

Title	FABIG Technical Note 10: An Advanced SDOF Model for Steel Members Subject to Explosion Loading: Material Rate Sensitivity	
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Scope	<p>Introduction</p> <p>This Technical Note describes an extension to a sophisticated SDOF model for steel members subject to explosion loading. The previous model accounted for:</p> <ul style="list-style-type: none"> i) Generalised support conditions for bending and axial actions; and ii) The catenary effect in axially-restrained members, under uniformly distributed (UDL), blast loading. However, that model did not incorporate material rate sensitivity, which has considerable influence on the blast response of steel members. The present work extends the previous model to deal with the strain-rate effect, and to provide more rational ductility measures than possible with rate-insensitive modelling. <p>The Technical Note proceeds by providing an overview of the problem characteristics as well as the formulation method used in developing the new SDOF model, where consideration is given to material rate sensitivity in accordance with the Cowper-Symonds model. The details of the overall model are then provided, mainly in the form of parametric tables, covering both the bending and catenary stages of the plastic rate-sensitive member response. Finally, several verification and application examples are provided, with particular emphasis given to the new developments, where comparisons are made against the nonlinear finite element analysis program ADAPTIC. These examples demonstrate the calculation process involved in applying the new SDOF model, and illustrate the very good accuracy which the new model achieves.</p>	
Table of Contents	<p>FOREWORD iii</p> <p>1. INTRODUCTION 1</p> <p>2. PROBLEM CHARACTERISTICS AND ASSUMPTIONS 3</p> <p>3. FORMULATION METHOD 5</p> <p> 3.1 Cross-sectional Response 5</p> <p> 3.2 Bending Stage 6</p> <p> 3.3 Catenary Stage 7</p> <p>4. CROSS-SECTIONAL RESPONSE 9</p> <p> 4.1 Major-Axis Bending 9</p> <p> 4.2 Minor-Axis Bending 9</p> <p>5. DYNAMIC STRENGTH 11</p> <p> 5.1 Bending Stage 11</p> <p> 5.2 Catenary Stage 11</p> <p> 5.3 Evaluation of Model Parameters 12</p> <p>6. DUCTILITY MEASURES 13</p> <p>7. MODEL SOLUTION PROCEDURE 15</p> <p>8. EXAMPLES AND VERIFICATION 17</p> <p> 8.1 Cross-section Response 17</p> <p> 8.2 UDL Blast loading 17</p> <p>9. CONCLUSION 23</p> <p>REFERENCES 25</p> <p>APPENDIX A NOTATION 27</p> <p>APPENDIX B FIGURES 31</p>	

	APPENDIX C TABLES	37
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