

Blast Designs for NEO Destruction & Deflection

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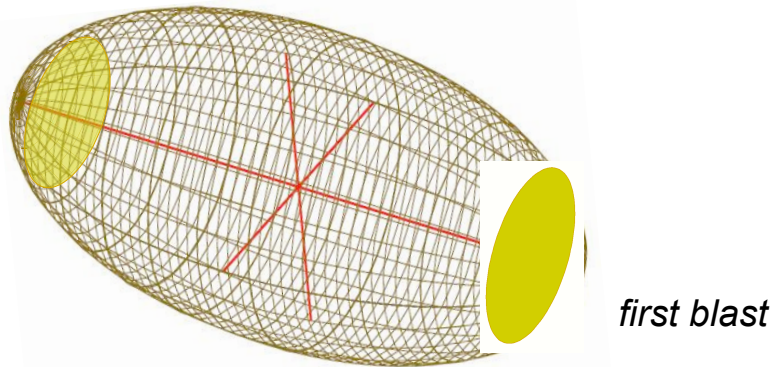


Asteroid Itokawa

Goal: Fragmentation

Blast Design:

- 0.6 kg explosive/m³ rock
- 6.6 km drilling, loaded with 15,400 tons TNT equivalent
- for 6 double-sided blasts



Requirements:

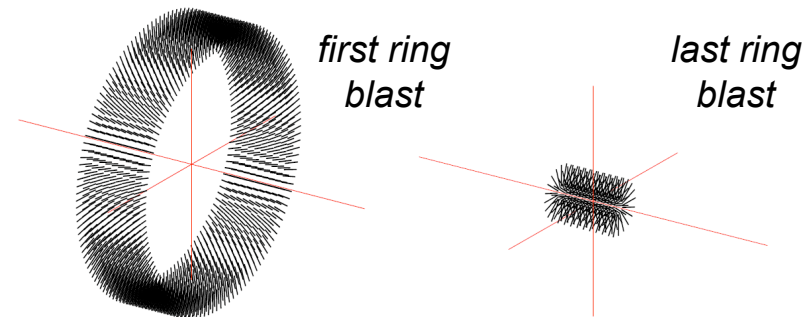
- 5 months on-site
- 1 drilling/blasting team

Comet Wild2

Goal: Fragmentation

Blast Design:

- 1.0 kg explosive/m³ rock
- 2,500 km drilling, loaded with 6,090,000 tons TNT equivalent
- for 4 double-sided blasts and 6 ring blasts



Requirements:

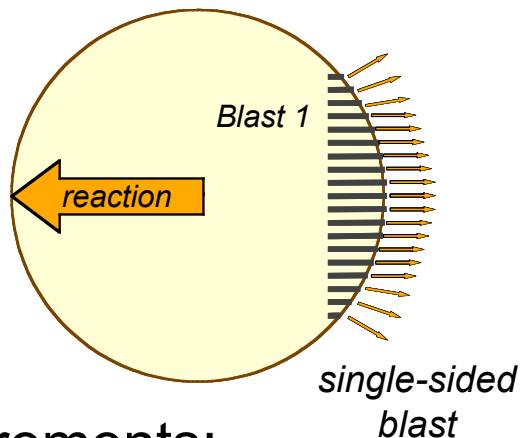
- 7.2 years on-site
- 20 drilling/blasting teams

Asteroid 1986DA

Goal: Orbit Change

Blast Design:

- 1.5 kg explosive/m³ rock
- 350 km drilling, loaded with 224,000 tons TNT equivalent
- for up to 3 ring blasts



Requirements:

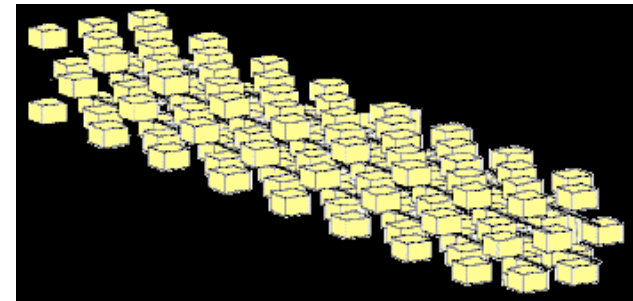
- 2.0 years on-site for 3 blasts
- 10 drilling/blasting teams

Asteroid Eros

Goal: Splitting/Orbit Change

Blast Design:

- 0.5 kg explosive/m³ rock
- 408,000 km drilling, loaded with 3,830,000 tons TNT equivalent
- for single mass blast across waist



*completed stopes
before pillar blast*

Requirements:

- 25.8 years on-site
- 1,000 drilling/blasting teams

R&D Needs

Distributing Explosives at Depth in Microgravity

- Equipment
- Techniques

In situ Fabrication

- Explosives, life-support gases, propellants, equipment
- Reduce launch mass

Test Shots

Other Needs

Sufficient Warning Time

Effective Transport

Conclusions

Distributed-Energy Blasting

- Controls maximum fragment size
- Builds on pre-existing body of knowledge
- Requires some adaptations

NEO Mitigation Toolbox

- Multiple approaches needed
- Each focused on particular situation(s)
- Applicabilities must overlap
- Can be combined

***NOT A QUICK FIX,
BUT A SURE ONE***