

A PRACTICAL CONCURRENT CAE APPROACH FOR DIE CASTING DIE PRODUCT LIFE CYCLE

Joshua Changhua Huang*, Warren Bishenden

Exco Engineering

KEYWORDS

Concurrent Engineering, Concurrent CAE, Design for Manufacturing, CFD, FEA, Die Casting, Die Casting Die, Die Casting Process

ABSTRACT

Concurrent Engineering research and development activities have declined drastically in recent years. Its principals and methodology had been extensively researched in the 1990s and early 2000s. Implementation has not been seen as widely as expected because of its complexity and limitation in the application process. In die casting industry the part and its tooling designs in general are still far from the expected status of Concurrent Engineering to meet the challenges of market demand. This paper discusses a practical concurrent CAE approach for die casting die systematic design which employs the principals and methodology of Concurrent Engineering in different phases of die casting die product life cycle. This practical concurrent CAE approach consists of three major stages along the die casting die product life cycle. It starts from the up-front engineering of die casting part design, in which the die casting manufacturing process should be considered to achieve the optimal die casting geometry for manufacturing in the context of die casting part functionality design. The second stage is die casting die design, which includes three major functionality designs: die casting filling design, thermal process design and die structural design. All these design analyses and simulations are concurrently carried out with die casting die system design progresses, not at the end of the design phase as with conventional design process. The third stage is die casting process “fine-tune” optimization based on the die casting foundry’s operational conditions. At each individual stage there is a different combination of CAE programs harmonically employed to simultaneously address the design concerns and/or to search optimal solutions in the context of the whole die casting die product life cycle. This concurrent CAE approach has been

implemented into engineering practice for about 10 years at Exco and still continuously evolving. It has helped Exco to achieve superior competitive advantages in market by providing high quality, fast delivery, and reasonable cost products and services. For realization of this concurrent CAE approach some detail techniques are discussed as well.

Corresponding Author:

Joshua Huang

Email: joshuah@excoeng.com

Phone: (416) 8188264 (cell)