How Process Automation Took Kanban in Construction to Higher Levels

CASE STUDY | Lean/Agile Project Delivery

BUSINESSMAP
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BMWC CONSTRUCTORS™
INDUSTRIAL-STRENGTH CONSTRUCTION

Industry

Construction

Location

Western Region

Specializing in

Pipe fabrication and installation

Key Results

- ◆ Optimized efficiency
- ◆ Better flow tracking
- ◆ Real-Time collaboration
- ◆ Knowledge sharing
- ◆ Managing work fluently

How a Global Project Delivery Firm Increased Its Operational Transparency?

"The software has created a new environment centered around communication and transparency in a visually appealing way that we haven't seen before."

- Ben Jackman
Fabrication Shop Coordinator

Introduction

We were excited to see how improving communication, visualization and automation influenced efficiency and allowed this big construction company to optimize its process and achieve more without making huge frustrating changes. See how Businessmap helped BMWC minimize their wasteful activities and bring Kanban in construction! We talk to Ben Jackman, Fabrication Shop Coordinator, who kindly welcomed us to their boards and gathered his colleagues' points of view, which allowed us to present the big picture. In the following pages we will explore Kanban in construction and provide practical insights.

Who is BMWC Constructors?

BMWC Constructors is an American construction company, that tackles the world's toughest, most daunting industrial construction challenges. Mostly performing pipe fabrication and installation, the industries they serve include Aerospace, Biotechnology, Pharmaceutical, Power Generation, Semiconductor, Oil and Gas Distribution, Refining, and Chemical companies. Their Western Region operation is the first to implement the software.

BMWC has been in business for more than six decades. They believe that a company's success is based on its people — and its leadership. Leadership understands the importance of being hands-on with their clients. In fact, most of their project managers are also owners of the company. BMWC is a Lean/ Process driven organization and this system enhances the Pull/ Planning and Planned Percent Complete (with barrier identification) that they strive to follow.

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Challenges and Company Goals

BMWC knows that sustainable business means an excellent relationship with the customers, while continuously improving their performance. However, there was something constantly getting in the way and slowing them down. They were suffering from ineffective communication and lacked a visual/virtual solution.

They had so many different people involved in a typical scope of work that they were having trouble communicating issues between the teams. If they were missing a part of an assembly, a phone call or email would be placed to purchasing. But with no centralized purchasing, that person would change for each job site or project. This created a constant challenge of making sure that needs or problems "blocking" production were actually communicated to the right person and solved in a timely manner.

Before implementing the Businessmap platform, communication between the Fabrication Shop and multiple job sites was accomplished via email and phone calls. Historical tracking of work was done using Excel. There was little transparency and a lot of "He said, she said" which created confusion and difficulties at every stage of the shop drawing, piping fabrication, pipe installation, and quality control processes. Each individual job site was also somewhat disconnected from what the others were doing.

"Our main goal in adopting the software was to create transparency and increase visual communication throughout our region."

Software Criteria Fulfilled

- ✔ Clear Visualization
- ✔ Powerful Flow Analytics
- ✔ User-friendly interface
- ✔ Flexible workflows; ability to have various swimlane structures within the same board
- ✔ Highly customizable card and board views
- ✔ Process automation through business rules
- ✔ Provides actual project status on all levels

Since they had the opportunity to fully experience what the platform is capable of doing, the ability to meet efficiency goals has improved.

"Now that we know its full capabilities, we want to do several things including using the analytics data to address bottlenecks, benchmark our capacity and use historical data to help increase or decrease it as necessary and use the Monte Carlo simulations to forecast and estimate more accurately."

Their goals started simply, and as they have learned more about the capabilities of the tool, they have many ideas on how to use workflow tracking and the data it produces to take them to the next level. Let's see how it started, and how they use the software.

"The software displays the pertinent information and allows us to visually see the workflow from start to finish."
– Zac (Shop Foreman)

Salvation from Excel

They were introduced to the tool by a design partner on one of their larger projects. The design partner and BMWC were collaboratively designing and routing piping, in an accelerated time frame, for a project with many finite scopes of work that could not support waiting for the traditional handoffs. After seeing the value that the system brought to the design phase of the project, the BMWC Project Manager began to implement the platform as a way of tracking the remaining work flowing through the construction phases of the project. After that trial proved that it added value, they went "more upstream" and included the estimating process, BIM/CADD, fabrication, installation, and turnover (quality control). As they became more familiar with the program, their team started to explore how they could better utilize the tool, specifically for the fabrication shop, which serves multiple internal and external customers. They saw amazing success with the implementation of the software, and they already started using it throughout multiple departments to assist in managing their workflow.

Nine months after implementation, they have five departments using digital Kanban boards. The entire Western Region is using their board tied to the fabrication shop to track pipe fabrication from receipt of "issued for fabrication" spool drawings through delivery to field. They also have a team using the platform to monitor proposal tracking and estimating for each scope of work and a separate board to track construction, testing, and commissioning in the field.

Finally, their BIM/CAD Virtual Design Team uses the Businessmap software to facilitate their production of Isometric Drawings, to use in conjunction with fabrication. Moreover, they now use the tool to archive and log all completed isometric drawings. This was previously tracked in an Excel spreadsheet, but now they can archive each isometric drawing by its job number and each job can find its entire history and documentation within the software archives. This "history" section allows them to see what took place and when, and they link every isometric drawing to each parent/initiative card for their records.

By the nature of construction work, they often have multiple project teams in a wide range of locations. Digital boards allow the seamless, real-time communication of the data across different geographical areas. This allows for easy updates and changes, if required, including automatic updates (such as our completion date proximity rules). Their job sites are spread out over many cities and states that would make changes to physical boards difficult to communicate.

"Additionally, a large part of software being effective is how intuitive and easy it is to use. The software is appealing to look at, easy to work with and to use, and intuitive in its design. The support we have received from the Businessmap product support team has been the best we have ever seen in the software industry. Every time we want to try and add a feature, a tracking method, or custom field, it's an option that is easily achievable."

Process Automation

The work in construction is complex and ensuring effective communication is often tightly related to creating an automated workflow that doesn't depend on each person's attention, memory and presence in order to function smoothly. Automation dramatically reduces stress levels when there is no longer a need to remember all the details, steps and procedures. It also creates standards and increases predictability. BMWC discovered that the Businessmap software allows them to create custom automation through powerful business rules.

Business Rules

One of the most important features for them was the business rules engine. It enabled them to automate the process and customize the triggers and actions. They use the business rules in combination with blockers and stickers to produce notifications to relevant teams. The team says that the ability to visualize all the work at every stage and to set custom policies has been a game changer.

For their main fabrication board used by all job sites, they have clearly defined each stage of production (and the respective roles and responsibilities for it), created stickers and blockers for every scenario that could cause a delay and created business rules to increase communication and create a notification whenever those stickers or blockers are put in place.

If we take a look at their Fabrication Shop Board on Fig. 1, we can see the custom stickers and blockers they created such as Missing Material or Documentation Issue. They have a sticker for emergency tasks, which easily signals all team members for a priority item. One of the policies sends a specific notification to the responsible person when there is a sticker "missing material" on a card. They also have time-based policies and others are triggered by blockers – e.g. 'when a child card is blocked, block the parent initiative'. Another example business rule is configured to send a notification when the walk down checklist is completed.

The circles before the names of the swimlanes on Fig.1 indicate that there are active business rules running. BMWC has a total of 15 business rules set on their boards.
The Jobsite Board on Fig.2 contains all work related to a customer and the columns represent all the phases that a task passes through before it's delivered. There are a few approval columns: Fabrication received on site, installation, testing, analysis and completed work. There are business rules connecting columns of the Jobsite Board with columns on the Fabrication Shop Board, which easily connects the teams in real time, despite the different locations. Also, no information is lost through the communication process and notifications are sent automatically, without someone having to ring an alarm.
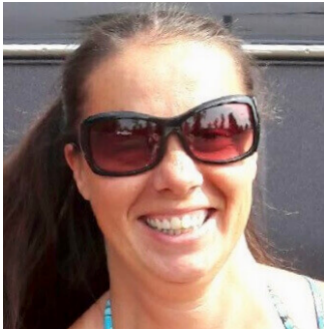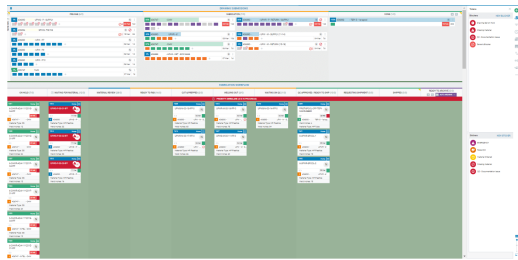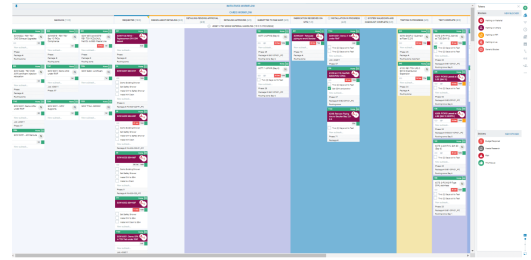
Fig.1 Fabrication Shop Board

Fig.2 Jobsite Board

Custom Fields

Another useful feature that improves communication are the custom fields. This is extremely important as their work is very specific and some information about the tasks should be added manually. Instead, they created their own fields that employees fill in.

With the custom fields, they are able to include in cards "Material type" (high purity tube, high purity plastics, carbon steel, etc.) and "Weld inches" (how many inches need to be welded to complete a fabrication) and then export that data to begin to forecast their work capacity and manpower needs. These are "exciting features" that they look forward to harnessing to take their forecasting and estimating to the next level. Moreover, BMWC can filter data by custom fields and easily generate the specific reports they need. Creating templates with preset custom fields is also a kind of automation that saves the people the effort to remember all the information they need to fill in.

Results and Benefits of Kanban in Construction

The response from the teams has been overwhelmingly positive. After experiencing the previous structure for a few years, BMWC believes the introduction of the Businessmap platform has revolutionized their workflow and significantly increased transparency throughout the region. A manager recently stated,
"this is the most productive thing to take place within our division in many years." Simply having the ability to completely visualize their entire workflow and the status of work within it has been revolutionary.

"We could tell almost immediately that we were on to something big. As it was implemented, there was a lot of excitement as we began to fully comprehend the full potential of what the Businessmap software was capable of providing for us. We focused on what worked before and optimized our process to refine our results."

Fig.3 Created vs Finished Cards

We asked them to summarize the benefits that were most important and they shared that the improvements are seen in three main areas:

1. Because the Kanban board is web-based, they are now able to communicate across multiple project sites very quickly and effectively with everyone looking at the same data. Using the blocked card function and the comments tab they can quickly share their constraints and keep each other updated on the resolution of these issues.

2. Utilizing the custom fields tab they have been able to separate their data for the fabrication shop into unique production areas of their shop to allow them to better gauge their backlog and the required manpower to meet the production workload.

3. The business rules were what took their Kanban boards to the next level. By noting each job site in the "Tag" field, any sticker or blocker attached to a card produces a notification to that jobsite's project team that action is required. There are also changes based on due date; if a completion date is within 7 days the cards are moved to priority swim lanes and if a due date is within 2 days the affected teams get a notification.

These improvements allow the teams to visualize their workload. Business units can now see the progress on their scopes of work and raise questions if they see issues. The 15 minute "Daily Standups" have been implemented and a representative from each jobsite attends in person or through video conference. This meeting entails a discussion around "blocks," questions or concerns and has removed surprises or recurrent issues from the equation.

We were also able to get some actual data from the analytics panel and illustrate what the team says with numbers. First, let's take a look at their "Created vs Finished Cards" chart (Fig. 3) that shows how much work enters the workflow compared to how much work exits it. The chart is configured to show data per week and the horizontal axis shows weeks with their respective numbers. The vertical axis indicates the number of cards. For each week there are two bars – the blue represents created cards and the brown – the finished cards. The first two weeks show controversial data which is normal when they were filling in their data into the system. It is normal for the first few weeks to see a dramatic difference between the two columns. Once the work is transferred into the software, we see that during the next three weeks, the workload normalizes and the regular is between 40-60 new cards per week. The trend we see is very clear – the amount of finished work, increases steadily, regardless of the number of cards entering the system.

This is evidence that process visualization and efficient communication are speeding up delivery, even without making drastic changes in the organization.
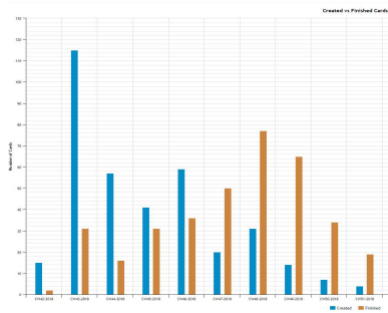
Another important proof is found in the trend chart for cycle time (Fig.4). The first thing we see is the dramatic drop during the Christmas holidays, so we can ignore this outlier and focus on the overall trend. At first, when they were getting used to the tool, we notice an increase in the cycle time. Then each peak is lower than the previous and in the middle of February when we gather the data, we see the shortest cycle time they ever achieved.
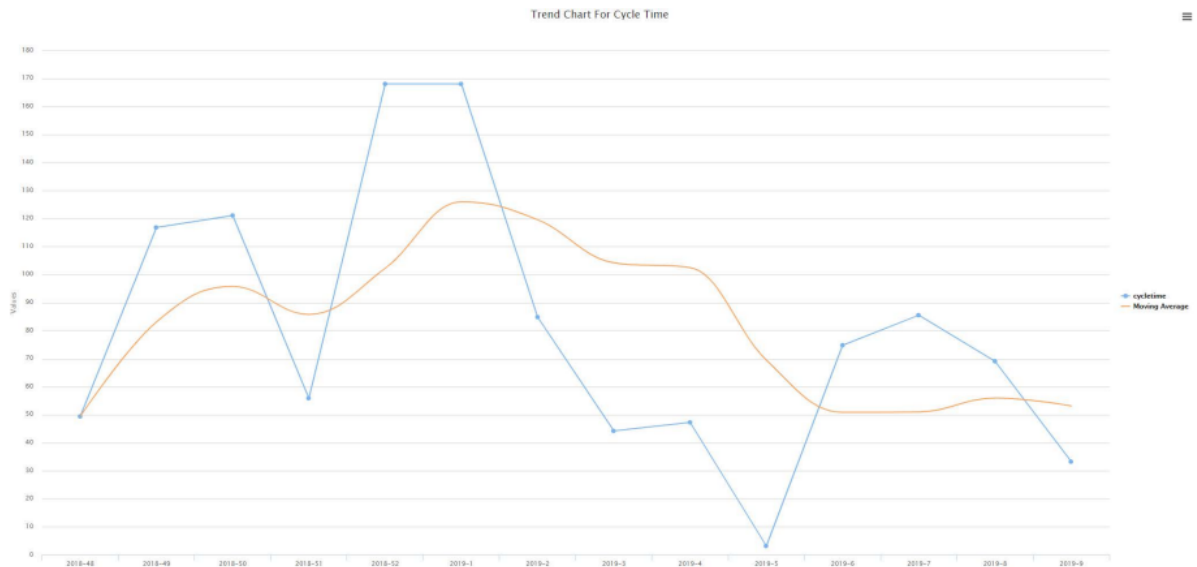

Fig. 4 Trend Chart for Cycle Time

Further Steps

Being so excited by the results they achieved and the overall acceptance of the Businessmap software in the company, BMWC is committed to getting the most of the tool and continuing to pursue the path of continuous improvement.

"We are excited to head into 2019 with our new process refined and ready to reach its full potential. We are beginning to use analytics and data to identify constraints and bottlenecks and further refine our workflow. The software has created a new environment centered around communication and transparency in a visually appealing way that we haven't seen before." concludes Ben.

About Businessmap

Businessmap is an Enterprise Agility solution provider aiming to discover new management ways and share this knowledge through amazingly powerful, easy-to-use tools and professional services.

Businessmap offers the most flexible software platform for outcome-driven enterprise agility. Its unmatched functionality consolidates multiple tools into one, enabling affordable deployment at scale, visibility across all projects/portfolios and alignment on goals, to deliver quality work faster. Pairing it with the proprietary consulting program delivers a tailored solution that ensures lasting value and exceptional ROI.

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