Development of Bulk Bag Design Process using Finite Element Analysis

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유한요소해석을 이용한 벌크백 설계 프로세스 정립

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Abstract

Bulk bag used to transport, store, and dispose of very low level waste(VLLW) was developed. Various regulations provide only test methods to evaluate the durability performance of bulk bag, but design method is not provided. This is because the bulk bag is made of polyethylene and behaves as the membrane and the contents show the same movement as the particle element. The structural model for designing bulk bag is difficult to define because of considered material characteristics. Therefore, rather than using theoretical models or computational analysis methods to predict the various performance of bulk bag, the performance is evaluated by testing using built bulk bag. Since there is no way to predict bulk bag deformation, try and error methods are used to develop bulk bag. It takes a lot of time, manpower and cost to develop. In order to reduce design time and cost, this study aims to establish a bulk bag design process. First, a structural analysis model and analysis method that can predict the behavior of bulk bags and contents were developed. In addition, a design process was developed and a method of evaluating the performance using the analysis results was presented. The design process presented in this study will be very useful in designing bulk bags in the future.