Benefits and Method of Housing ALL Project Information in the Schedule

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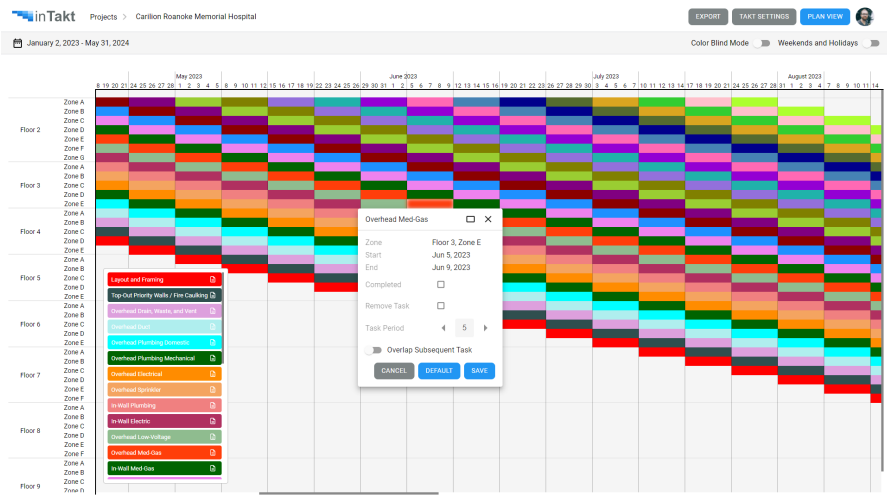
Background

Throughout my career, I have scheduled billions of dollars of work across the United States, for various contractors. Through over a decade of dedicated project controls experience, I have learned to understand and appreciate the wisdom of standard industry practices and theory. I have also witnessed tremendous challenges and shortcomings when applying these principles to reality. These workflows are often held together by imports, exports, work-arounds, and custom spreadsheets. I have tested many tools and systems aimed at bridging these gaps, but which increase complexity and workload. We need tools and methods that bring it all together in a less-disjointed fashion.

During my off hours, I love to create new tools for the industry, aimed at streamlining and simplifying the scheduling process. I spend many hours pondering our industry's challenges and brainstorm solutions to make project scheduling more manageable for all stakeholders. A few examples of my after-hour creations include:

TimeMachine - a physical controller designed to make 4D schedule navigation intuitive for average people. This plug-and-play device lets users control live Synchro 4D models in the same way that they control their televisions.

SlatPlanner - a hybrid physical/digital planning system that allows teams to collaboratively arrange tiles on a wall and use a phone to pull dates and changes back into the digital environment. Average users can arrange physical tasks on the wall, then scan the plan back to a digital environment.

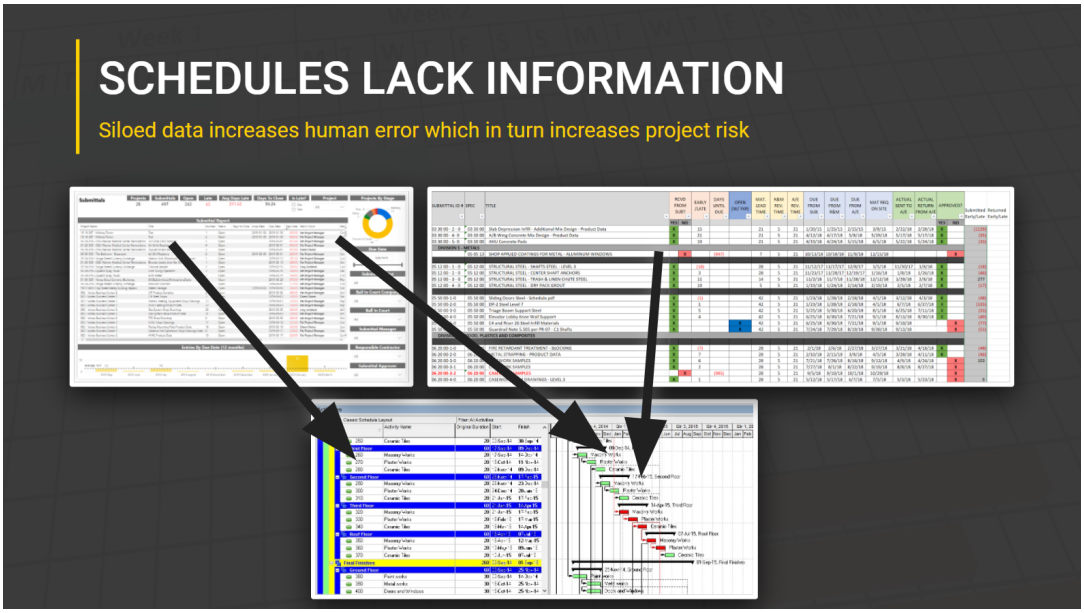


inTakt - a web-based tool designed to simplify the process of building and maintaining schedules for projects that utilize Takt planning; rather than employing clunky spreadsheets or work-arounds in other software. This tool walks average users through the process of developing and maintaining a takt plan.

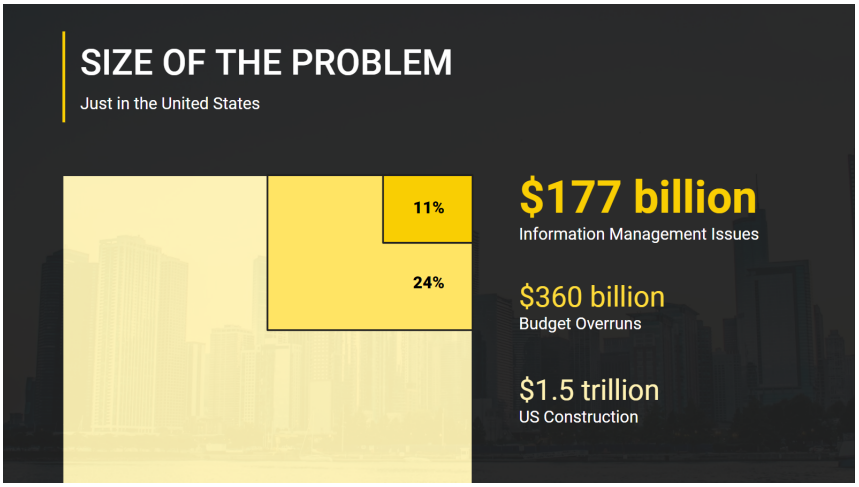
The Problem

My premise for improving project planning has focussed around making individual planning tools easier for average stakeholders to engage with. However, I have learned that the problem is more global. Below are a few issues that I see with our projects today:

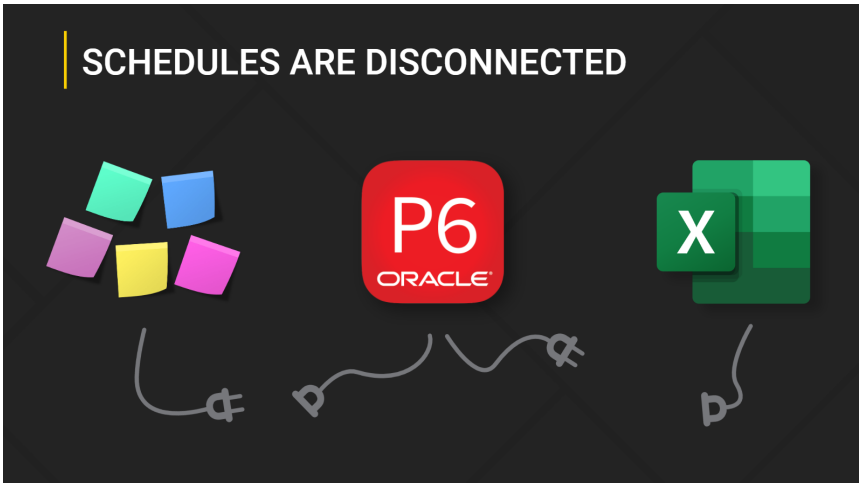
- **Information is scattered between siloed tools.** The problem is not with the individual tools themselves, but with the messy human interfaces required to manually maintain connections between them. Our project tool portfolios range from spreadsheets to scheduling tools and ERP systems, along with many other pieces of specialty software. Project information is stored in many separate silos and a combination of manual labor, memory, and instinct are often required to connect the dots. Our teams are required to learn and operate many cumbersome tools, with unique user interfaces and varying data structures.



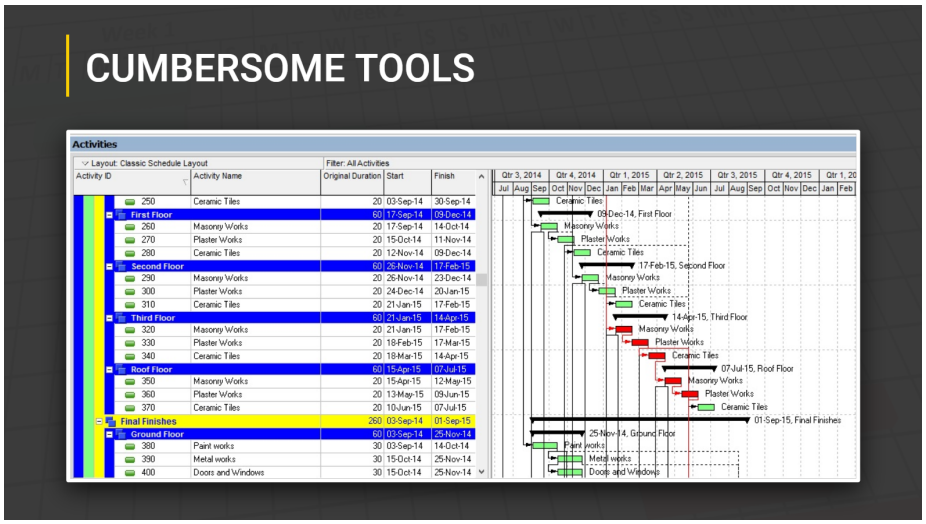
- **Missing information leads to reactive priorities and planning.** Siloed tools are maintained by siloed team members. This results in poor communication and a poor understanding of priorities. This lack of centralized, detailed coordination leaves users guessing and assuming what is important to the project, as all the pertinent information is not found together in one place. Even coordination tools and processes live in their own separate silo and are manually maintained. In just the United States of America, 177 billion dollars are lost each year (1), due to poor communication and mismanaged information. This valuable information slips through the cracks of our siloed tools and costs us billions of dollars of rework, among other problems.



- **Project schedules only contain a fraction of the plan.** Schedules contain very little information and can only logically solve for the variables which they contain. Schedules lack a great deal of important detailed information that affects them, such as submittal logs, RFI status, and many other fundamental details. It is no wonder that most projects are critically delayed. Even schedules themselves are siloed between pull plans, master schedules, and look-ahead plans. There is currently no simple way to see all of the information in one place and see how it all fits together.



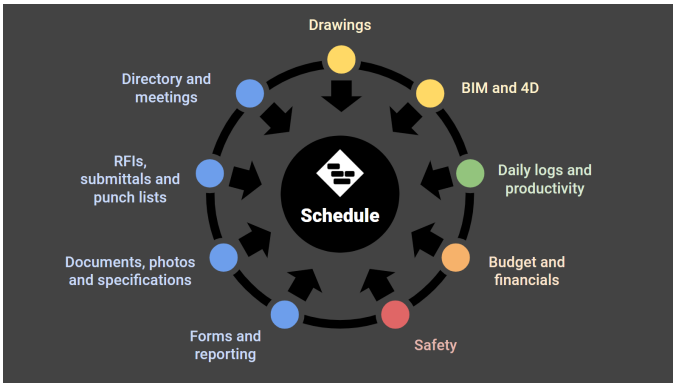
- **Scheduling tools, themselves, are clunky.** I used to regularly teach a week-long course on Primavera P6. This course was only suitable for those who were comfortable with technology. Even then, students walked away with only a basic understanding of how to operate the software and how to apply basic scheduling principles. Unfortunately, it takes specialized and experienced scheduling experts to run the software, while those who should be deep into the schedule sit on the sidelines.



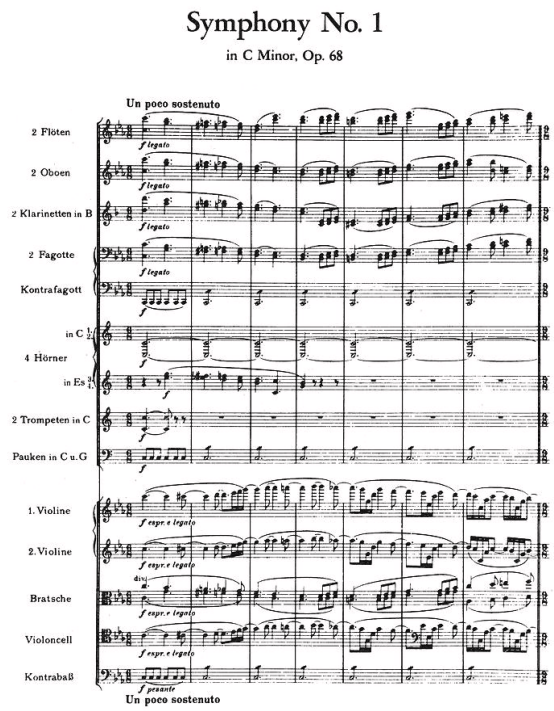
Proposed Solution

In order to bring order to chaos and solve for the above-mentioned problems our industry faces, we need to consolidate our data and present it in a way that is intuitive and not overwhelming. Below is the proposed solution:

- **Bring all project information into the schedule.** The common currency for any project is time. For everything that must be accomplished on a project, there is a who, what, where, and when. The project schedule already acts as a unified platform to answer these questions on the surface. However, it currently does not have the detail to fully answer these questions without supplementary data from other sources. Rather than relying on other tools to fill in the missing details, why not simply integrate the missing details into the plan? A project simply comes down to choreographed actions that must be taken in a certain sequence. Every piece of project data/information belongs to an action that must be taken in the schedule. With enough information, the schedule can be a single, unified platform that provides the detailed instructions and information for building the entire project.



- **Keep everything and everyone within the same logic network.** Every person on a project contributes to its forward progress. If we put all project information and tasks into one single project plan, everyone will clearly understand how their part fits into the greater whole. A field engineer might not realize how important a submittal package today is to the critical path in six months, until it is all laid out together as one, all-encompassing plan. Designers and owners can see the importance of changes and decisions and project managers can see what they need to work on today to keep everyone in the field moving forward.
- Planning and executing a project can be compared to composing and performing an orchestral score. Sheet music is essentially a detailed schedule of events. Each musician must clearly understand the sequence and timing of their part in order to keep the music flowing perfectly. Think of the percussionist preparing to clash a cymbal. What if this percussionist had to reference multiple separate documents to know the pitch, volume, and timing? It makes obvious sense that all of the necessary information for execution resides together in one place. How could the musical director ensure that all parts come together perfectly as a whole without the entire symphony score together in front of them, rather than scattered information stored in multiple places with varying methods of nomenclature? The same principle applies to construction. We can bring order to the chaos and streamline the flow of all project information through a single schedule.



SOLUTION

Streamline all project information through a single, schedule-centric platform.

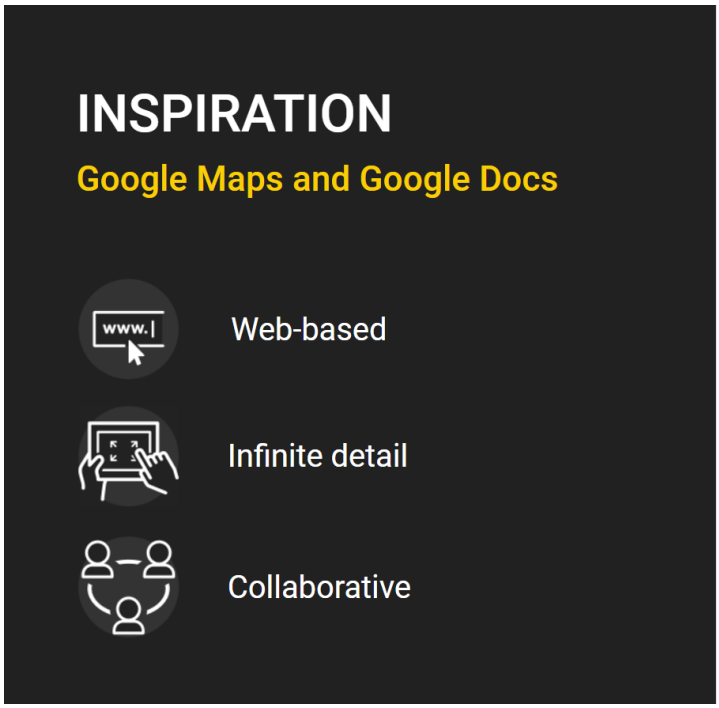
- The list of tasks in front of any one person can be daunting and overwhelming, until it is all laid out in a manageable sequence that can be seen on an all-encompassing project

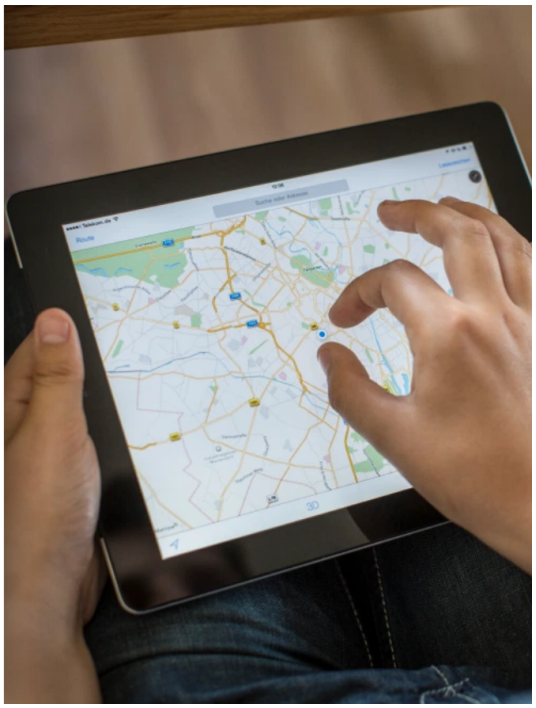
timeline, much like a musical score. When a project manager, or a musical conductor, can see all of the tasks and resources laid out along a single timeline, it becomes manageable. Musicians or field users can find exactly the information they need, right when they need it, as all pertinent information to their work can be found right within the single sheet/task that they are working on. Tasks in the schedule can contain all information necessary to carry them out, including submittals, procurement status, RFI information, photos, drawings and markups, among other things, right there within the schedule activity.

Vehicle for Implementation

This may seem like an impossible vision to achieve. Conventional scheduling tools cannot handle this much information without becoming extremely cumbersome to navigate and maintain. Current scheduling tools cannot even handle this much data without simply failing to load. Are any tools even capable of such a feat? One web-based tool comes to mind: Google Maps, which effortlessly displays over 21 million gigabytes of data (2), through the web, using just two fingers or a mouse to navigate on any device.

Infinite Zoom enables infinite detail. With Google Maps, billions of users can sift through limitless data, covering the entire earth. Average users can intuitively drill down and find what they need, including detailed imagery, navigation, store hours, photos, restaurant reviews, traffic data, and much more. No training or instructions are needed, just an internet connection.



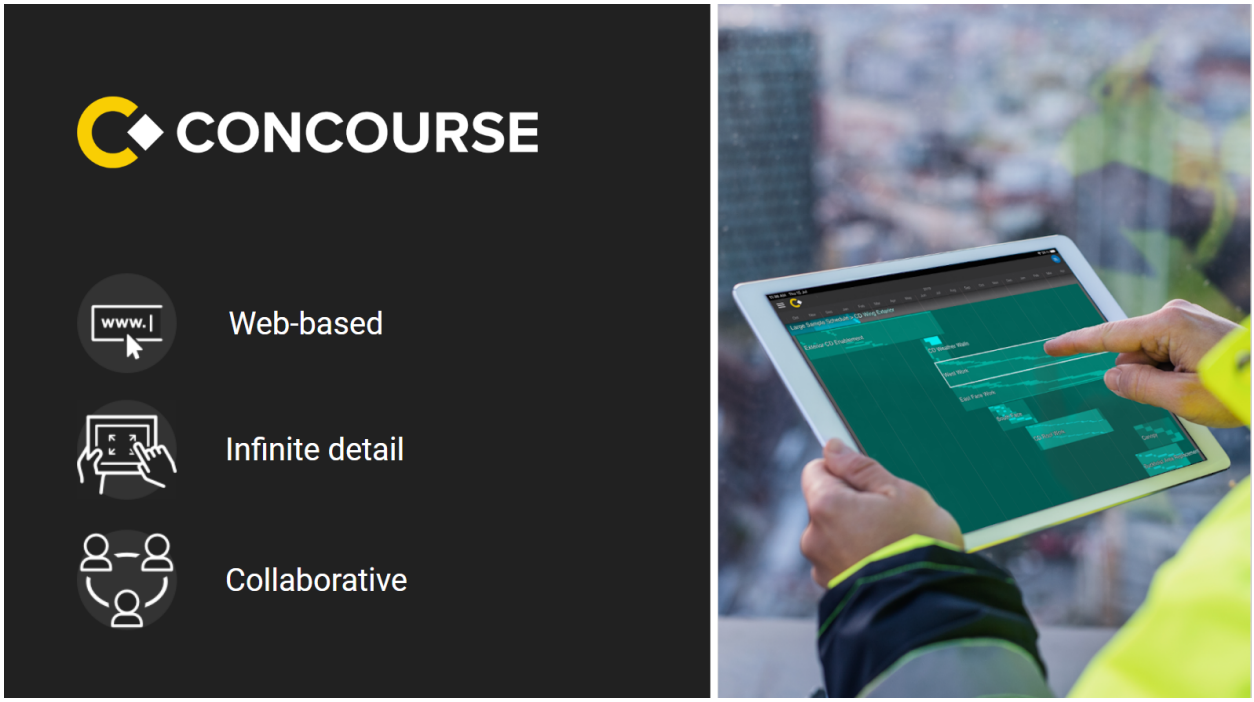


This proposed tool, named Concourse, aims to do the same thing for all construction project information, through the common interface of the project schedule. For projects, everything can be placed along a timeline; including field and office operations, among all stakeholders, completing all tasks associated with a project. The overall project plan should be the focal point of all; giving everyone the common goal of keeping the music playing in perfect harmony, without disruption. Infinite zoom makes this all possible, without getting too cluttered or difficult to use. This platform allows limitless project information to be stored in one place without navigation or performance issues. No training or instructions are needed to navigate it.

With just two fingers or a mouse, users can access unlimited project information from the web, just as they do with Google Maps. They can access this single source of information from any web-connected device, including computers, phones, and tablets. To ensure a truly collaborative experience, we have also included live visual awareness of other users operating in the system. As with Google Docs, users can see who else is looking at or working on the same things they are, with markups and changes shown in real time. It is not just a platform for information, but also for live collaboration and communication.

By keeping the schedule as the main focus, all supporting information can be tied into the activities that they affect. Submittals, RFI's, specifications, and procurement status all fall within the shared project timeline, rather than in separate logs. Even production tracking, daily logs, and look-ahead plans live directly within the activities of the schedule. Owners can see how their decisions and approvals affect the timeline. Designers and builders can easily understand and communicate priorities. This revolutionary platform provides clarity for everyone involved. Project managers can clearly see which RFI's, Submittals, etc. are most critical to work on today, for the greater good of the project.

Placing all of this information on a single timeline breaks down large, daunting piles of work and clearly prioritizes it, down to the daily level of what needs to be worked on next. Field workers can easily pull up their scheduled tasks and instantly see all relevant information and instructions right there within the task. They can add their own detailed look-ahead tasks, photos, and daily logs right within their scheduled activities, for everyone to easily find. Everyone on the project is playing from the same, single, infinite-zoom orchestral score.



- Concourse (www.concourse.tools)

The Future and Beyond

Removing manual interfaces between siloed tools can lead to much greater efficiencies and opportunities, while decreasing errors and re-work. Though, far greater future opportunities await. Having all variables together in one database opens the doors to powerful machine learning. With schedules containing the entirety of project data, a tremendous amount of deep learning can take place. This leads to the possibility of construction schedules becoming as intelligent, intuitive, and accurate as Google Navigation and beyond.

The final interface for construction information is that of the tools used to physically build the project. Currently, these tools are mostly manually operated by human hands. However, in the inevitable future, these tools will likely be replaced by automated equipment; robots disguised as specialized construction hardware. In preparation for this future, we will need our schedules to be detailed enough to provide instructions to these machines.

Like a musical score, to keep them performing in harmony with each other and to know exactly what, where and when to build.

For manufacturing robotics, a design model is inserted into a slicer software, which breaks down the model into a highly-detailed, yet simple, string of instructions for carving, shaping, or printing the final product. When multiple machines are involved, these processes need to be coordinated through a single plan, to ensure perfect coordination and timing. With all project information integrated into an all-encompassing schedule, both humans and machines can receive clear instructions through a single channel.

Conclusion

Directly integrating all project data into the project schedule eliminates a great deal of waste, frustration, and confusion. Separate tools, with siloed information, require the tremendous burden of manual integration and greatly increase human error. A single tool that contains all project information can eliminate unnecessary manual interfaces and deliver a streamlined flow of information that eliminates waste and inefficiencies.

Current scheduling tools do not have the structure or capacity to handle this volume or variety of information, nor can they present it in a usable interface. However, a purpose-built solution that harnesses the design principles and architecture of Google Maps, can effortlessly handle this kind of data and much, much more, all with a simple and highly-intuitive interface.

The future of construction is exciting. However, we have much to do to prepare for it. The next logical step along our evolution is to consolidate all project information into a single framework. Much like a large symphony is orchestrated through a single score, construction projects can be driven by an all-encompassing set of instructions, delivered through a universal project schedule.

Sources:

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