

Dam break - impact on hypoelastic structure

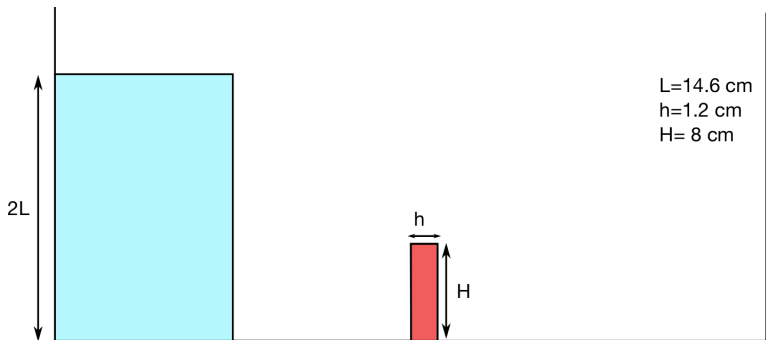
Iñaki Çaldichoury Facundo Del Pin Rodrigo Paz

LSDYNA ICFD solver
Dev version SVN 110295

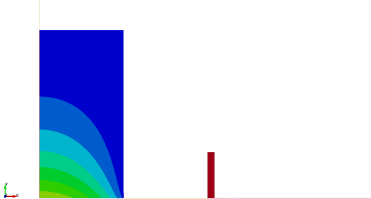


This Validation problem uses adaptive remeshing every three timesteps with $dt = 1e - 3s$ and the mesh size varying between $2mm$ and $1cm$.

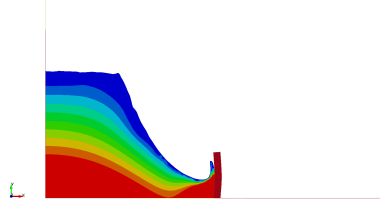
Quantity	Units	Value
ρ_f	$kg.m^{-3}$	1000
μ_f	$Pa.s$	0.001
g	$m.s^{-2}$	9.81
ρ_s	$kg.m^{-3}$	2500
E	Pa	$1.0e^6$
ν_s	—	0.0



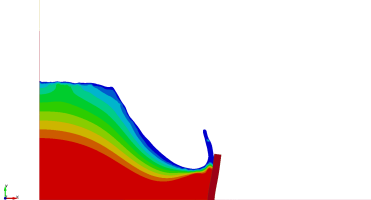
LS-DYNA keyword deck by LS-PrePost
Time = 0.005, #nodes=33615, #elem1d=916, #elem2d=46312



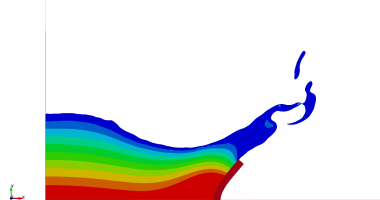
LS-DYNA keyword deck by LS-PrePost
Time = 0.14, #nodes=11882, #elem1d=916, #elem2d=22846



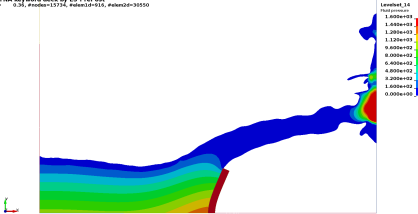
LS-DYNA keyword deck by LS-PrePost
Time = 0.18, #nodes=12021, #elem1d=916, #elem2d=23124



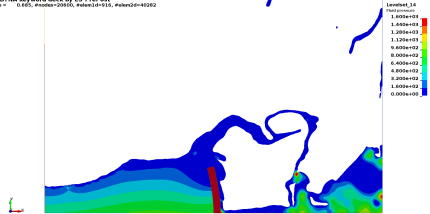
LS-DYNA keyword deck by LS-PrePost
Time = 0.24, #nodes=14952, #elem1d=916, #elem2d=20986



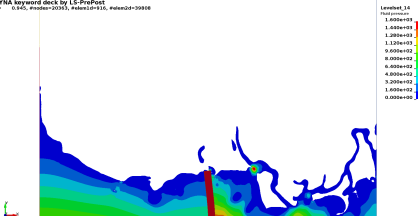
LS-DYNA keyword deck by LS-PrePost
Time = 0.38, #nodes=13734, #elem1d=919, #elem2d=30550



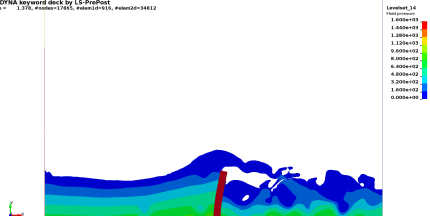
LS-DYNA keyword deck by LS-PrePost
Time = 0.605, #nodes=20910, #elem1d=919, #elem2d=40262

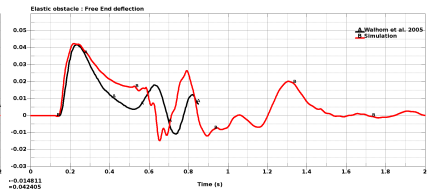
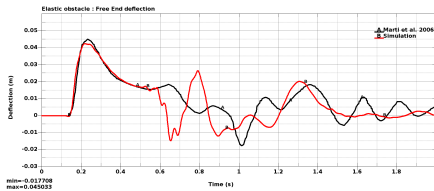
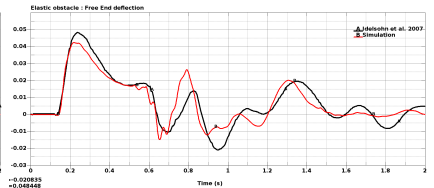
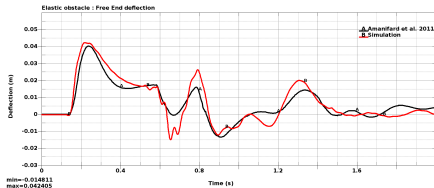


LS-DYNA keyword deck by LS-PrePost
Time = 0.145, #nodes=20393, #elem1d=916, #elem2d=39916



LS-DYNA keyword deck by LS-PrePost
Time = 1.370, #nodes=17815, #elem1d=916, #elem2d=34612





- [1] World Congress on Engineering, *An SPH Approach for Fluid-Hypoelastic Structure Interactions with Free Surfaces*, (London, U.K), WCE, July 2011.
- [2] S. Idelsohn, J. Marti, A. Limache, and E. Oñate, “Unified lagrangian formulation for elastic solids and incompressible fluids: Application to fluid–structure interaction problems via the {PFEM},” *Computer Methods in Applied Mechanics and Engineering*, vol. 197, no. 19–20, pp. 1762 – 1776, 2008.
Computational Methods in Fluid–Structure Interaction.
- [3] J. Marti, S. Idelsohn, A. Limache, N. Calvo, and J. D’Elía, “A fully coupled particle method for quasi-incompressible fluid-hypoelastic structure interactions,” *Mechanica Computacional*, vol. 25, pp. 809–827, 2006.
- [4] E. Walhorn, A. Kölke, B. Hübner, and D. Dinkler, “Fluid–structure coupling within a monolithic model involving free surface flows,” *Computers and Structures* vol. 83, no. 25–26, pp. 2100 – 2111, 2005

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