ELSEVIER

Computer Physics Communications 96 (1996) 105–106

Computer Physics Communications

Erratum

Application of a particle-in-cell method to solid mechanics [Comput. Phys. Commun. 87 (1995) 236–252] ★

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Received 12 March 1996

In Ref. [1], we described an extension of the particle-cell-method FLIP [2] for solving problems in large deformation solid mechanics. Results using the method to study a Taylor impact problem [3] were reported. The Taylor problem consists of the high speed impact of a cylinder against a rigid surface. A description of the material properties for the aluminum cylinder, as well as the initial geometry can be found in Ref. [1]. Fig. 5a,b in that paper showed contours of the plastic strain invariant. There was a large strain at the impact surface, as expected; but, also some strain along the axis of the cylinder.

We noted that this result should be scrutinized more closely. Subsequently, we have identified a coding error which caused the plastic strain on the axis. In particular, the hoop stress was not computed correctly. Making the correction resulted in the plastic strain contours pictured in Fig. 1a,b on the next page. Details of the implementation of the axisymmetric formulation of the numerical method are given in Ref. [5].

The maximum strain has also been reduced with this correction. The results now agree quite well with other computed results in the literature [4]. The corrected hoop stress had a small effect on the overall deformation of the cylinder. Table 1 records the final geometry of the cylinder predicted by FLIP for both a perfectly-plastic cylinder and a strain-hardening, plastic cylinder. The table shows the final length L^f, radius at the impact surface R_1 and the radius 0.25 cm up from the impact surface, R_2. The values in this table differ by 1-5% from the results reported previously [1].

Table 1

	L^f (cm)	R_1 (cm)	R_2 (cm)
Perfect plasticity	1.45	0.98	0.49
Strain hardening	1.65	0.78	0.51

References

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★ SSDI of original article: 0010-4655(94)00170-7.

PII S0010-4655(96)00061-6

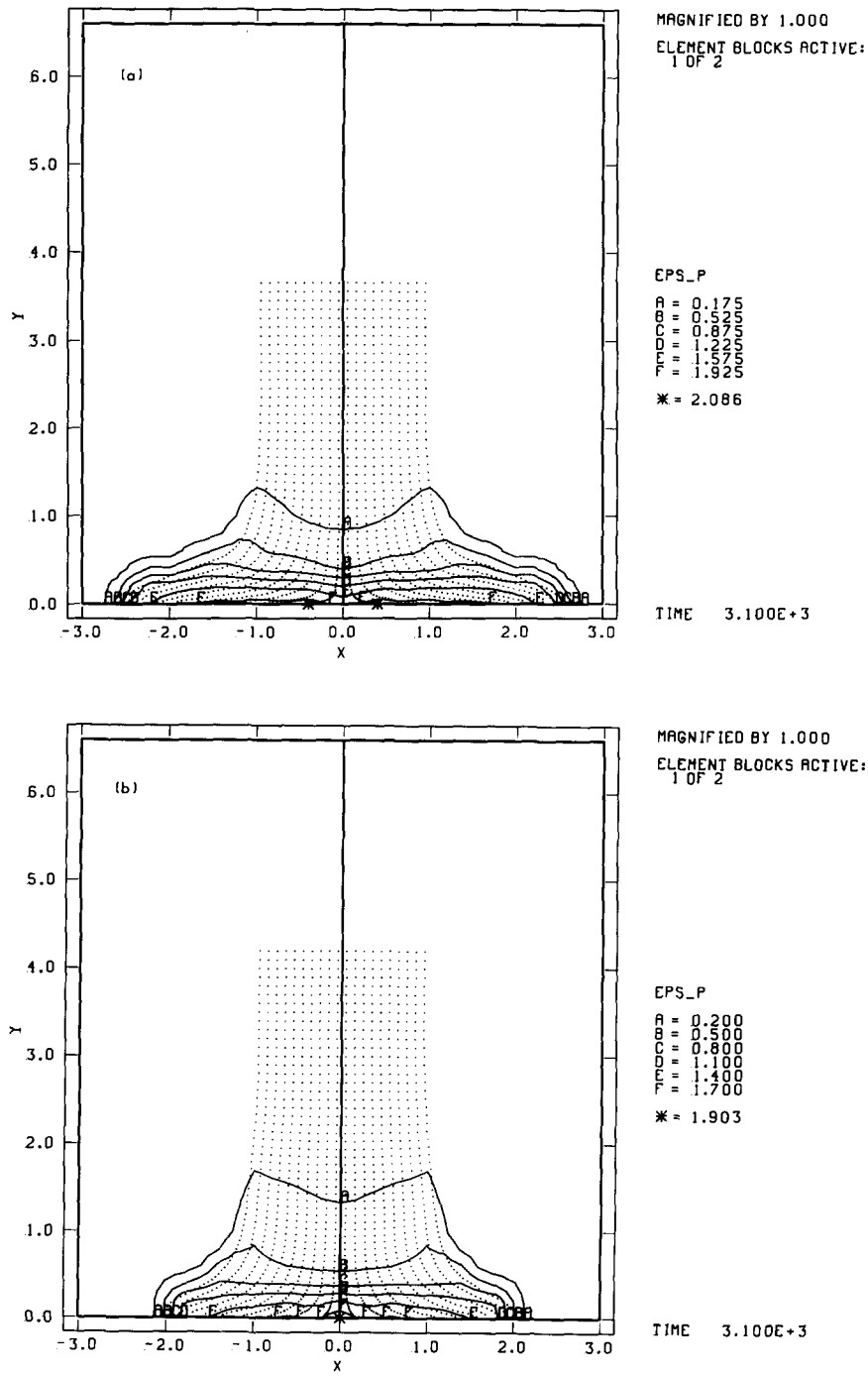

Fig. 1. Contours of plastic strain invariant after impact for the deformed cylinder, (a) perfect plasticity, (b) strain-hardening plasticity.