Book Review

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Forbes and Ahmed have prepared an authoritative text on the emergent fields of lean construction and integrated practices [e.g., integrated project delivery (IPD) and building information modeling (BIM)]. While frequently presented (and studied) as separate and distinct methods for improving performance outcomes, recent studies have shown that constructive synergies can result from the integration of lean and various integrated technologies (Sacks et al. 2010). Therefore, it is important and appropriate that these interrelated topics be presented together, in a single text. Prefaced by the authors as a tool to enhance productivity, the book provides significant detail on the methods, rationale, and historical justification for the implementation of lean and integrated technologies.

1 SCOPE AND SUBSTANCE

The book begins with a review of the construction industry. Focusing heavily on the need to improve productivity and integration, the authors detail the standard delivery methods and contract structures employed by owners. Generally understood pros and cons are presented, albeit with a noticeable emphasis on the shortcomings of traditional delivery methods and contract methodologies. Among the many industry problems identified, a handful are congruent with those found by Rooke et al. (2004), i.e., the culture of blame, exploitation, component optimization in lieu of system optimization, and the pursuit of opportunistic claims. Performance and productivity measures in construction are presented, highlighting the role productivity plays in profit generation and the benefits of improved productivity. Factors impacting construction productivity are detailed, including the roles of management, performance standards, subcontracting, innovation, and training. A brief discussion on earned value analysis is included along with information on assessing percent completion and other similar project benchmarks.

Mass production is contrasted with the Toyota Production System (TPS) in a historical context, emphasizing that the origins of lean theory reside in manufacturing. The compatibility of lean with various emergent forms of relational contracting is discussed, as are the shortcomings of traditional delivery methods, such as design-bid-build. Through a presentation of lean construction fundamentals (e.g., customer focus, culture, organization, waste elimination, continuous improvement, and Five Big IdeasTM), the authors set the foundation for a more detailed recitation of the tools and techniques needed for a lean journey.

An exhaustive presentation of prescriptive process models, management devices, and general definitions—each marked with a simple acronym—are put forth as the means to both understand and implement lean construction theory. These include, but are not limited to, the following: Lean Project Delivery SystemTM (LPDS); Last Planner SystemTM (LPS); weekly work plan (WWP); activity definition model (ADM); owner’s project requirements (OPR); post occupancy evaluation (POE); target value design (TVD); plan, do, check, and act (PDCA); quality function deployment (QFD); percent planned complete (PPC); work in progress (WIP); reverse phase scheduling (RPS); Five-Step plan (5S); and rolled throughput yield (RTY). The discussion leaves the reader with a fundamental understanding of the underlying premises, nomenclature, vocabulary, and apparatus of the lean construction movement.

The text highlights the need for adequate training and coaching in order to bring about the process and cultural adjustments necessary for successful implementation of Lean practices. For example, within the discussion of Just-in Time (JIT) delivery, the authors

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note, “JIT does not work in an atmosphere of suspicion, distrust, and internal competition” (page 133). Additionally, the authors emphasize the significant pre-condition commitments necessary in the areas of team-building, relationships, collaboration, and a readiness to change. The authors accentuate this point with respect to Lean and IPD by stating, “the most significant factors that underlie relational contracting are cooperation and dependency between the parties” (page 134).

The text then transits to the integration of lean construction with other recent developments in the design and construction industries-most notably IPD, BIM, and sustainable construction. Through the use of previously well documented case studies (Azhar et al. 2008; Lichtig 2005), and industry guidelines (AIA 2007) the authors expand the discussion to include parallel and aligned technologies. For example, quality tools, management philosophies, and safety are among the many additional topics covered in more than passing detail. The potential synergies between BIM and IPD are well documented (AIA 2007; Becerik-Gerber and Kensek 2010), and the authors fittingly emphasize the point on several occasions. Likewise, the integration of lean with BIM and IPD has been recognized (Sacks et al. 2010; Smith et al. 2011) and the text addresses this issue satisfactorily. The end result is a comprehensive volume covering a broad range of overlapping topics the authors coin Modern Construction.

2 CRITIQUE AND DISCUSSION

An important contribution of the book is the conceptualization of lean, green, BIM, IPD, and other relatively new management tools as parts of a new paradigm for managing projects - Modern Construction. Through the combination of these technologies, previously identified synergies are rationalized and communicated as interrelated parts of a cohesive whole. The authors make the point that Lean theory and practices are complimentary to sustainable practices. Similarly, they note that IPD practices can enhance Lean outcomes, and when combined with BIM technology, can affect sustainability. Refer to Figure 1 for a representation of the complex interplay that exists between the technologies, as implied by the authors.

The text delivers unnecessarily critical, and sometimes misleading, discourse when describing traditional project delivery methods and non-lean practices. A few examples include the following:

1. When commenting on the disadvantages of Design-Bid-Build-the most common delivery method used by owners today-the authors state “there is ... the possibility of a compromise in quality in order to lower the cost of the project” (page 10). Many would disagree with this statement. Quality levels are defined by the plan and specifications. The general contractor is not at liberty to alter these standards.

2. Engineer-procure-construct arrangements are described as potentially “... unimaginative, emphasizing cost over quality” (page 13), suggesting that “imaginative” thought processes are somehow inherently absent from engineer-led endeavors. Furthermore, such rhetoric implies that engineer-led processes are predisposed to be acquiescent to cost considerations at the expense of aesthetic features.

Figure 1. A representation of the interplay between lean, IPD, BIM, and sustainable construction practices
3. Within the discussion of lessons learned it is asserted that “project teams often start installation of work packages too early, erecting incomplete quantities of materials and equipment in a discontinuous sequence because a certain amount of material happens to be on hand” (page 198). Such a broad generalization depicts pre-lean (traditional) construction managers in an inaccurate and disparaging manner, as if such practitioners are unable or unwilling to properly schedule and sequence work flow in the absence of lean theory and practice.

The cultural barriers to widespread adoption of Modern practices are formidable (AIA 2007; Ghassemi and Becerik-Gerber 2011; Rooke et al. 2004). Most proponents of Modern practices - the authors included - fail to emphasize or recognize the significant barriers that are entrenched within the industry landscape (e.g., institutional, cultural, technical, and contractual). Generational turn-over may be required to see the implementation of the models and practices proposed in the text. Similarly, the effort required to learn and adopt the specialized vernacular of lean construction is not discussed as a potential impediment to implementation.

While the text includes a brief note on the 14 Points and Seven Deadly Diseases put forth by Deming (1982), a robust discussion of Deming’s enormous contribution in the areas of lean thought, statistical process control, industrial management, and the TPS is a shortcoming. The authors repeatedly focus on maximizing the whole and not the part, they do not address the challenges associated with the inherently diffuse nature of building construction work. A typical building project may have hundreds of subcontractors and suppliers contracted at multiple levels. Even in the case of an IPD tri-party arrangement, many of these second and third tier entities will remain unaffected as a result of the adoption of Modern practices by management and select 1st tier contractors. This conundrum leaves one to question how the adoption of these principles and practices can significantly improve productivity on a measurable project-wide basis. This condition is exacerbated by the varied nature of subcontracting. At times, the authors assume that subcontractors and suppliers are willing to learn a new way of behaving for the benefit of one project, only to become equally adept at abandoning the integrated mindset when moving to their next (presumably traditional) project.

The span of topical coverage is broad. In addition to covering anticipated subject matter suggested by the title (e.g., lean construction, IPD, BIM, and sustainability), the authors extend the content of the text to include reviews of affiliated issues including performance improvement, construction safety management, workforce management, and systems integration. Although the aim of such inclusiveness is admirable, studious, and well intentioned, its effect on the standing of the text is debatable. A case in point is the narrative on noise in the construction environment, where the authors state, “…sounds can distract workers from doing what they are supposed to do” (page 385). Although this statement may be absolutely true, noise and auditory distractions are largely unavoidable byproducts of the process of building construction-especially for the structural and framing trades. Such discourse could leave readers wondering from what perspective the authors were writing.

3 CONCLUSION

The text is a compendium of the latest research and thinking on lean and integrated practices. By integrating and contextualizing the current thinking on a wide variety of construction management practices, the authors have prepared a useful and dependable resource for both academicians and industry professionals alike. While the tone of a portion of the commentary does appear biased, it does not substantially detract from the value of the work. Equally, the extended coverage sections (e.g., safety, work force management, performance improvement, and systems integration) are not critical to the delivery of the main thrust of the text, but do provide useful background and contextual underpinning for the central themes of the work. Practical matters of adoption and industry evolution could be discussed in more detail. Should a second edition be planned in the future, the critique contained herein may provide useful material for updating and expanding the text.

REFERENCES


contracting model to support lean project delivery.” 
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