

## Biography Joost Kalker (1933-2006)

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Joost Kalker was born in The Hague on 25 July 1933 to a Jewish family. His father, a general practitioner, was killed in Auschwitz and his mother and her two children remained in hiding during the occupation. His mother took up her occupation again as a dentist to support her children. Joost attended the Gymnasium in The Hague from 1941-1951 and entered The Delft University of Technology as a student in physics, but then got transferred to Mathematics and graduated cum laude as the first Mathematical Engineer. It was there that he met his wife Cornelia Kalkman (Cokkie).

During 1956-1957, he worked as a Research Associate in Applied Mathematics at Brown University USA. After his military service (marine intelligence), back in Holland, he was appointed as an Assistant professor at TU Delft, and he took his Ph.D. cum laude in the Mechanical Engineering Department. His research supervisor was A.D. de Pater, a name well known to members of IAVSD, who introduced him to wheel-rail contact problems, which play such an important part in the vehicle system dynamics. His PhD dissertation "On the rolling contact of two elastic bodies in the presence of dry friction" was a real magnum opus, now sadly out of print. However, copies can be ordered by email : [kalker@zonnet.nl](mailto:kalker@zonnet.nl)

The dissertation established for all time the mechanics of frictional rolling contact under arbitrary combinations of tangential force and spin, which govern the curving and dynamical stability of railway vehicles. His results are used by the railway dynamicists world wide. In deriving these results, he acknowledges Professor Rein Timman in the Maths Department as his effective supervisor. Perhaps he was responsible for the rather formal mathematical way in which Joost's papers were written, which caused so much angst in his engineering readers. In 1979, Kalker presented a state of the art "Survey of wheel-rail rolling contact theory" at the IAVSD Conference, followed by several papers on wheel-rail contact mechanics published in *Wear* and *VSD*. For a number of years, he was a member of the Editorial Board of the latter. In the years that followed, further significant advances were achieved. He showed that he was not so slavishly tied to mathematical exactitude, but by developing his Simplified Theory, in which the elastic continua were replaced by Winkler foundation type models, he gave rise to readily calculated values of contact forces in conditions of arbitrary creep.

Kalker was the first to tackle the transient rolling contact problem that follows a sudden change of imposed force, or under the action of an oscillating force. He also developed a variational method for finding the contact area and pressure with arbitrary profiled bodies. All these works were brought together in a scholarly, but eminently useful book :

"Three dimensional elastic bodies in rolling Contact"(Kluwer,1990)

By combining Archard's wear law (wear rate is proportional to the product of contact pressure and sliding speed) with rolling contact mechanics, Kalker and his students predicted the wear of wheels and rails during curving and dynamic motion of the vehicle. In 1999, Kalker organised a course on "Rolling Contact Phenomena" at the International Centre for Mechanical Sciences at Udine in Italy, with seven leading experts as lecturers and 60 students. The proceedings (Ed. Jacobson & Kalker, Springer 2000) provide the best possible introduction to the subject for the student of vehicle system dynamics. It was a very fitting climax to a most successful career.

In retirement, Joost was sadly a victim of Parkinson's disease and attended the defence of his last "Graduate Student" in a wheel chair. He is survived by a devoted wife, 2 children and 3 grandchildren.

K.L.Johnson

Cambridge, June 2006

Copies of papers of Joost Kalker can be ordered by email :

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