A blast master plan is the tool that harmonizes all the aspects that need to be considered in a pit regarding blasting, and involves different departments whose activities influence the performance of the explosives. When a blast master plan is properly elaborated, the mine has a powerful tool for efficiency and optimization of the whole mining operation.

Each Blast Design requires a plan that take into account each particular rock mass (UCS and FF), site conditions/restrictions, mining direction and surrounding blasts.
A Blast Master Plan should:

- Define the goal of each blast: A primary goal of the blast has to be declared depending on the priority determined: fragmentation, dilution control, displacement, slope protection, flyrock control and vibrations. Priorities should be established in order.

- Assign blast designs: According to the goal determined, blast designs are assigned. Parameters: hole diameter, burden, spacing, charge, timing, stemming type and length.

- Define blast size: Based on blastability, production requirements and limitations imposed by drill fleet and blast crew blast shapes and sizes, with a corresponding tonnage are established. Fragmentation, dilution control and wall protection are critically influenced by blast size and shape.

- Define blast shape and orientation: Blast shape is defined based on promoting explosive efficiency, controlling muckpile displacement, limiting overbreak and encouraging consistent blast performance - the pattern orientation should be based on the most beneficial direction to achieve the primary goal of the blast - blasthole locations are offset from bench to bench to prevent drilling into bootlegs.

- Define production sequence: Production sequence is determined by slope sensitivity, ore/waste requirements, drill utilization, and excavation rates and bench preparation with consideration given to the optimum displacement direction needed to maximize blast performance.

- Shot rock inventory: Shot rock inventories should be large enough to avoid irregular patterns and allow timing design to be based on blasthole assays if applicable.

- Review and approve blast master plan: Blast master plan is reviewed, modified if necessary and approved by representatives from production, ore control, geotechnical, long / short range planning and drilling and blasting - design approval is signed off by each group.

- Archive blast master plan: Actual blast boundaries and blasthole locations are archived for future reference and design assistance.

Some Bad Examples

- Situation: irregular shapes, blast sizes too different, non-consistent results

- Situation: Blast designs following ore pockets resulting in oversize due sharp corners, back break and wall damage.

(by Blast Dynamics)
This case shows the transition to a world-class Blast Master Plan at Ellatzite Med copper mine, the largest open pit operation in Bulgaria. Initially, basic blast design guidelines involving the restrictions (mainly vibrations) of the blasts were detected, but with no proper order of blasts and inconsistent blast shapes.

Restrictions to be considered at Ellatzite:
- Vibration levels at nearby ore transportation tunnel
- Wall control concerns, specially at the main pit fault. Main wall is 800 m (2,400 ft) height
- Drill utilization
- Stocks of blasted rock
- Fragmentation
- Efficiency

Production and Planning needed to interact more closely in order to deliver the tonnage needed for the mine and, at the same time, configure a consistent set of blast designs that took into account blast goals and site restrictions. Single row blasts, shooting around corners, small size blasts were changed to more efficient designs.
Main features now are:

- Blasts are consistent in shape, making it possible to evaluate and optimize designs
- Wall control blasts are improving final wall quality
- Dilution is taken into account
- Drill rig travel times have decreased significantly
- Geology/geotechnical conditions interact closely with the blast design team

Once this detailed Blast Master Plan was achieved, the main goal of each one the blasts could be declared and agreed by concerned departments: geotechnical, planning, load-haul, drill and blast. Potential for this tool is now being pushed to the limits in order to achieve: A dilution control program, Fragmentation optimization – explosive efficiency and Wall Control refinement