

INCORPORATING GREEN BUILDING CONCEPTS IN MANUFACTURING PLANT DESIGN

Pradeep Jayatilaka, Asela Kulatunga, Roshan Ekanayake

Dept. of Production Engineering, Faculty of Engineering, University of Peradeniya, Sri Lanka
prjayatilaka@gmail.com, aselakk@pdn.ac.lk, eroshansanjeewa@gmail.com

Abstract

Presently Green building concepts or sustainable built environments are extensively discussed in many construction and architectural forums due to various reasons. Many countries have already established their own evaluation schemes on these concepts (LEED-USA, BREEAM-UK, GREEN^{SL}[®] etc). These rating systems have been developed to match with generic situations irrespective of nature or the purpose of the buildings. Due to the restrictions imposed on generalization evaluation, building designs for specific applications such as manufacturing plants tends to lose opportunities at the inception of plants or sometimes initial designs may restrict future changes which can be done within the premises. Therefore, this research aiming at incorporating green building concepts specifically relevant for manufacturing sector not only limiting to design the building but also incorporating them in key elements of the plant design such as facility location, plant layout design, facility systems design and material handling systems, etc. Key areas come under each of above categories were identified in the initial phase of the study by referring various standard check lists methodologies used in relevant fields. Later, selected factors were grouped and ranked based on the level of importance and easiness to implement. Then each sub area was assigned with points range and within the each category allocated points were divided among the factors listed by considering the impotency and level of implementation. The proposed system was compared with GREEN^{SL}[®] and LEED in order to signify additional areas of considerations. Furthermore, a case study was done to check whether propose method bringing surface the already lost sustainability options of the existing manufacturing plants. It has been found that, if proposed system is used during the new manufacturing plant design and commissioning, there are many advantages during the operations as well as they can easily get the required certifications from the bodies such as GREEN^{SL}[®], LEED etc. without much efforts.

Keywords: Green Building, Sustainable Built environment, Manufacturing plant design, facility systems, LEED