

Integrated Design



The Design Challenge of Integrated Design

Cost effective green buildings are optimized by addressing entire building systems, their relationship to one another and what must be done to balance the impact of each system against established environmental goals, human health goals, and project life cycle cost goals.

Cost effective green buildings require that design **teams** are optimized by including the entire building team in the design process, optimizing their relationship to one another and collaborating on what must be done to balance the needs of each team member against all project goals.

This is the purpose of the integrated design process.

TRADITIONAL DESIGN PROCESS

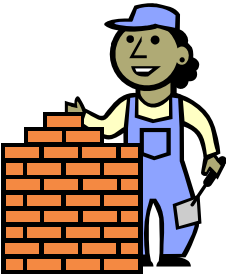
A typical process involves a linear progression from the architect down to the engineers and finally the contractors. A strict hierarchy of communication is enforced by the project manager.



www.aangepastbouwen.nl



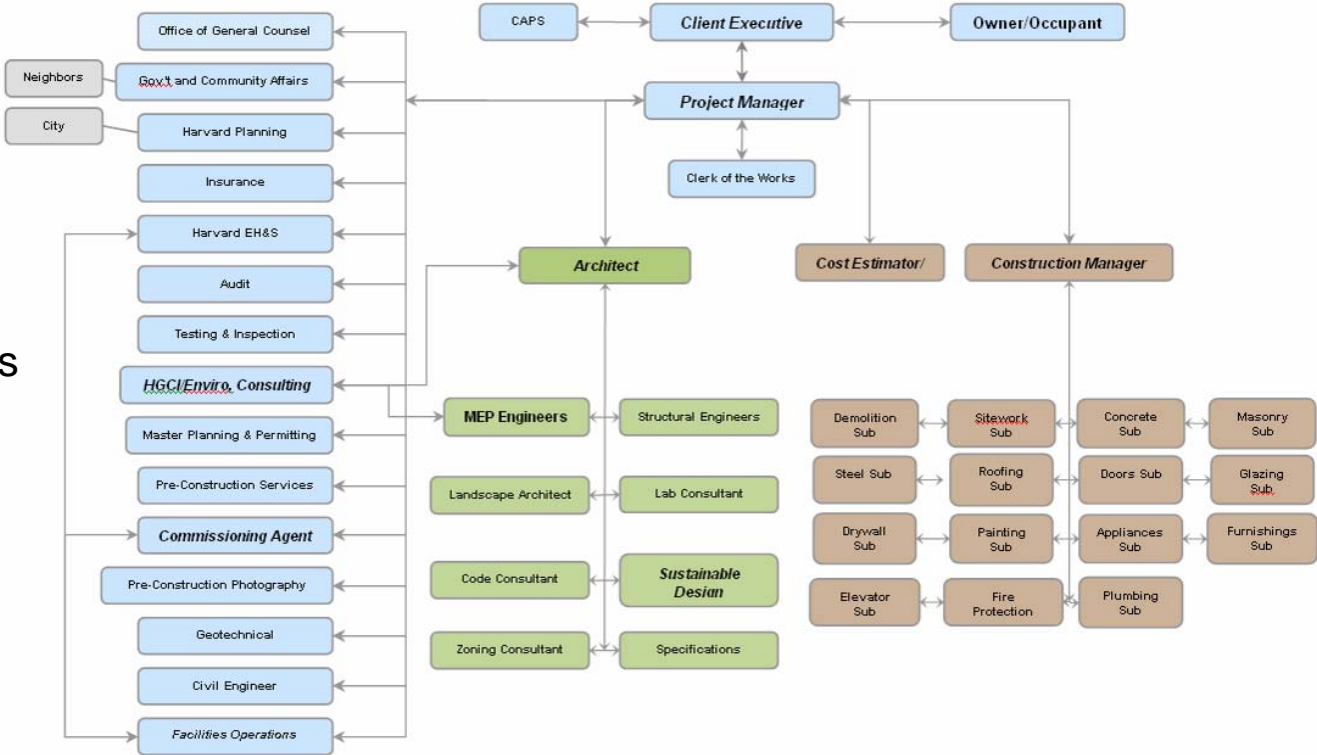
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Architects

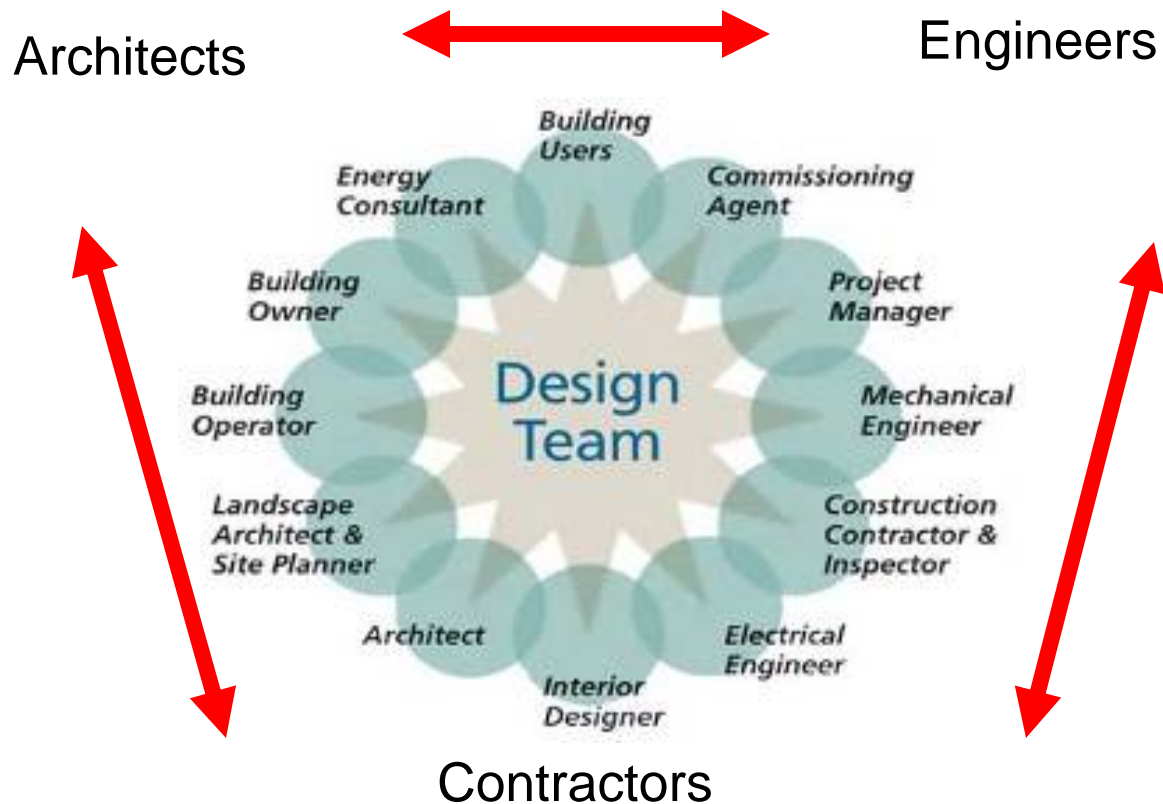
Engineers

Contractors



Integrated Design

An Integrated Design Process is not as linear as a traditional process. It is a more iterative process that provides additional flexibility and dynamism in the engagement of all team members so that there is scope for ongoing learning and the capacity to address emergent features and strategies. The project team is still required to adhere to clear communication protocols to minimize conflict and confusion, however there are more deliberate opportunities for cross communication between team members. The design charrette is a key forum for integrated design.



The Most Important Factor for Successful Integrated Design is Inclusiveness and Collaboration

Conventional Design Process

Involves team members only when essential



Less time, energy, and collaboration exhibited in early stages



More decisions made by fewer people



Linear process



Systems often considered in isolation



Limited to constrained optimization



Diminished opportunity for synergies



Emphasis on up-front costs



Typically finished when construction is complete



Integrated Design Process

Inclusive from the outset

Front-loaded — time and energy invested early

Decisions influenced by broad team

Iterative process

Whole-systems thinking

Allows for full optimization

Seeks synergies

Life-cycle costing

Process continues through post-occupancy

The Integrated Design Process is as Much a Mindset as it is a Process

Mindset	Principle	Strategies
Inclusion & collaboration	⇒ Broad collaborative team	⇒ Careful team formation
Outcome oriented	⇒ Well-defined scope, vision, goals & objectives	⇒ Team building
Trust & transparency	⇒ Effective & open communication	⇒ Facilitation training for team Expert facilitation
Open-mindedness & creativity	⇒ Innovation and synthesis	⇒ Visioning charrettes (with comprehensive preparation) Brainstorming
Rigor & attention to detail	⇒ Systematic decision-making	⇒ Goals and targets matrix Decision-making tools
Continuous learning and improvement	⇒ Iterative process with feedback cycles	⇒ Post-occupancy evaluation Comprehensive commissioning

The Team Challenge of Integrated Design

An unbuilt building first lives in the minds of the building team. Each team member holds in their minds the capacity to contribute various aspects needed to build it.

What each team member is contracted to contribute can be viewed as either fully fixed or it can be viewed as including some additional potential for emergent capacity as a result of their interactions with other team members.

Integrated Design assumes that the team contains additional potential that is purely the result of the way in which the team members interact with each other and the unique possibilities that this can produce. Integrated design assumes that if facilitated effectively, the team can function to generate ideas and capacities that are greater than the initial sum of the team parts.

In integrated design, the art of facilitating team member minds to work together synergistically is the essential challenge. First comes the integration of minds then comes the integration of design.

The Personal Challenge of Integrated Design

Fostering the quality of team member interaction necessary for minds to effectively work together to produce something beyond the sum of their individual parts requires intentionality, trust and good will on the part of the team members.

At the personal level team members must be motivated to engage in a shared learning process and they must feel secure to interact in this way.

At key moments a team member must be able to lay down the burden of having to appear to know everything and be comfortable sharing the limits of their knowledge, inviting others on the team to meet them at this frontier and to share in the process of moving beyond it.

Most design professionals are used to having to appear to know everything and they feel very vulnerable to losing credibility and future work if they do not keep up this appearance. The reality is they do not know everything but they do know enough so that with the right spirit of collaboration the rest can be worked out in the team to the benefit of the end design.

At key moments design team members must be able to challenge one another, without it being viewed as a professional attack or an invasion of professional territory, but rather as a moment of exploration and learning that should be embraced to the benefit of all.

The Management Challenge of Integrated Design

The integrated design process requires skillful management. A number of integrated design process management recommendations include:

- ❖ Ask for it up front, include it in the RFPs, Owners Project Requirements etc
- ❖ Select design team members with experience in integrated design where possible.
- ❖ Include design team members at the right time, such as operational representatives, commissioning agent, sustainability consultant, cost estimator, controls engineer etc
- ❖ Engage the team in a process of internalizing all sustainability and project goals.
- ❖ Establish an early dynamic of trust and mutual understanding across the team as the foundation of effective collaboration.
- ❖ Undertake a **design charrette** with full team participation to develop strategies and allocate roles and responsibilities
- ❖ Carefully and consistently diagnose when to bring the team together, when to drive them to collaborate and when to implement linear task sequence management.
- ❖ Continuously ask why particular strategies are being recommended and what other options have been considered
- ❖ Implement modeling strategies & life cycle costing to evaluate impacts of design options
- ❖ Ensure the effective engagement of operations staff, the commissioning agent to ensure the design meets operational needs

The Principles and Benefits of The Integrated Design Process

Integrated Design Principles	Benefits of Successful Integrated Design Process	Net Benefits
Broad, collaborative team from outset	Early formation of a broad, interdisciplinary team ensures necessary expertise is present when opportunities for impact are greatest . Collaboration harnesses the team's best effort and collective wisdom	Realization of challenging goals and objectives
Well-defined scope, vision, goals and objectives	Investing time up front ensures common understanding and 'buy-in'.	Realization of high-performance (sustainable)
Effective and open communication	Transparency builds trust and increases team's sense of ownership . Respectful communication avoids disputes and harnesses a team's best effort and enthusiasm.	Buildings Realization of more optimally integrated solutions
Innovation and synthesis	Fostering open-mindedness and creativity leads to innovation and synthesis, which allow the team to achieve the complex requirements of a high performance building.	Maximized benefits and quality
Systematic decision making	A clearly defined and understood decision making process can lead to better choices . Tools like life-cycle costing can foster the type of holistic and long-term thinking necessary for sustainable design.	Minimized cost
Iterative process with feedback loops	Providing opportunities for feedback along the way allows lessons to be learned from start to finish	Good team relationships and likely partnerships for future projects

Source: 'Roadmap for the Integrated Design Process'. Prepared Busby Perkins+Will, Stantec Consulting