A Tribute to Abeles the Engineer

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Like many other great men, Paul W. Abeles was very modest; his presence was anything but overbearing, and his build was also slight. He spoke English with a noticeable accent and it was sometimes difficult to conduct a conversation with him. (It must be appreciated that Dr. Abeles came to England in 1938 as an Austrian refugee.) Thus, many who met him for the first time found it difficult to believe that this was indeed *the* Dr. Abeles.

I remember his sincere amusement when a participant at the FIP-PCI Congress in New York in 1974 looked at him and exclaimed: "Oh, now I understand, you are the *duplicate* Dr. Abeles. I knew that with all these great things you have done for so long you couldn't possibly be still alive."

In true professorial manner, Paul Abeles had lost his name badge; and with equally true American efficiency the PCI had issued him with another, overprinted in red with the word "Duplicate."

Although he was widely known as a researcher and teacher, I have most admired him as a designer and consulting engineer. He was the brilliant pupil and student of Fritz von Emperger; and like that earlier pioneer of prestressing, St. Paul* (though in a different context), he spread, explained and enlarged his teacher's original message better than all the other disciples put together.

In the thirties, Emperger was trying to improve the cracking and deflection behavior of reinforced concrete beams by adding some prestressed wires; Abeles developed partial prestressing, and introduced high strength wires to minimize the effect of prestress loss.

In this way, like the thoroughbred engineer that he was, he preserved the ductility of well-proportioned under-

*"And running under a certain island which is called Clauda we had much work to come by the boat: which when they had taken up, they used helps, undergirding the ship." Acts of the Apostles, Chapter 27.

It has been just over three years since Paul W. Abeles died. Now the true magnitude of his contributions to engineering and to prestressed concrete in particular can be more fully appreciated. Today, Dr. Abeles is recognized as the pioneer in the development of partially prestressed concrete, a field which currently is being intensively pursued on both sides of the Atlantic. In this article, Mr. Jan Bobrowski (with whom Dr. Abeles was affiliated during his latter years) recounts some of his experiences with Dr. Abeles and gives an assessment of the man's accomplishments and a tribute to this extraordinary engineer—EDITOR

Paul W. Abeles (1897-1977).

reinforced concrete yet managed to decrease the deflections under service loads and decreased also the cambers during production. While preserving the advantages of prestressed concrete, in general, he avoided the serious disadvantages of fully prestressed concrete under impact loading.

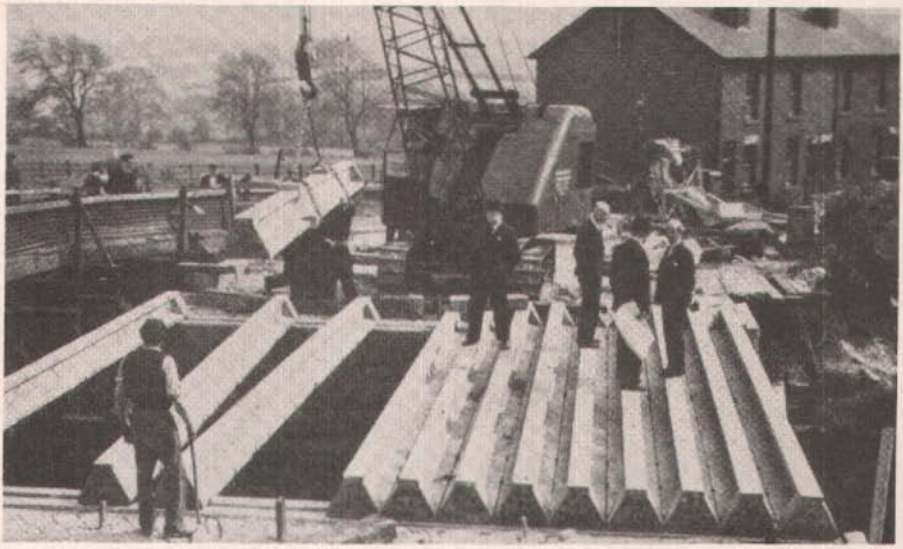
His pioneering work in the latter field was crowned by the *Abeles Symposium on Fatigue in Concrete* at the ACI Convention in 1973. Partial prestressing is also recognized in the ACI Code (though implicitly).

Load-deflection curves for fully prestressed, reinforced, and partially prestressed beams adorned the cover of the March-April 1979 issue of the PCI JOURNAL,* demonstrating graphically that reinforced concrete and fully prestressed concrete are merely the two extreme cases of the general solution offered by partial prestressing—the message that Abeles already preached and the great Freyssinet emphatically rejected at the memorable ICE meeting in London almost 30 years ago.

The recipient of many awards, Dr. Abeles in 1963 won PCI's prestigious Martin P. Korn Award for his paper "Partial Prestressing in England," published in the February 1963 issue of the PCI JOURNAL.

While many leading engineers, even today, are still reluctant to base designs upon definite safety factors against failure, Paul Abeles as a consulting engineer in private practice in Vienna published several papers back in 1935 describing ultimate limit-state design for spun concrete masts using what could then be described only as high strength steel in lieu of normal reinforcement. This design approach developed for

*The subject of partially prestressed concrete was also highlighted on the cover of the May-June 1977 PCI JOURNAL. Both papers on partial prestressing in these two issues subsequently won PCI's prestigious Martin P. Korn Awards in 1977 and 1979, respectively.



Placing precast prestressed beams for the Gilroyd Bridge on the Manchester-Sheffield railroad line in 1949. Dr. Abeles is on the right.

masts was soon adapted to tubular floor beams, and used in Yugoslavia, Hungary, Austria, Czechoslovakia, and Poland. His use of prestressed concrete for British Rail, described by L. Czuprynski, is known world-wide.

Normally, Paul Abeles was tolerant to a fault; but he would transform at a flash if he thought that principle was being sacrificed, even with the best of intentions.

Dr. Abeles would not be mesmerized; neither the "purity of reinforced concrete" nor the claims of intellectuals or salesmen for the uniqueness and novelty of fully prestressed concrete, impressed him. Instead, in his book *Introduction to Prestressed Concrete* he set out "Ten Commandments for Designers"* from which I here quote but a few:

- "You cannot have something for nothing."
- "You cannot have everything."
- "It is never too late—to alter a design or strengthen a structure before it collapses."
- "There is no progress without considered risk."
- "Do not generalize, but rather qualify the specific circumstances."

It is both significant and revealing that the engineers he most admired were Francois Hennebique and Eduardo Torroja.

To use a superlative is always dangerous; it gives an opening for a counter-assertion that can be denied but not disproved. But I for one am convinced that history will judge Paul W. Abeles as one of the greatest engineers of this century.

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*The "Commandments" also appear in the *Prestressed Concrete Designer's Handbook*.