University-Industry Collaboration in Multidisciplinary Design Education: The Sandvik Mining Equipment - Queen’s Mine-Mechanical Experience

Patrick F.R. Murphy, Sandvik Mining & Construction Equipment, Burlington, Ontario
Laeeque K. Daneshmend, Queen’s University, Kingston, Ontario

Abstract
Queen’s University at Kingston has been graduating a unique breed of multidisciplinary engineer since 1994: the Mine-Mechanical option students within the Queen’s Mining program are exposed to the fundamentals of both Mechanical Engineering and Mining Engineering. The final year capstone engineering design project in the Mine-Mechanical option focuses on mining equipment design, and since 2000 this multidisciplinary project has been carried out in collaboration with Sandvik Mining and Construction of Burlington, Ontario. The students work on real world design projects formulated by design engineers at Sandvik, under close communication and coordination with academic project advisors. These design projects are differentiated from typical mechanical engineering design projects in that they require a thorough understanding of the mining context in which the equipment is to be deployed and operated. This paper will present the structure and format of this university-industry educational collaboration, review past successes, evaluate the educational outcomes as well as benefits to industry, and ponder some lessons learnt.