

# Bulk Solids Handling Research at the University of Newcastle

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Forschungsvorhaben an der University of Newcastle

Recherche sur la manutention des matériaux solides à l'Université de Newcastle

Investigación en torno a la manutención de materias sólidas a granel en la Universidad de Newcastle

ニューカースル大学における粉体取扱いについての研究

纽卡斯尔大学对散装固料处理的研究

امحاث مناولة المواد الصلبة السائبة بجامعة نيوكاسل

## 1. Introduction

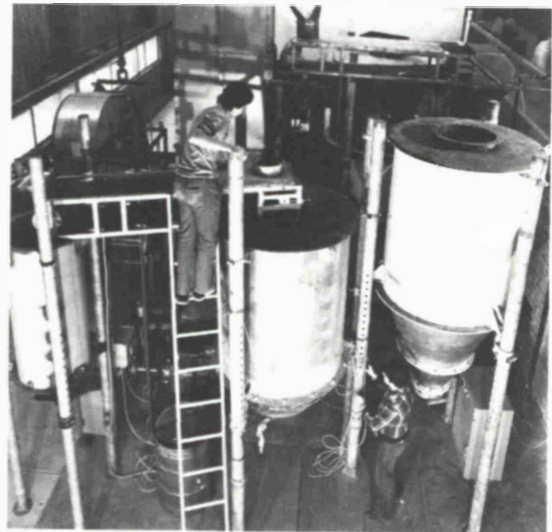
The handling of materials in bulk form is a major industrial activity of the various mining and mineral processing industries throughout Australia. With this background, the Department of Mechanical Engineering of the University of Newcastle has had an active research interest in this field for a number of years.

Broadly, this research encompasses conveyor performance investigations, determination of flow properties of bulk solids, analysis and design of storage bins and surface storage facilities and economic evaluation and optimisation of bulk handling systems design. The latter has included the development of computer-aided design procedures for the optimum design of storage bins and conveyors.

Comprehensive laboratory testing facilities have been established to aid the bulk solids handling research. Much of the equipment has been designed and manufactured within the Department. In the powder characterisation and flow property testing laboratory the strength and relevant flow parameters are determined under the required simulated field conditions. A system of experimental bins and conveyors has been set up in the adjacent handling laboratory to permit pilot scale experimental research to be carried out. Specialised elective courses in bulk materials handling are offered at the senior undergraduate and postgraduate levels as part of the engineering degree programmes. These courses integrate the latest research developments with the design of bulk materials handling systems and, at the same time, through case study type examples based on the industrial consultative experience, permit the application to 'real' industrial problems to be emphasised.

## 2. Co-operation with the University of Wollongong

In view of the strong interest in bulk solids handling of the Department of Mechanical Engineering of the University of Wollongong, the two groups at Newcastle and Wollongong work in close collaboration with fundamental and applied research. The research is planned so that each centre complements the work of the other.



Test bins and conveyors

## 3. Industrial Consultative Work

In recent years there has been considerable interest expressed by Australian industries in the bulk solids handling research work at Newcastle and Wollongong and the two groups carry out extensive consultative projects for a wide range of Australian industries. The co-operative arrangement has been formalised by the formation of a joint research group, TUNRA BULK SOLIDS HANDLING RESEARCH ASSOCIATES, a Division of THE UNIVERSITY OF NEWCASTLE RESEARCH ASSOCIATES (TUNRA) LIMITED.

While much of the work is associated with the design of storage and discharge systems a parallel activity of great importance has been the development of a non-intrusive continuous output bin level indicator and associated electronics for flow control.

## 4. Industrial Awareness Seminars

Through the activities of TUNRA BSHRA, industrial awareness seminars on bulk solids handling are held from time to time at the University of Newcastle. These seminars involve specialist lecturers from the two Universities and consultants and researchers in Australia and from overseas. The seminars have always attracted considerable interest, with delegates coming from every State of Australia.