

## **STEMPLUG ANNOTATED BIBLIOGRAPHY**

A. “The Importance of the Explosive Confinement” co-authored by Arturo Cancec I., Nasslo Gallardo G., Manuel Gutierrez S. for Orica, Chile “Collahuasi Mine” presented at The 27<sup>th</sup> Annual ISEE Conference on Explosives and Blasting Technique. **2001**.

**“ (We) obtained a 50% improvement in fragmentation with an increase of 23.3% Dragline Diggability Index in Ignimbrita.”**

**“Using StemPlugs made the blasting operation easier and have significantly improved fragmentation.”**

**“...explosive wave reaches the StemPlug...expands the StemPlug making it occupy the entire hole. The lower stemming cannot escape because the StemPlug stopped its advancement...upper stemming acts by reaction...adding more frictional forces to the blasthole walls. This winds up confining the explosive in a better way and increasing the working time inside the hole.”**

**“ These results indicate the use of StemPlugs reduces truck loading time by 8.3% and 21.3% as regards Gravel and Soil Stemming (respectively).”**

**“ The study will reduce the costs for the year 2000 :**  
**Auxiliary Boreholes Drilling: \$ 81,000 (US)**  
**Blasting Cost Reduction: \$0.0005 / ton (US)**  
**Drilling and Blasting Cost Reduction: \$390,861 p/yr. (US)**  
**General Reduction of Costs: \$471,861 p/yr. (US)**

B. “Blast Control Plugs Prove Worth” by Lynn Long, Quarry, October 1997.

**Anecdotal article on StemPlug in which positive numerical results are reported on fragmentation and airblast**

C. “Part B: Improved Fragmentation via the use of Blast Control Plugs” by Ron Frye and Dan Leach presented at the Seventh High Tech Seminar, Orlando, Florida- July 28, 1997.

**“A detailed fragmentation analysis demonstrating a 22% improvement in fragmentation.”**

D. “Stemming Selection for Large-Diameter Blastholes” by Jack Eloranta at the 23rd Annual ISEE Conference on Explosives and Blasting Technique, **1997**

**“...Plugs (StemPlugs) in conjunction with coarse stemming reduced ejection velocities about 40%.”**

E. Handwritten report “ Kidston Gold Mines Limited” by Rick Schwengler, April 24, 1996.

**“ In 1995 crusher and mill records were broken (which was) largely attributed to improved fragmentation. The only changes made were the introduction of StemPlugs and improved stemming material on wet holes.”**

**F.** “Blast Control Plugs” by Lynn Long presented at The 22<sup>nd</sup> Annual ISEE Conference on Explosives and Blasting Technique. 1996

**“ When we introduced blast control plugs (StemPlugs) into a blast, the first improvement seen was improved fragmentation within the blast”**

**“ We were able to reduce the amount of stemming by as much as 20%, in solid uniform rock, while still maintaining better control of flyrock and stemming ejection”**

**“ ...we were experiencing air blast that was creeping up toward the 129 dB range. Introduction of the blast control plugs immediately brought the airblast down into the 115 to 118 dB range. This result was phenomenal and helped with a vast improvement in relations with neighboring residents.”**

**G.** “ New blasting technology improves Shot Rock Production”, author unknown, Canadian Aggregates and Roadbuilding Contractor, June 1995

**“ Extensive testing using high speed photography has verified significant reductions in airblast and flyrock, and computer analysis has confirmed improvements in fragmentation of 20% or more.”**

**H.** “Guide wall Demolition at Bonneville Dam” by Randy Marks, an abstract study.

**“Use of StemPlugs in a non-conventional blasting scenario with superb results.”**

**I.** Internal memo on analysis of StemPlug Blast Control Plugs at the Granny Smith Mine in Western Australia, August, 1993.

**“ The fragmentation analysis indicated that an improvement in fragmentation of 22% T 80% passing and a decrease in oversize from 3.5% to 1.5% of the total blast has been achieved.”**