SHAWMUT DESIGN AND CONSTRUCTION:

Using AI to manage project risk at scale

We're about more than just compliance; we're about prevention. Our #1 goal is to make sure everyone on-site and in the office goes home safely every night. **—Shawmut Core Values**

Shawmut Design and Construction has seen tremendous growth since its inception in 1982. Founded in Boston, the company's clients asked the firm to build projects across the country, resulting in 9 regional offices and thousands of employees working on approximately 500 projects a year. This created a challenge for Director of Safety, Shaun Carvalho: How could the company continually improve upon its commitment to preventing risk while scaling each year?

A SOLID FOUNDATION

Shawmut already had a strong set of policies and technology in place, especially when it came to early risk indicators. Carvalho and his team used Procore's construction management system for field data collection from project teams and safety personnel as well as ConstructSecure, which enabled a trade management risk program. Many projects generated visual project data daily through OxBlue site cameras. The safety team managed observation-based metrics

Shawmut's Safety Risk Technology Stack

Smartvid.io	AI for risk analytics
Procore	Construction management and field photo documentation
ConstructSecure	Trade partner risk management
OxBlue	Site cameras for photo documentation
Microsoft	PowerBI dashboarding platform

for risk indication as well as positive behaviors through Shawmut's "Caught Safe" initiative, which recognizes safe jobsites. However, Carvalho knew artificial intelligence (AI) could expand the team's perspective, providing additional risk data and even predicting issues before they happened.

ENTER AI (A.K.A. "VINNIE")

Shawmut used data from Smartvid's AI engine, nicknamed "Vinnie," to build dashboards that helped rank projects by potential risk factors. Vinnie uses construction-specific visual AI models that have been trained to identify indicators of risk in photos, video and other project data. For Carvalho's team, this included automatically tracking work seen at height, housekeeping, standing water and workers missing personal protective equipment (PPE) such as hard hats, high vis, safety glasses and gloves. These factors were reported weekly by project to show which were improving or becoming less safe.

Carvalho said,"Smartvid complemented our human-based observations with a third-party AI perspective. Both are necessary for understanding risk and deciding where to focus our attention. For example, when Vinnie found a high rate of housekeeping issues on an otherwise well-performing project, we immediately reviewed examples and found the project had begun demolition, creating piles of debris and standing water. We provided additional resources to the site, including a tool box talk, as the project had now entered this higher risk phase. Without Vinnie, we never would have known to give the project some added support."

In addition to risk data, ratios of risky to non-risky observations are useful in highlighting positive behavior, as Shawmut does by integrating Vinnie's findings into its "Caught Safe" program.

HOW DID VINNIE ANALYZE RISK?

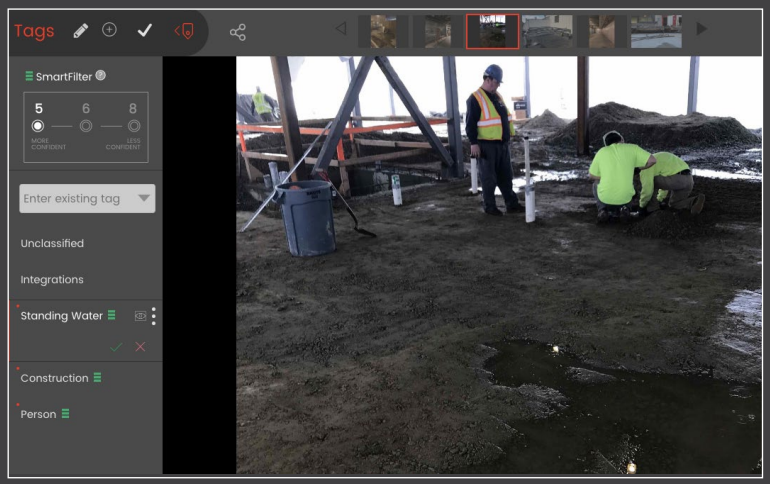
The Shawmut team used Smartvid's pre-built integrations with Procore, OxBlue and 360 imagery from multiple sources to analyze data from projects. Vinnie presented results to the Shawmut risk and project teams in two forms: an executive dashboard and project-level reports. The executive dashboard provided an objective view of risk based on leading indicators across projects in a single view, showing weekly trend data for each. Project level reports had more specific results for key risk categories at each project, including photo examples.

Vinnie automatically analyzes the images and project data already gathered in construction management systems. Carvalho said, "data from OxBlue, Procore, and our 360 photos

Project URL	Project Name	November Score	October Score	Photos per Month	Work at Height	Housekeeping	PPE Compliance
		27.0	33.6	334	78.4	0.3	72.3
		28.1	DSQ	152	82.8	0.0	76.0
		29.5	DSQ	788	303.4	0.0	100.0
		29.6	DSQ	287	55.1	0.0	68.3
		32.6	DSQ	163	62.6	9.2	84.3
		33.1	50.0	222	131.1	9.0	97.2
		40.9	45.8	108	31.5	0.0	97.2
		42.7	47.6	177	113.0	0.0	92.9
		43.1	57.8	119	44.5	0.0	98.9
		45.9	42.7	315	110.2	0.0	97.5
		45.9	34.2	432	74.5	0.2	88.6
		46.5	43.4	404	132.7	0.0	99.3
		46.8	DSQ	142	84.5	1.4	93.1
		46.9	57.1	182	87.4	0.5	93.2
		48.1	DSQ	102	56.9	2.9	99.4
		49.1	53.9	352	77.0	0.0	92.7
		49.3	57.2	266	81.2	0.0	98.2
		49.9	DSQ	195	30.8	0.0	86.0
		50.6	41.6	924	97.2	0.5	97.1
		51.0	DSQ	115	67.0	0.0	92.5
		52.6	54.7	1,939	118.4	0.1	99.1
		56.5	DSQ	109	46.8	0.0	94.0
		58.3	39.4	163	60.1	0.0	98.1
		60.1	DSQ	108	45.4	0.0	97.3
		60.4	39.3	369	53.1	0.0	97.7
		60.5	71.3	830	17.5	1.8	91.9
		60.8	66.6	436	57.3	0.0	98.7
		61.2	DSQ	125	29.6	4.0	98.3
		61.2	58.6	258	49.2	0.0	98.2
		61.8	61.9	412	31.1	4.1	99.2
		64.0	38.3	184	26.6	1.6	98.5
		66.5	DSQ	238	13.4	0.0	97.1
		67.4	63.9	108	9.3	0.9	98.3
Average				335	71.8	1.1	93.7

Dashboard showing which projects need attention based on AI metrics rolling up to a project score.

Sample image showing standing water found by "Vinnie."



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SMARTVID.IO

coming together and being used to identify indicators of risk is a key benefit of the Smartvid system. No person could ever review all of those photos, but with Vinnie, we can use them to look for signals of risk."

WHAT'S NEXT - PREDICTING RISK AND A PROMOTION?

The Shawmut team is working with Smartvid to help predict specific incidents through Vinnie's AI observations. Shawmut has joined 10 other firms on Smartvid's cross-industry predictive analytics strategic council, which aims to build new predictive risk models based on multiple factors--from Vinnie's visual analytics to real project data. The council's goal is to move beyond trends to new models that can predict incidents on specific projects.

Even with predictive analytics on the horizon, Carvalho advocates using Vinnie's data to drive down risk today. "I firmly believe we can prevent incidents by looking at photos alone - if you're seeing a high rate of Vinnie observations for PPE or other issues that is like an independent auditor reviewing your jobs. Predicting incidents is the next phase, and we're excited about the potential there, but even today the trend data we're getting from Vinnie is helping us figure out where we need to focus our attention."

Now in 2019, Shaun's work to fulfill Shawmut's corporate pledge to prevent safety risk was recognized with a promotion. Could Vinnie have predicted that Shaun would become a VP? Perhaps so, given all of the hard work he put into partnering to bring new AI-based indicators of risk into the dashboards he and the team use weekly to focus their attention across their growing set of projects.

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Shaun Carvalho, Vice President - Safety, Shawmut Design and Construction

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Shawmut Design and Construction is a national construction management firm with a reputation for completing extremely complex and logistically challenging projects for the most high-profile clients in the industry.

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Smartvid.io is a software company headquartered in Cambridge, MA which provides machine learning tools for the management and analysis of industrial media.