

Frank G. Woollard: Forgotten Pioneer of Flow Production

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The historical record of the origins of Lean management centers almost exclusively on Ford Motor Company in the 1910s and 1920s and Toyota Motor Corporation in the 1950s through the 1970s. There is no mention of the British automaker Morris Motors Ltd., the pioneering production work of Frank G. Woollard in the mid-1920s, or their possible influence on Toyota Motor Corporation in its formative years. Woollard's groundbreaking work has been forgotten, overlooked, or ignored. That now has to change.



Those of you who are aficionados of the origins and early industrial applications of Lean management will be pleased to know of the publication in January of the 55th Anniversary Special Reprint Edition of *Principles of Mass and Flow Production* [1]. It revives the brilliant work of a practical engineer named Frank George Woollard (1883-1957) who worked in the British automotive industry in the early 1900s. The new book includes an unabridged digitized copy of his 1954 book *Principles of Mass and Flow Production* and his landmark 1925 paper titled "Some Notes on British Methods of Continuous Production." It also includes commentary on Woollard's work and an analysis of the likely influence of Morris Motors on Kiichiro

Toyoda, the founder of Toyota Motor Corporation, by yours truly.

The focus of *Principles of Mass and Flow Production* and the 1925 paper "Some Notes on British Methods of Continuous Production" is on achieving flow in processes upstream of final automobile assembly. Flow must be also achieved in subcomponent assembly and parts manufacturing, and even into raw material production, to support flow in single-model or mixed-model final assembly. However, Woollard understood that achieving flow in production activities alone is not enough; management and workers must connect all processes, beginning to end, to achieve flow throughout the business. This is an aspect of Lean that most senior managers today have yet to understand, mistakenly thinking that achieving flow in operations is sufficient. Woollard was aware of this in 1925.



Woollard successfully achieved flow production in the context of the British automotive industry starting around 1914, and was also the first to develop and implement mechanical materials handling equipment known as automatic transfer machinery in 1923. His contribution to progressive manufacturing management practices is comparable to that of the legendary Taiichi Ohno (1912-1990), the principal architect of Toyota Motor Corporation's production system. Without a doubt, anyone interested in

Lean management, the evolution of flow production, or the history of industrial management and automation will want to read this very important book.

One of Woollard's distinctive contributions was to prove that achieving flow in small volume production (compared to Ford in the U.S.) resulted in costs that were almost as low as that which could be achieved by large-scale mass production. Thus, medium-sized companies producing tens of thousands of automobiles annually could compete against foreign companies that produced automobiles in much larger volumes. Kiichiro Toyoda would have this same insight in 1937, some 12 years after Woollard reduced it to practice.

Woollard's work is of great significance because it expands our understanding of progressive management practices in the British motor industry in the mid- to late-1920s, informs us of new contributions that likely helped shape today's practice of Lean management, and helps us better

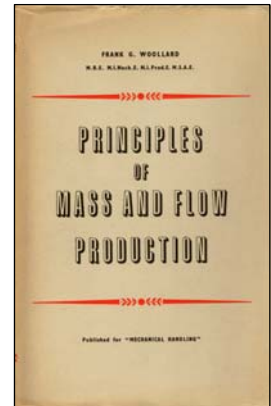
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Originality in Lean Thinking

understand Toyota's unique contributions to Lean management. Woollard was associated with the introduction of a basic flow production line to assemble steel railroad coach bodies in 1904. He introduced more advanced flow production in automobile parts manufacture around 1917. He then pioneered the introduction of high-volume flow production coupled with development and use of innovative automatic transfer machinery for automobile engine manufacturing beginning in 1923.

Woollard understood the idea and practice of continuous improvement in a flow environment, saying that the need for modifications to the flow line "should cause no anxiety, but rather should be a matter for rejoicing... the virtue of flow production lies in the fact that it brings all inconsistencies into the light of day and so provides the opportunity for correcting them," and "[the] high visibility conferred on the company's activities by flow production will lead to unceasing and continuous improvement."

In addition, Woollard's long-standing recognition that flow production will not work if it is used by management in a zero-sum manner, where one party gains at the expense of another, is particularly insightful and distinctive. He understood the importance of what we now call the "Respect for People" principle in Lean management, and was a skillful practitioner of that principle as well.



Readers interested in Lean management will appreciate Frank G. Woollard's remarkable work in flow production. His prescient innovations in industrial automation would come into widespread use in the global automotive industry in the early 1950s, some 25 years later. As a result, Mr. Woollard deserves a prominent place in the history of industrial management, production engineering, and automation – and his work in flow production and automation is clearly congruent with today's Lean management principles and practices. While reading this book, you will wonder how so many people could have missed Woollard's important work for so many years.



Frank G. Woollard was a pioneer and should be given due recognition for his penetrating insights and numerous real-world accomplishments, which lie between the time of Henry Ford and Kiichiro Toyoda. He was the first person to successfully adapt Ford's flow production system to local market conditions outside of the United States. Not even Ford could do that. Frank Woollard stands with Taiichi Ohno of Toyota Motor Corporation as one of the greats.

Now, when we think of the origins of Lean management, the conversation must include Ford Motor Company, Henry Ford and Charles Sorensen; Morris Motors, William Morris (Lord Nuffield) and Frank Woollard; and Toyota Motor Corporation, Kiichiro Toyoda and Taiichi Ohno.

Notes

[1] F.G. Woollard, with B. Emiliani, *Principles of Mass and Flow Production*, 55th Anniversary Special Reprint Edition, The CLBM, LLC, Wethersfield, Conn., January 2009.

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