



Australian Foundry Institute National Conference

2020

Never say NEVER



www.australianfoundryinstitute.com.au/victorian-division

AFI Vic - Sofa Seminars 2020

Presentation #4

The final presentation in our AFI Sofa Seminar series was presented by Professor John Campbell “Live from the UK.” There was an opportunity for Q&A after the presentation. Don’t miss this rare opportunity to view this recording of a live audience with the doyen of bifilms which are “The Fundamental” defect in cast metals.

To view this presentation please pour a glass of your favourite poison, find a comfy chair and enjoy:

<https://youtu.be/e5YNuhlgURw>

Professor John Campbell



The author is a physicist, with 2 masters and 2 doctors’ degrees, as clear signs of a misspent youth, and has written far too many papers, patents and books. Having become a foundryman by mistake, he has bulldozed foundries, built them, run them, owned them, and has made plenty of really bad castings. Being now definitely older but less certainly wiser, he is nevertheless keen to make better castings, promoting the cause of better castings, better profits and a better industry. The targets of better castings, consisting of better metals, metals which cannot fracture, will be products which, for the first time, engineers can trust.

Engineering Developments

One hundred years ago, Griffith proposed that cracks in metals could only be initiated from pre-existing cracks. This completely accepted prediction has been largely neglected by the metallurgical profession. It seems that the bifilm has taken on the role of the pre-existing Griffith crack. Dense populations of bifilm cracks exist in most of our engineering metals, and lead to all the observed failure modes, including overload fracture, fatigue, creep, hydrogen embrittlement, stress corrosion cracking etc. All these failure modes can now be explained by the bifilm concept. Furthermore, all these failure modes can now, for the first time in history, be avoided by appropriate melting and casting technology. Metals should never fracture. As an example, recent helicopter tragedies are described, explained, and future engineering avoidance recommended.