

Harmful to the environment: Air conditioning consuming gigantic amounts of electricity
对环境有害：空调的耗电量巨大

Electric power consumption
耗电量占比

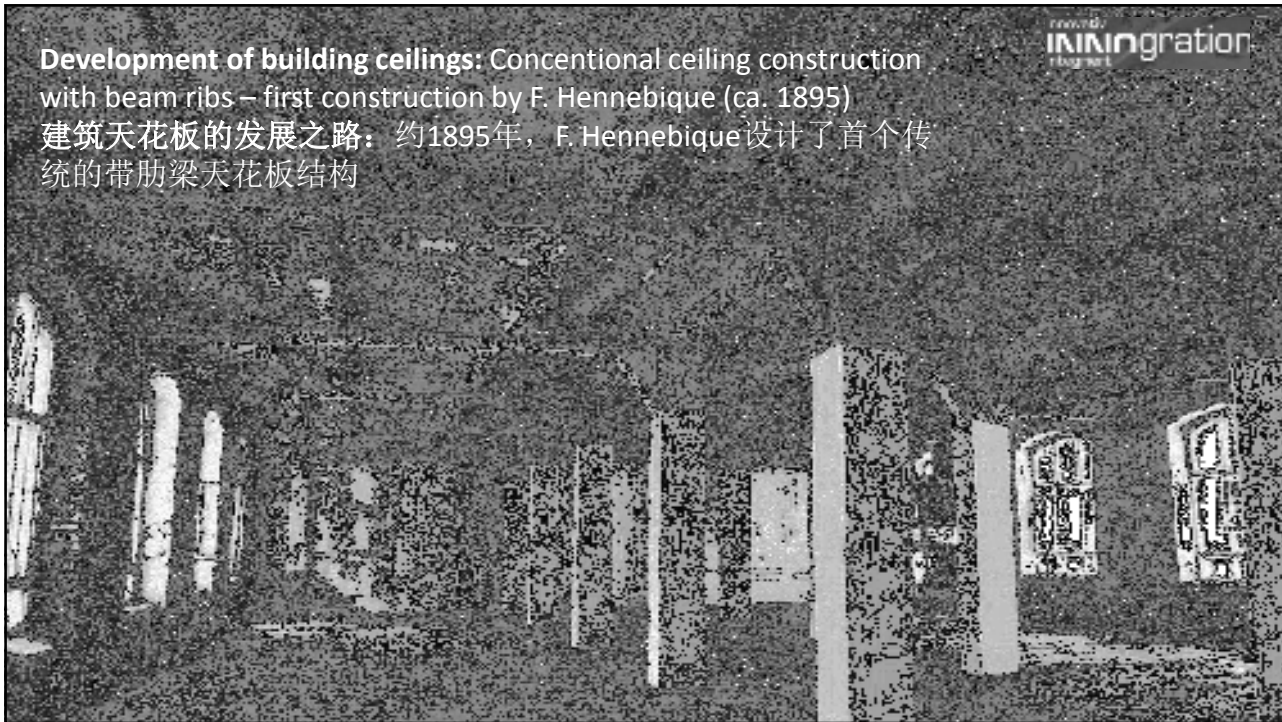
Year	Electric Power Consumption (%)
2018	10%
2050	30%

2018 2050

new power station
新建发电厂

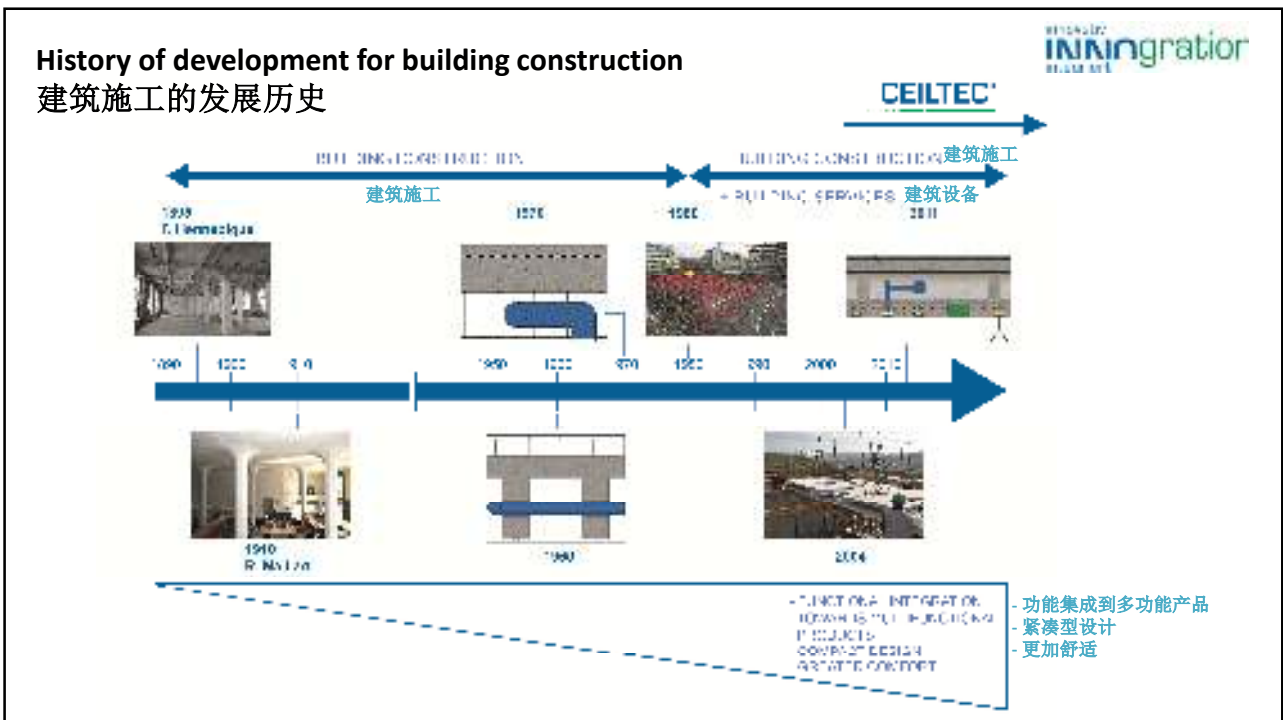
multifunctional building systems
多功能建筑系统

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Actual slab system for building construction: traditional beams and installation between the beams
建筑结构的实际楼板系统：传统梁以及梁间结构



New approach: value innovation **新方法：价值创新**
More than a structural element **不只是结构构件**

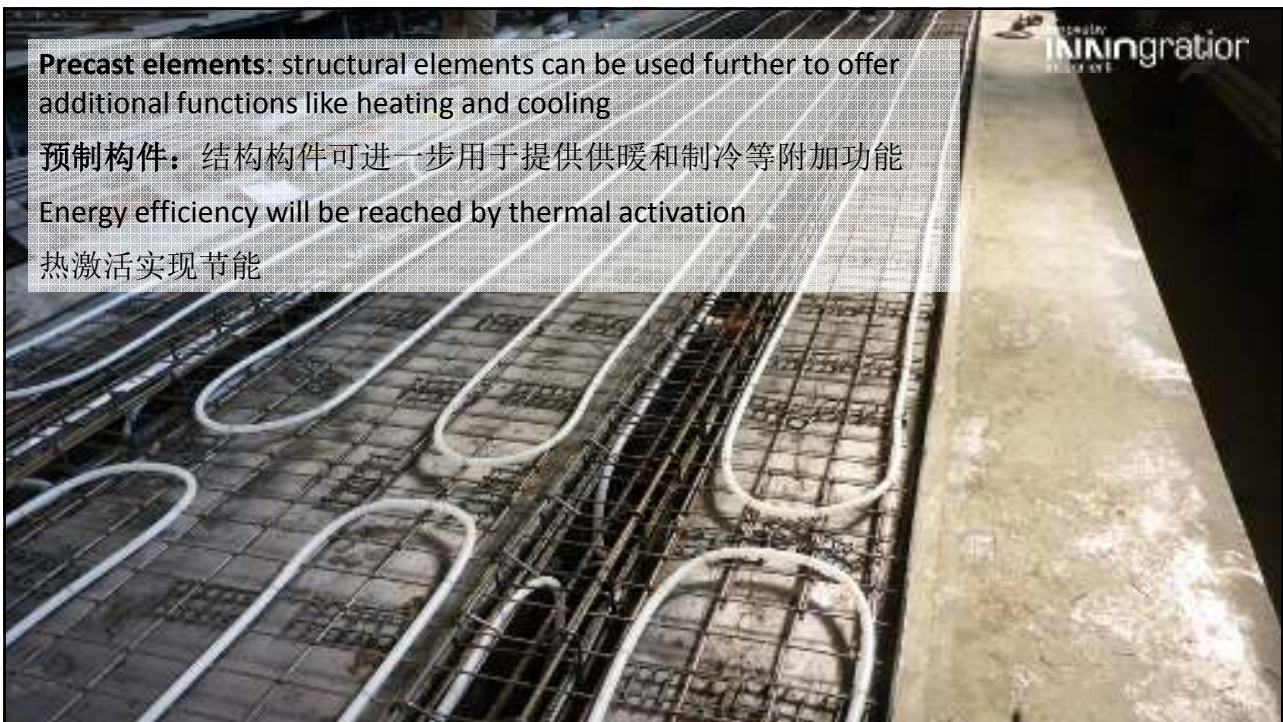
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INNOgrator
INNOVATION

The diagrams illustrate a structural element (a rectangular frame) with four different functional integrations:

- structural element** (结构构件): A simple rectangular frame.
- heating/cooling** (供暖/制冷): The frame with a red grid pattern on top.
- Ventilation** (通风设备): The frame with yellow and blue slats on top.
- acoustic absorber** (吸音装置): The frame with a yellow grid pattern on top.

Precast elements: optimum in light weight and just used for large spans BRUNNEN
预制构件：重量轻，仅适用于大跨度结构 **INNOgrator**
INNOVATION

A photograph showing a large, flat, precast concrete slab being lifted by a crane. The slab is suspended by several cables. In the background, there is a building under construction with a white facade and a blue sky. The foreground shows a construction site with yellow and grey scaffolding.

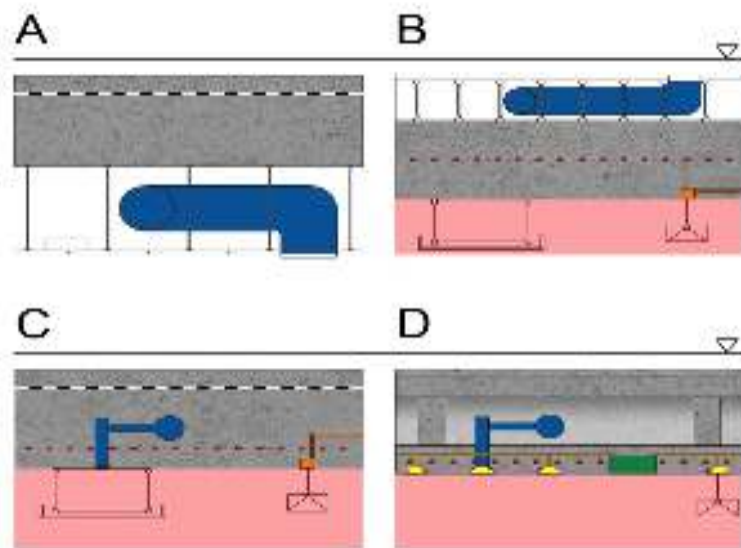


Where to install the elements for building service

when thermal activation is used within the cross-section?

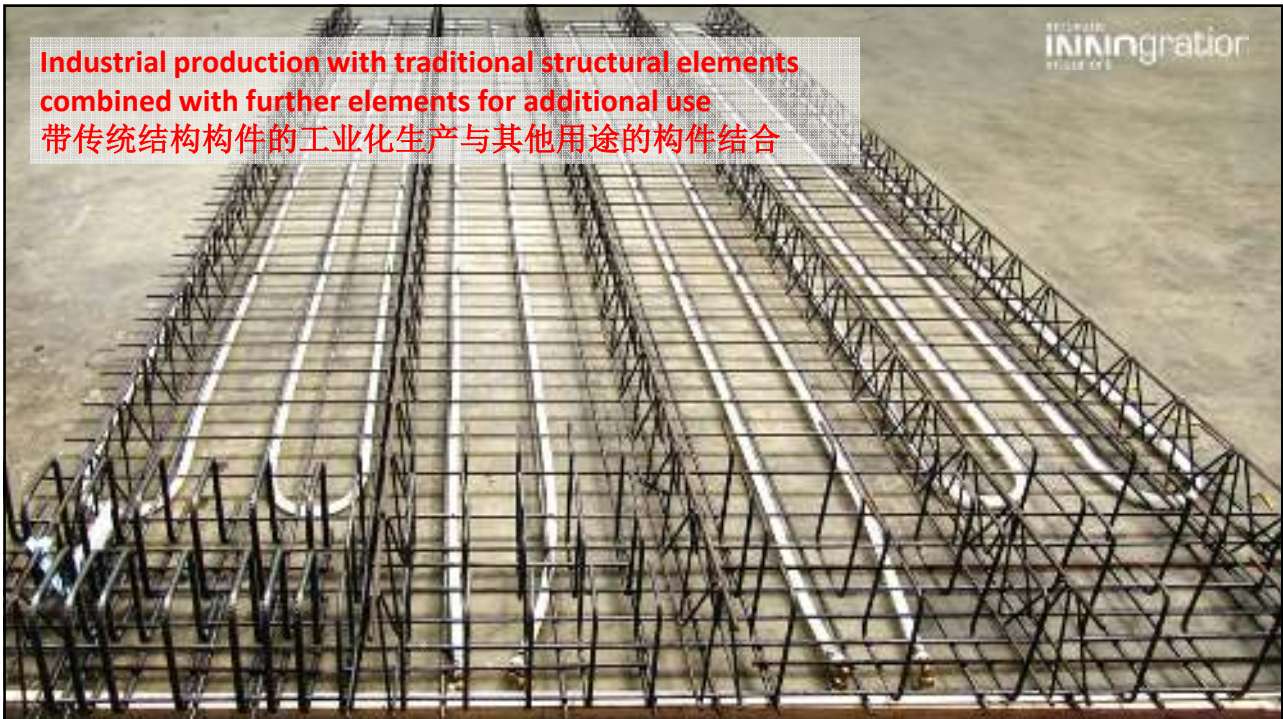
当在截面内使用热激活时
在哪里安装构建服务的构件?

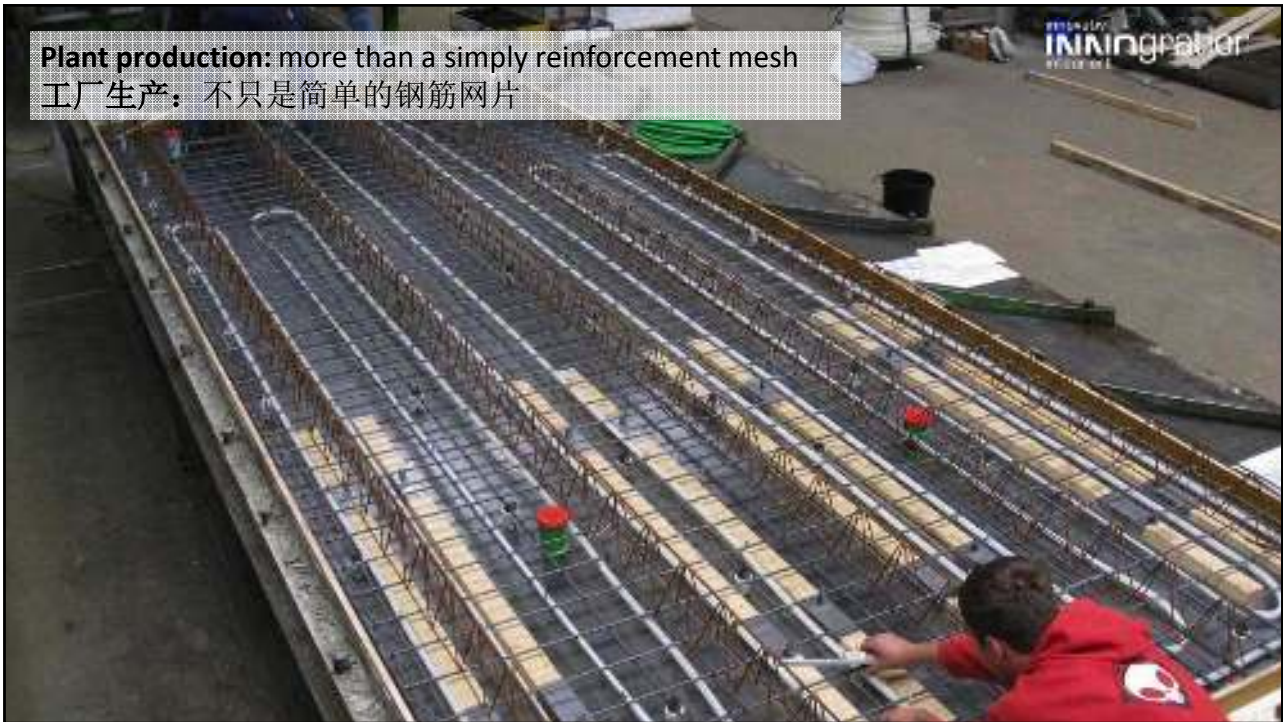
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Industrial production with traditional structural elements
combined with further elements for additional use
带传统结构构件的工业化生产与其他用途的构件结合

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Plant production: more than a simply reinforcement mesh
工厂生产：不只是简单的钢筋网片

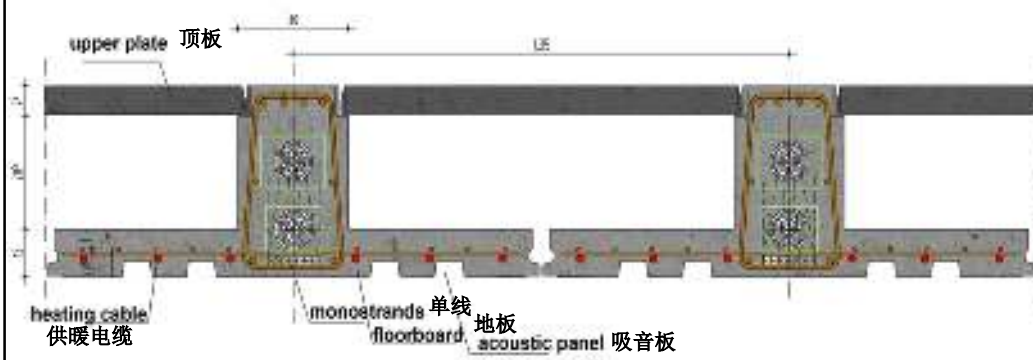


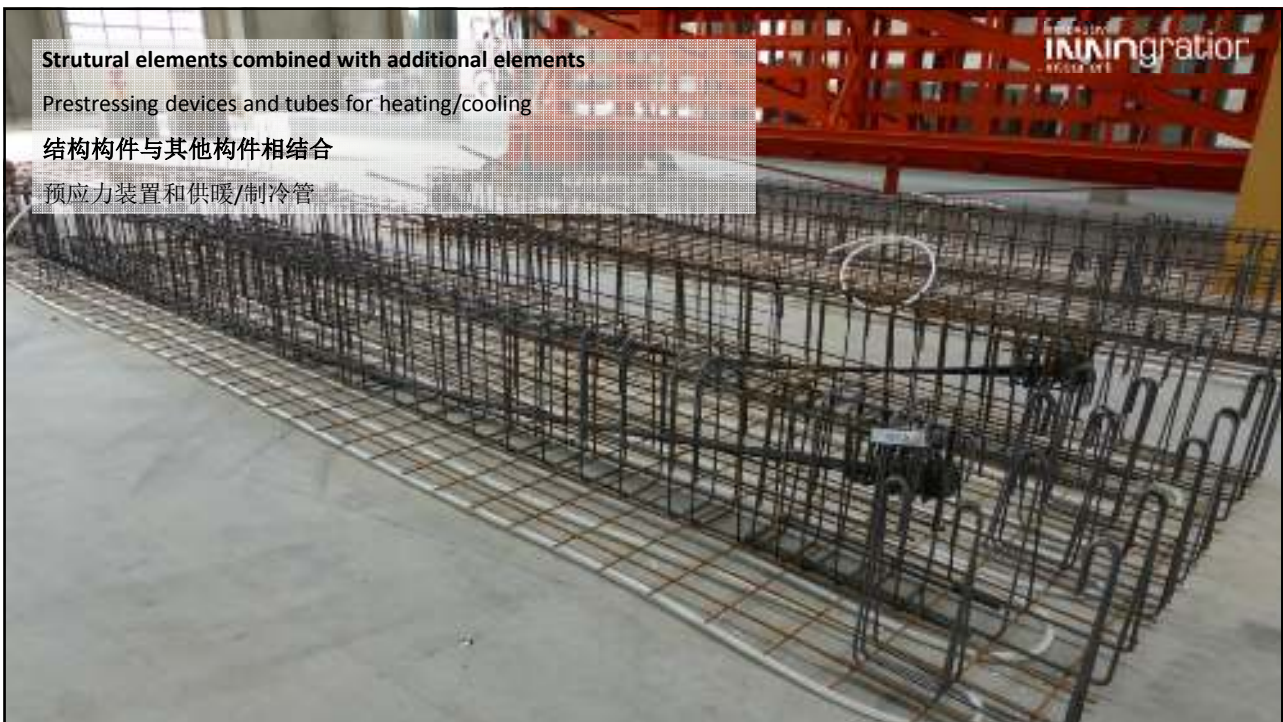
New development due to energy saving reasons:

节能带来新发展:

- sandwich construction = less material / save resources 夹层结构=减少材料/节省资源
- new possibilities (integration of technical building equipment and construction) 新的可能 (技术建筑设备和结构的一体化)
- thermoactive material performance: heating and cooling 热活性材料性能: 供暖和制冷

Cross-section 截面

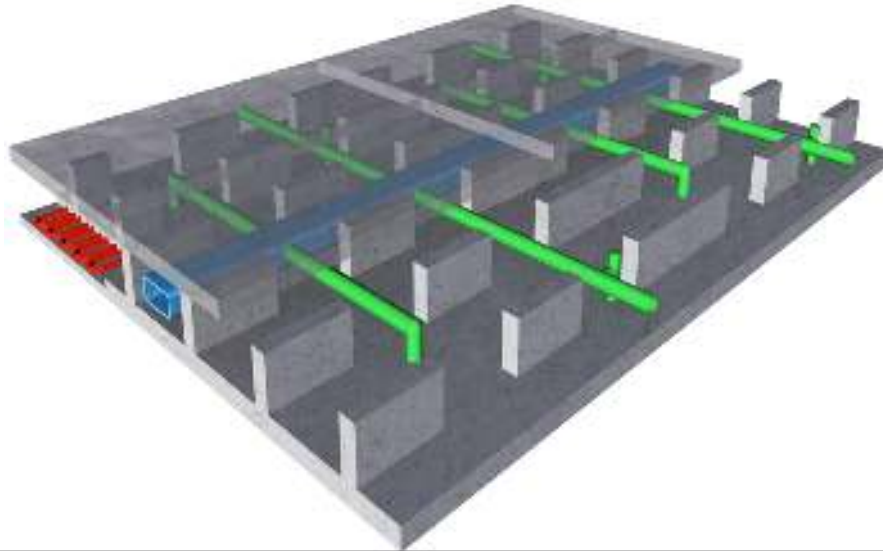




Shallow cavity and large opening in the load bearing ribs allows tubes and pipes to be placed in each direction

承重墙中的浅槽和大开孔允许往各方向放置管道和管线

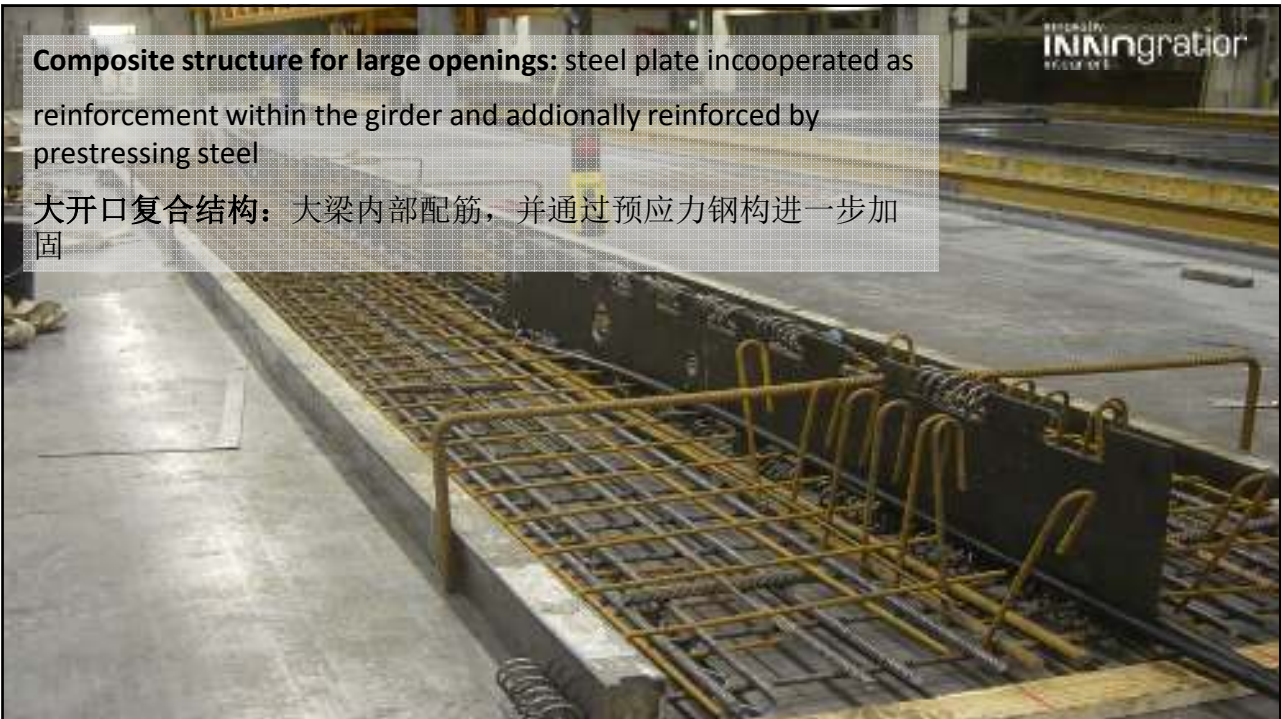
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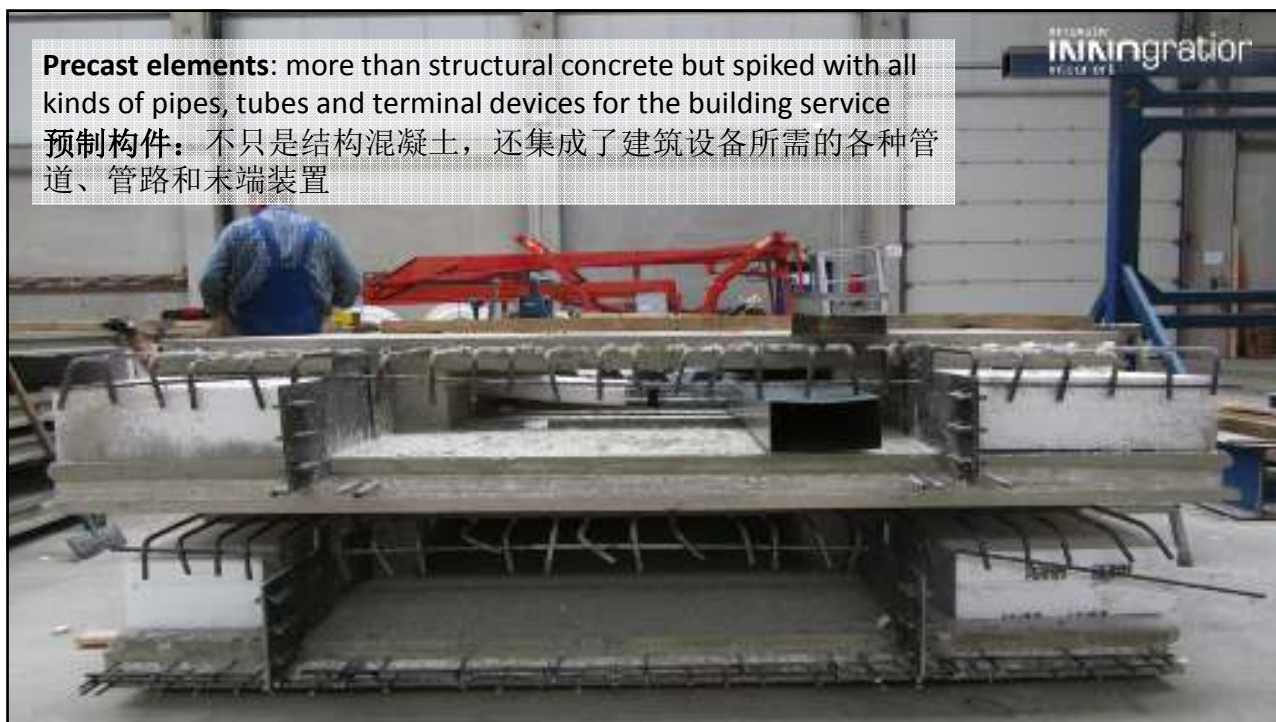


Composite structure for large openings: steel plate incorporated as reinforcement within the girder and additionally reinforced by prestressing steel

大开口复合结构：大梁内部配筋，并通过预应力钢构进一步加固

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BUILDING









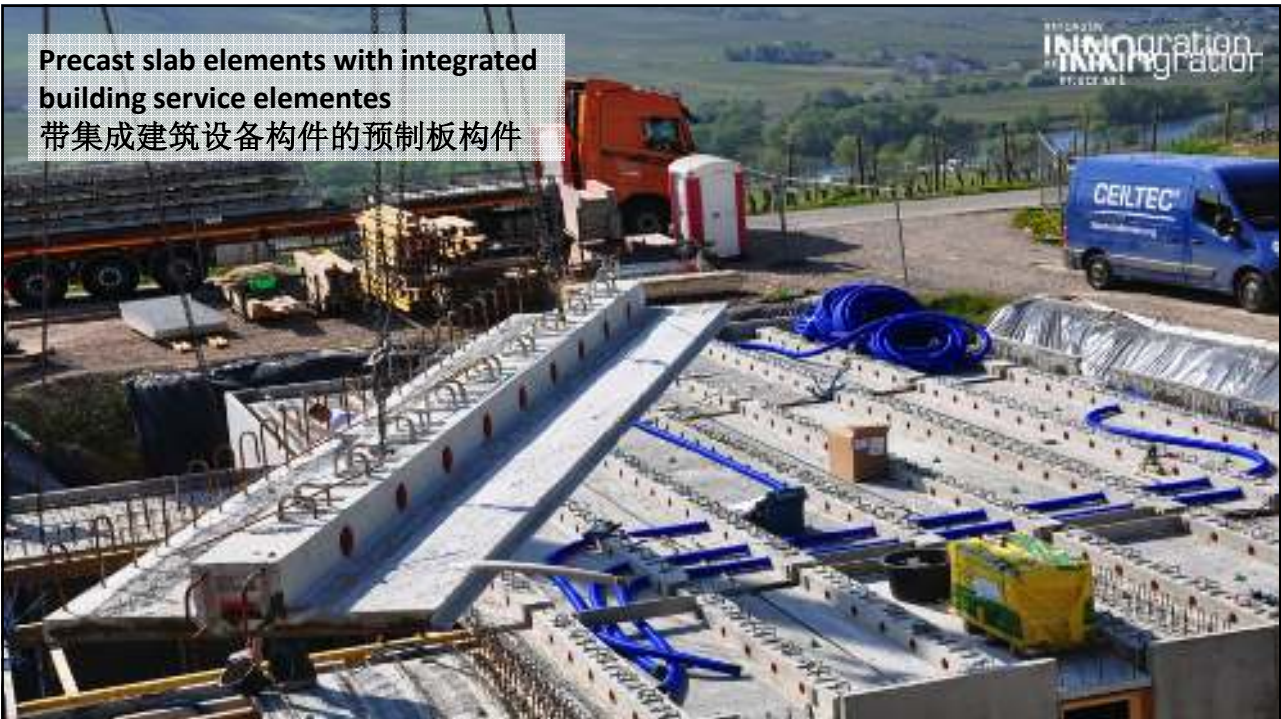




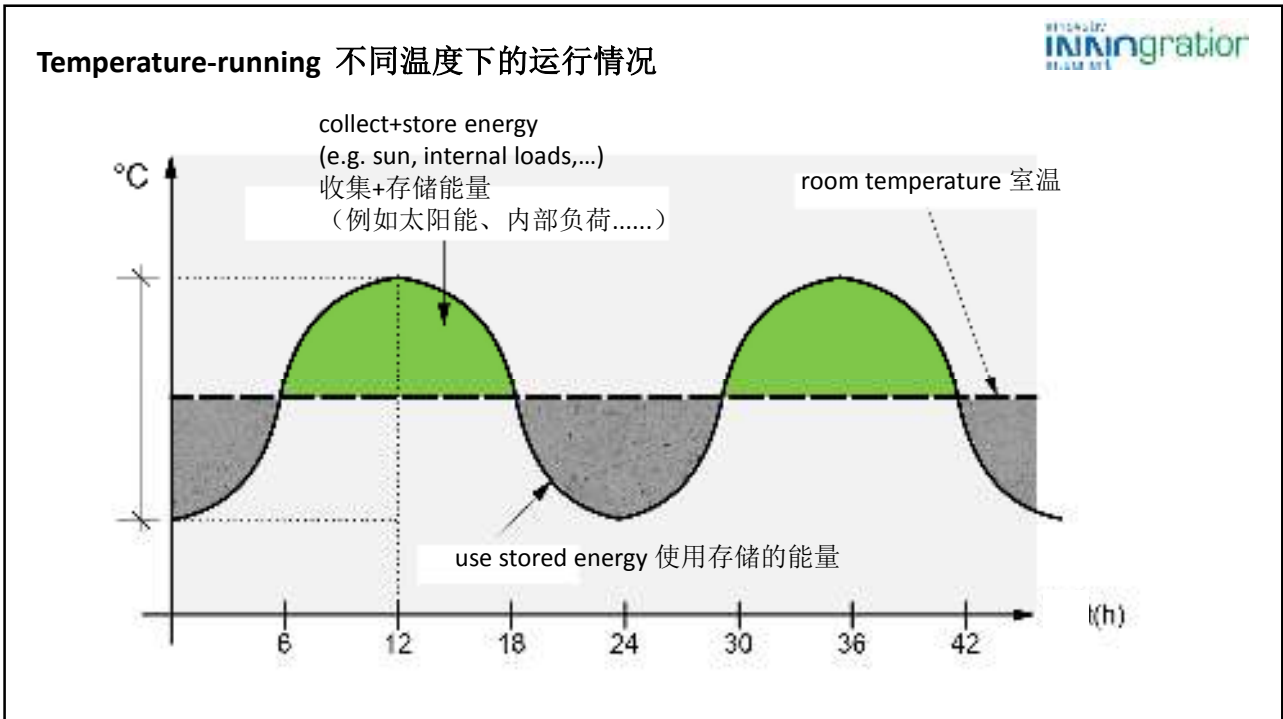
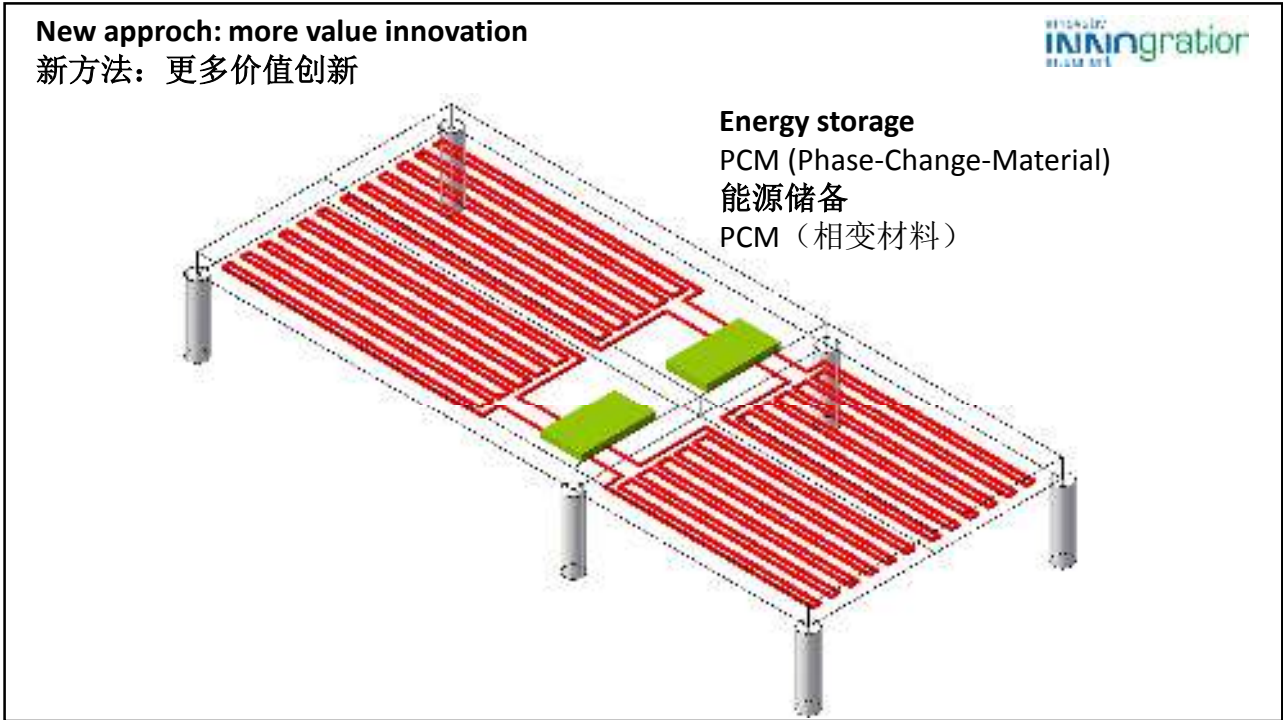
Precast slab element with different installation devices for multifunctional use
带不同安装装置的预制板构件实现多功能用途



Precast slab elements with integrated building service elements
带集成建筑设备构件的预制板构件



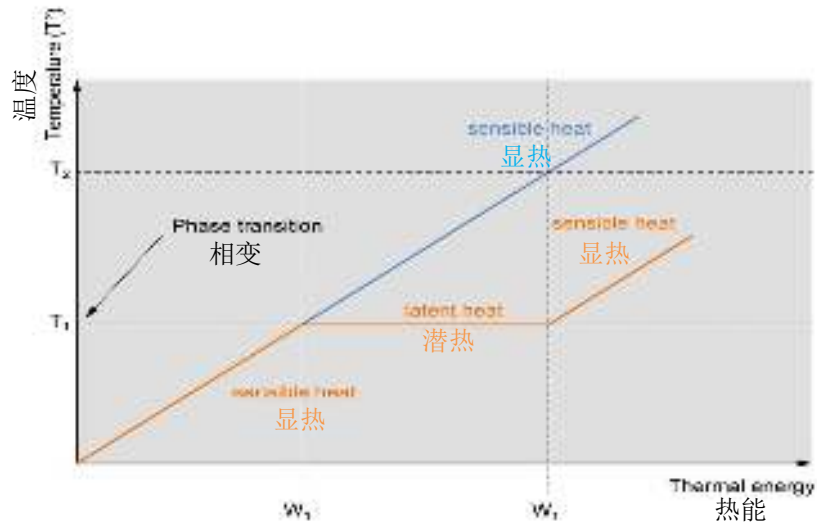




Saving thermal energy with latent heat in boxes, which are installed within the cavity of the slab with sandwich cross-section

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BUILDING SOLUTIONS

利用安装在夹层截面板槽内箱体中的潜在热量来节省热能



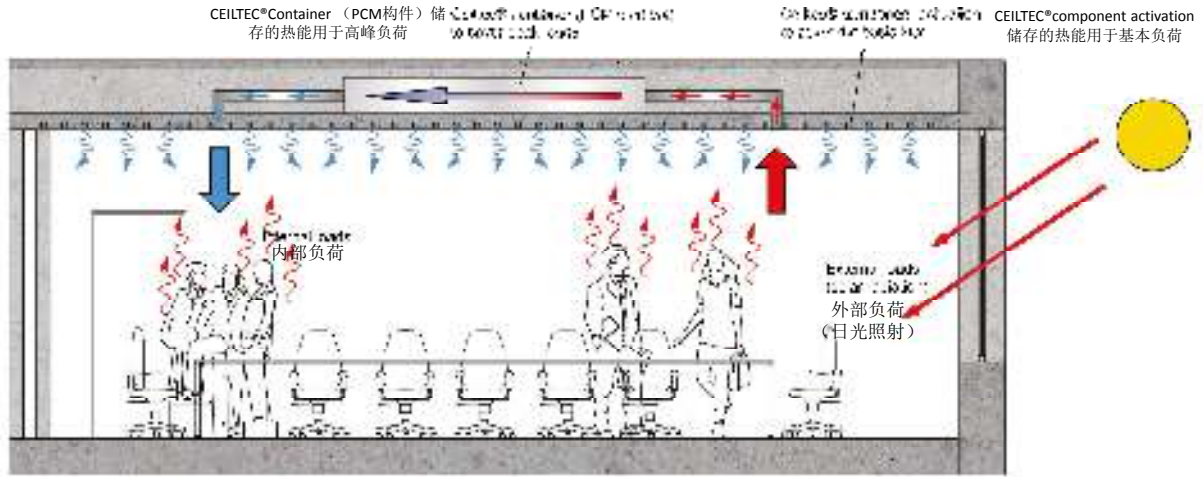
Separate thermal storage device, to cover for cooling performance, heating performance Flexible input wheather by air or by water conducted pipes (CEILTEC® PCM-Container)

独立的蓄热装置，根据气候状况灵活将空气或水导入管道 (CEILTEC® PCM-Container) 进行供暖或制冷



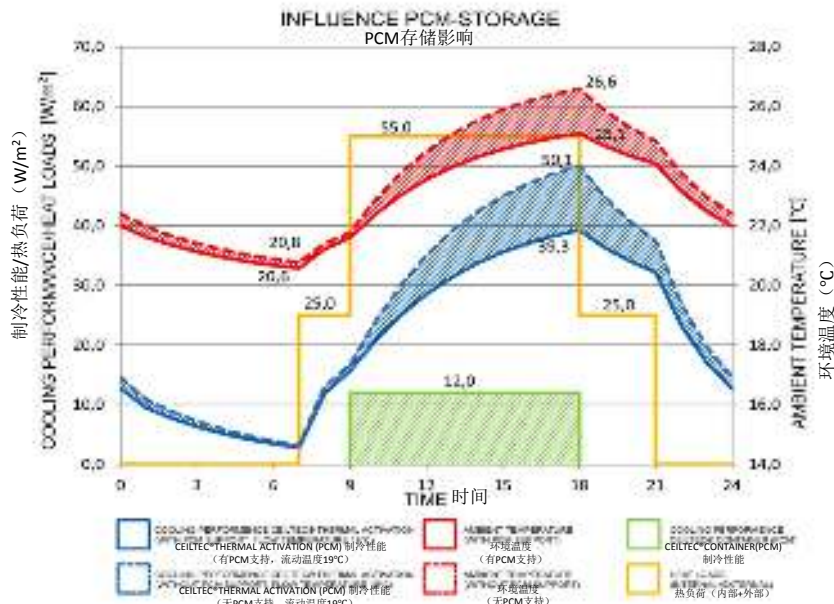
Stored thermal energy will be used during peak load time

存储的热能将在高峰负荷时段使用



Advantages with additional thermal storage elements

附加蓄热构件的优势





Projects
项目

German Sustainable Building Council
德国可持续建筑委员会



innovativ
iningrator
integriert

Member of:
成员:



Mitglied der
DGNB
Deutsche Gesellschaft für Nachhaltiges Bauen
German Sustainable Building Council





Kreativpark, Karlsruhe



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45

Hauptverwaltung Paulaner, München



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46

