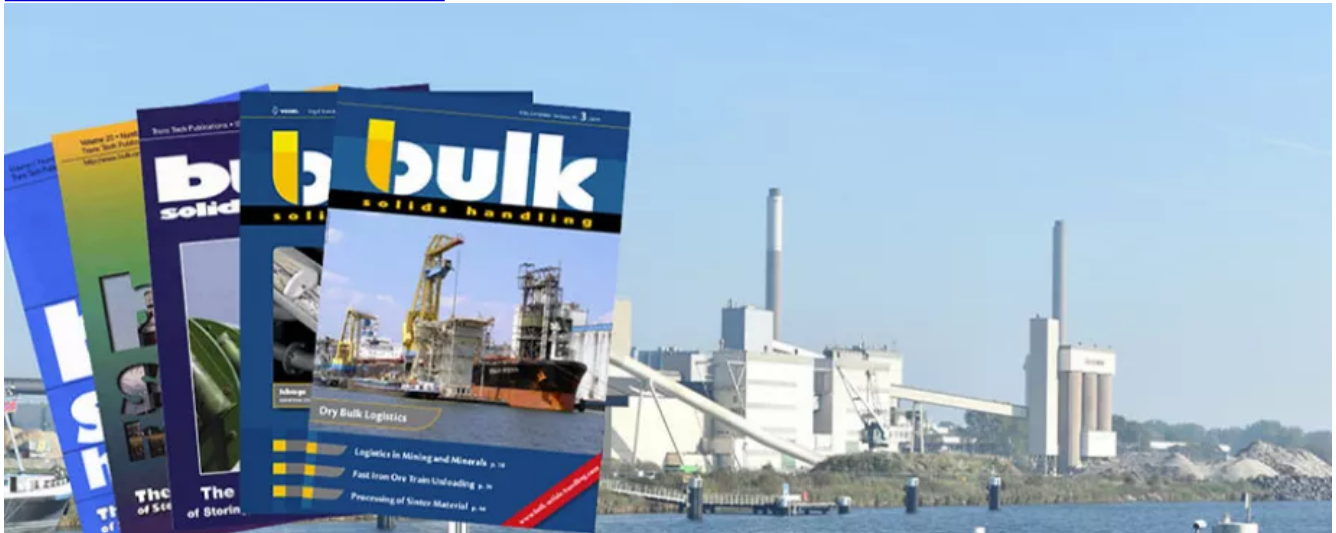




Technical Article

The Development of Bucket Wheel Excavators During the Last Fifty Years

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This article reviews the important development steps in the manufacture of bucket wheel excavators during the past 50 years. New developments and technical improvements in the areas of crawler drives, slewing gear, the bucket wheel, and the conveyor belt of the wheel boom are presented in detail. A section is devoted to the safety equipment of these machines. Finally, the author describes special applications of bucket wheel excavators in Canadian open pit oil sand mines, in chalk mines, in various open pits in Germany and other countries, as well as the construction of the Chasma-Jehlum Canal in Pakistan.

1. Introduction

The development of open pit mining over the past 50 years made it possible to mine economically raw materials from ever increasing depths. A prerequisite for this is the capability of stripping and dumping larger and larger masses of overburden at reasonable costs.

Open pit mining technology gave impulses for the development of suitable equipment for digging, dumping and transporting large masses, overburden as well as the pay mineral itself. This development took place simultaneously for the so-called conventional (discontinuous) mining equipment such as front end

loaders, shovels and draglines as winning machines with heavy trucks as transport units, and for the continuously operating equipment such as bucket wheel and bucket chain excavators as digging elements, conveyor lines for the transport of the mined material, and spreaders for dumping the overburden.

Conventional equipment is primarily used when mining pay zones which are not covered with high overburden depths and where the overburden can be overthrown directly across the stripped raw materials into the mined out zones of the pit.

In Germany, where the overburden has always been of considerable thickness and, therefore, direct overthrow of the overburden was not possible, the application of conventional equipment did not appear to promise any economic success. Therefore, the development of continuously working equipment, principally of bucket wheel excavators, was accelerated.