The work of designing and constructing a building relies on many processes, many which identify how information flows between many different disciplines. These processes are a rich source of available improvement that will significantly benefit any project.

How Rich is the Improvement Opportunity?

When people discuss waste in design and construction, most of the conversation focuses on the work performed by tradespeople in the field. We see excessive material movement, people waiting for equipment or materials, and rework because these forms of waste are visible. The waste embedded in many management processes is much less visible.

Yet it exists. In *Competing Against Time*, authors George Stalk, Jr., and Thomas M. Hout report that experience across many industries indicates less than five percent of total elapsed time spent providing a deliverable is spent adding value.[1] Even if this percentage is off by an order of magnitude for design and construction this indicates that there is a considerable amount of wasted time to

reclaimed. Stalk and Hout write that a significantly higher portion of this non-value-added time is in administrative and management processes compared to production processes.

This leads to the need to take process mapping of capital project management and administrative processes seriously. Here is a brief list of processes that are candidates for mapping, with some bullet points describing multiple processes.

- Owner / Builder / Design Firm contracts and change orders
- Product and equipment submittals
- Requests for Information
- Disruptive work approvals
- Weekly planning
- Constraint management
- Builder / Designer / Consultant / Trade Contractor / Subconsultant payments
- Phase planning
- Preliminary hazard analysis
- Safety inspections
- Material deliveries
- Quality assurance
- Owner Architect Contractor meetings

There are many more. Most projects can compile a list of several dozen processes. If we consider the many individual design, engineering, and construction installation activities the number of processes grows to into the hundreds.

With So Many Possible Processes to Map and Improve, Where Does a Team Start?

I recommend that a project team begin with the processes that involve several different organizations. Submittal reviews and addressing Requests for Information are two common processes that often involve a trade contractor, construction manager, architect, engineer, and sometimes owner. With so many different people involved, each with an array of different project experiences, misunderstandings and breakdowns that cause delays are frequent. The delays that most often put construction progress at risk are most likely in these multidisciplinary processes.

How to Start?

A process map is a flow chart, and the following guidelines will help.[2]

- Ideally each role in the process contributes to developing the map.
- Place a timeline across the top of the map, scaled to reflect the amount of time required to complete the process.
- Use rectangles to represent each task in the process for which a person is responsible. Scale the rectangle horizontally to represent how much time the task requires. Establish a way to document the inputs required and the individual steps required to complete the task.
- To visually indicate who is responsible for each task, either use

swim lanes to organize task responsibilities by person or role, or color code the rectangles to indicate responsibility for each.
- Connect the rectangles with arrows to show handoffs.
- Where necessary due to the complexity of a process, indicate where sub-processes are documented on another process map.

Without a shared, clear process map for collaborative project work teams risk getting lost and losing time.

Where to Continue?

While a process map helps to create a shared understanding of the process, its ongoing value is as a standard that can be improved. When you display the timescale for the process accurately you will see gaps in time when no work is being performed. This visual map provides a basis for a team to identify possible ways to shorten the time required for the process. Here are some tactics to keep in mind that will help.

- Apply small batch thinking to designing the flow of information
- Measure flow efficiency[3]
- Consider collaborative concurrent task performance

Why is Process Mapping Important?

The multitude of management and administrative processes on a design and construction project invites cognitive overload, which is a state of mental exhaustion.[4] This overload impacts the quality of decisionmaking and productivity while exposing the project to risks due to non-addressed issues. Process mapping, with a goal of reducing collaborative knowledge work in process while improving how quickly knowledge work is performed, mitigates the risk of cognitive overload. It also promotes a work environment in which people feel less rushed, and more confident in the execution of their work.

Just as importantly, this approach to process mapping for improvement establishes a mindset that time performance is important for providing value to clients and the people that use their buildings.

RisingTerrain LLC equips building project teams working in design and construction with leadership, planning, and execution skills demonstrated to reduce project durations and costs, improve productivity, and deliver projects meeting clearly understood client goals.

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[1] Stalk, Jr., George and Thomas M. Hout, *Competing Against Time: How Time-Based Competition is Reshaping Global Markets*. Free Press, 1990.

[2] Two software applications are helpful for process mapping. A common application is Visio, a Microsoft product. Another is See to Solve Flow (https://seetosolve.com/flow/), a cloud-based solution that embeds inputs, standard work within tasks, and outputs.

[3] Flow efficiency is a percentage calculated as the time work is performed within a process divided by the amount of time the entire process requires. Read *This Is Lean: Resolving the Efficiency Paradox*, by Niklas Modig and Pär Åhlström, Rheologica Publishing, 2012.

[4] The impact of increasing cognitive load on productivity is well understood. Writing in *Leading Product Development*, Steven Wheelwright and Kim Clark describe from a study of the work of design engineers how increased cognitive load, in the form of multitasking across many projects, reduced productivity by fifty percent. Multitasking across multiple open processes has a similar impact. Consider the weekly meeting time expended preparing, reviewing, and maintaining large logs of open items as another dynamic adding to team cognitive load.