1996-2006 Dragline Automation

The Mining Automation team at QCAT has been developing high-technology systems to assist dragline operators and mine planners since 1994. We have demonstrated our cruise control and Digital Terrain Mapping (DTM) technologies in operation on a scale model dragline in Brisbane, allowing the machine to be operated by a team member in the USA.

This work began with a number of ACARP sponsored projects to demonstrate a proof-of-concept dragline swing cruise-control system on Tarong Coal's BE1370 - a system to assist the dragline operators to perform consistently and reduce the strain and stresses on the dragline's boom. The project was successful and a second proof-of-concept demonstrator was trialled at Anglo's Boundary Hill pit in central Queensland.

This trial showed significant promise but revealed that to fulfill its potential such a system requires up-to-date spatial knowledge of its surroundings. ACARP sponsored two projects to demonstrate so-called Digital Terrain Mapping (DTM) on the Boundary Hill machine. Again, these projects were successful and the two technologies (cruise control and DTM) were shown in operation on a scale model dragline in Brisbane. This demonstration showed the power of the system as the dragline was operated by a member of the team in the USA - truly remote operation.

Dragline excavation systems are used in the removal of overburden in open cut coal mining operations.

Publications

- ACARP Tech Report C3007 - Dragline Automation
- ACARP Tech Report C4002 - Dragline Training Simulator
- ACARP Tech Report C5003 - Dragline Automation Implementation
- ACARP Tech Report C10039 - Automated Digital Terrain Mapping for Draglines
- ACARP Tech Report C13040 - Refinement of Automated Dragline Swing Control Algorithms
- ACARP Tech Report C13034 - Dragline Operational Enhancements through the use of Digital Terrain Maps
- IEEE Journal Article - Dragline automation - a decade of development : shared autonomy for improving mining equipment productivity

Patents

- US 8358810 Digital terrain mapping with GPS and laser system