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PBX 9501炸药动态增强因子的预测公式 分享到：

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Title: Predicted Formula of the Dynamic Increase Factor of PBX 9501

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摘要: 为量化应变率效应对PBX炸药力学性能的影响,引入动态增强因子的概念。以PBX 9501炸药为研究对象,总结并收集了其在不同温度和不同应变率下的压缩强度和拉伸强度数据,利用WLF时温等效原理将不同温度下的数据换算成室温条件对应应变率下的值,补充了缺少的强度数据。基于实验数据,分别拟合了PBX 9501炸药压缩强度和拉伸强度的动态增强因子的预测公式。结果表明,随着应变率的变化,PBX 9501炸药的压缩强度和拉伸强度在双对数坐标下均呈现双线性增长趋势,但是压缩强度和拉伸强度的变化趋势是不同的。在给定的应变率范围内,压缩动态增强因子的最大变化值超过40,而拉伸动态增强因子的最大变化值小于10。用这些经验公式,可预测不同应变率下PBX 9501炸药的强度变化,便于工程应用。

Abstract: To quantify the effect of strain rate effect on the mechanical properties of PBX, the concept of dynamic increase factor was introduced. The compression strength and tensile strength data of PBX 9501 used as the object of study under different temperatures and different strain rates were summed up. Parts of experimental data were converted to those at room temperature by the WLF time-temperature superposition principle to supplement the lacked strain strength data. The prediction formulas of dynamic increase factor of compressive strength and tensile strength of PBX 9501 were fitted based on the test data, respectively. Results show that with the change of strain rate, the compression strength and tensile strength of PBX 9501 reveal a bilinear growth trend in the log-log coordinate, but the trend of change in the compression strength and tensile strength of PBX 9501 is different. At the given range of strain rate, the maximum change value of dynamic increase factor of compression is beyond 40, while the maximum change value of dynamic increase factor of tension is less than 10. With these empirical formulas, the strength variation of PBX 9501 at different strain rates can be predicted, which is convenient for engineering application.

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