Abstract Submitted for the SHOCK11 Meeting of The American Physical Society

Computational work minimization of two-bucket searches for meshless-particle neighbors CHARLES GERLACH, Southwest Research Institute — Modeling explosive-solid interactions with meshless particles in a Lagrangian framework allows for robust computations in complex geometric situations where element explosives could be problematic. The EPIC code originally used a single-bucket scheme to find the nearby "neighbor" particles for the meshless algorithm. The efficiency of the bucketing scheme is O(N), where N is the number of particles, but there is a constant multiplicative factor which is proportional to the average number of particles per bucket (P). When the explosive particles expand, they can cause the bucket size to be an order of magnitude larger than what would be necessary for the majority of the particles, which drives up P and causes the computational time to become unworkably large. The computational time is reduced by adding a second set of buckets to sort the smaller particles. This paper will show the algorithm used to determine the size of the smaller buckets so as to approximately minimize computational time, and will also show some simulations that were made possible due to those time savings.

> Charles Gerlach Southwest Research Institute

Date submitted: 22 Feb 2011

Electronic form version 1.4