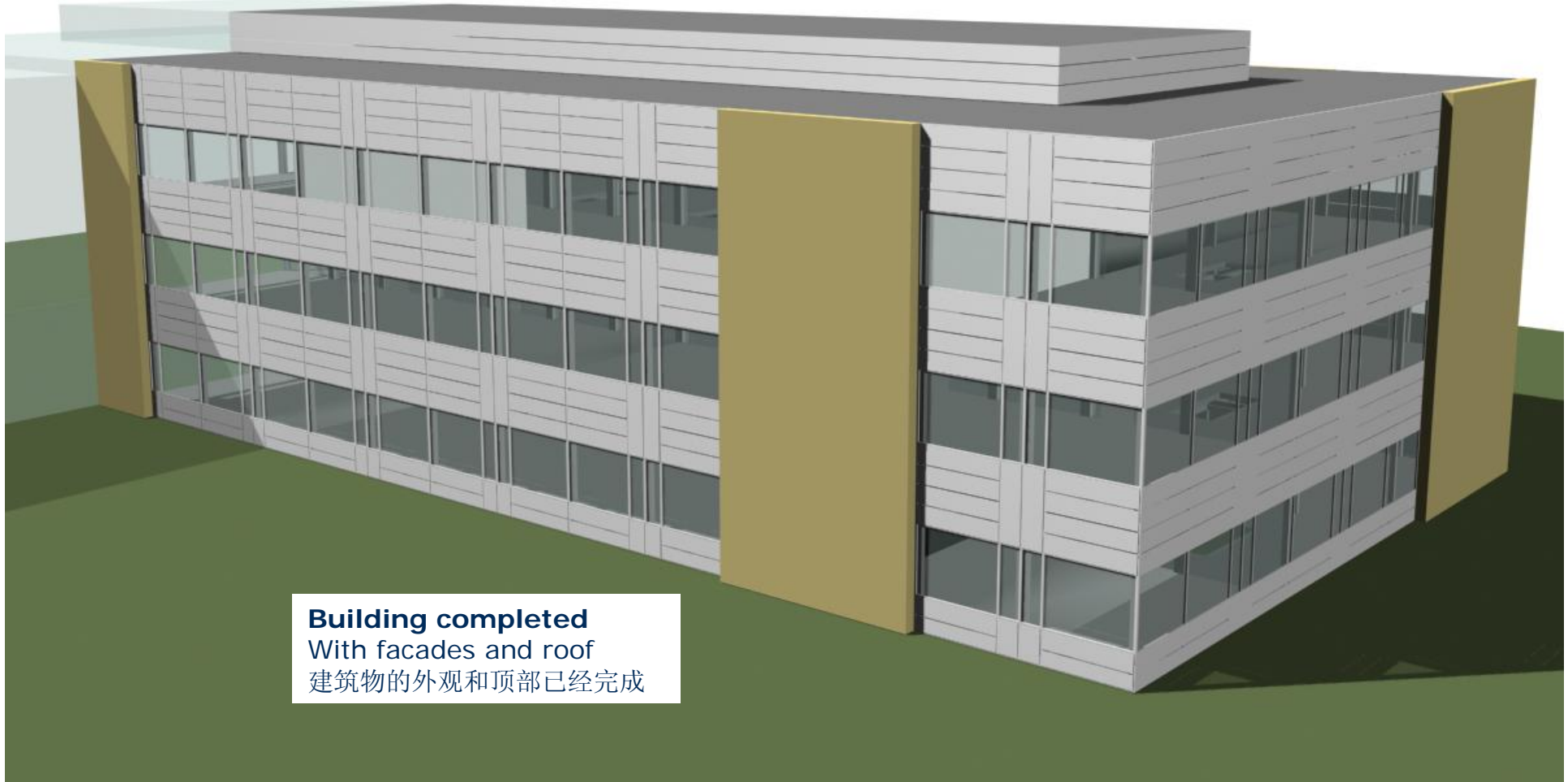
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Fully Prefab Modules

完整的预制模块

Features: 特点

- Modules completed when they arrive at site
当模块到达现场的时候已经完成



Building completed
With facades and roof
建筑物的外观和顶部已经完成

Fully Prefab Modules 完整的预制模块

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- Modules completed to 95-98% off site
95-98%的模块在现场外完成



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Modular project transferred from China to USA

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Modular Engineering

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- Questions ?

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Modular Engineering

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- And finally I would like to say thanks for listening

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