PP-MB-222

Stress analysis of projectile 155mm ERFB BT

Rajesh B Ohol[a], Tekram Parshuramkar[b], BA Parate[c] , DG Thakur[d]

[a,d] *Defence Institute of Advanced Technology, Girinagar, Pune-411 021, India.*
[b]*Ordnance Factory, Ambajhari, Nagpur- 440 021, India.*
[c]*Armament Research & Development Establishment, DRDO, Pune-4110 021, India.*

ABSTRACT

The stress analysis of 155 mm High Explosive Extended Range Full Bore Boat Tail projectile, the artillery ammunition subjected to propellant pressure inside the gun barrel by an analytical method is a complex exercise because the physical parameters of the projectile - the wall thickness and the external profile of the shell vary along the length. However, the analytical analysis is simplified by assuming the shell as a thick wall cylinder. Lamè's theory is applied to study the tangential, radial, and longitudinal stresses induced in the shell body. The work aims to check if the shell body filled with the explosive yields against the propelling charge pressure inside the gun barrel. In this study, numerical and analytical analyses are presented taking into account the static loading. The stress analysis of 155mm HE ERFB BT projectile using finite element analysis capabilities of the computer-aided software SOLIDWORKS reveals the nature of stress distribution in the shell body and boat tail. Numerical modeling has included a comprehensive mesh convergence study of the projectile. The von Mises stresses induced in the shell body and boat tail are within the limit of the yield strength of the shell. The results obtained are useful to support the failure analysis of the projectile from the point of view of the material strength of the shell assembly.

Keywords: Stress analysis; 155mm HE ERFB BT; Lamè theory; Static loading; von Mises stress; Failure analysis.

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Study on the mechanical behaviour of Metal Matrix Composites (MMC)

S.Venugopal[1], Sanjeevi baskar[2], Pulipaka Neel Fordham Samuel[3*]

[1] *Department of Automobile Engineering, Vels Institute of Science Technology and Advanced Studies (VISTAS), Chennai.*
[2] *Department of Automobile Engineering, Vels Institute of Science Technology and Advanced Studies (VISTAS), Chennai.*
[c] *Student, Department of Automobile Engineering, Vels Institute of Science, Technology and Advanced Studies (VISTAS) Chennai, India.*

**** Corresponding Author:*** venugopal.se@velsuniv.ac.in, samuelpulipaka@hotmail.com

ABSTRACT

Materials having metals as the base and separate, usually ceramic phases, added as reinforcements to improve the characteristics are known as metal matrix composites. whiskers and particles are examples of possible reinforcements. By changing the type of ingredients

and their volume percent, metal matrix composite properties can be adjusted. They provide a superior mix of qualities that no monolithic material currently in use can match, and as a result, the aerospace and automotive industries are using them more frequently. MMCs' main advantage over other materials is their increased strength and hardness per unit weight.

Keywords: MMC, alloy, mechanical properties, aluminium matrix composite, Al_2O_3.

PP-MB-235

Investigation of Aluminum Alloy 6061 in Wire-EDM regarding surface roughness & material removal rate by adopting optimization techniques

Ritik kumar rawat[a], Mohd Saif[a]

[a]*Department of Mechanical Engineering, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Prayagraj (Allahabad), 211007, India.*

ABSTRACT

Wire-electric discharge machining (WEDM) offers a number of benefits in comparison to traditional manufacturing process likewise, no obvious mechanical cutting trace also hard and rigid materials can be processed perfectly in WEDM. Since, aluminum alloys are used in aerospace, shipbuilding, breathing gas cylinder for scuba diving, surgical components and automotive industry for high strength to weight ratio, accurate shapes and dimensions. Through this method, complicated structures made of aluminum alloy are produced in a single setup with incredibly tight tolerances. The present investigation explores WEDM by varying different process variable of AA6061performance measures in terms of MRR and SR. The Taguchi L18 OA matrix, S/N ratio, ANOVA and GRA were employed to study SR and MRR in WEDM. It has noted that pulse on time and peak current are the utmost influential aspect for SR and MRR. Further, the best possible considered parameters setting has been established by applying GRA for outcomes.

Keywords: WEDM; AA6061; Taguchi Method; GRA; SR and MRR.