DYNARACK METHODOLOGY

Chuck Bullard

March 3, 2014

Overview

History of Use

Basis for DYNARACK Methodology

DYNARACK Model

Program Execution

DYNARACK Validation

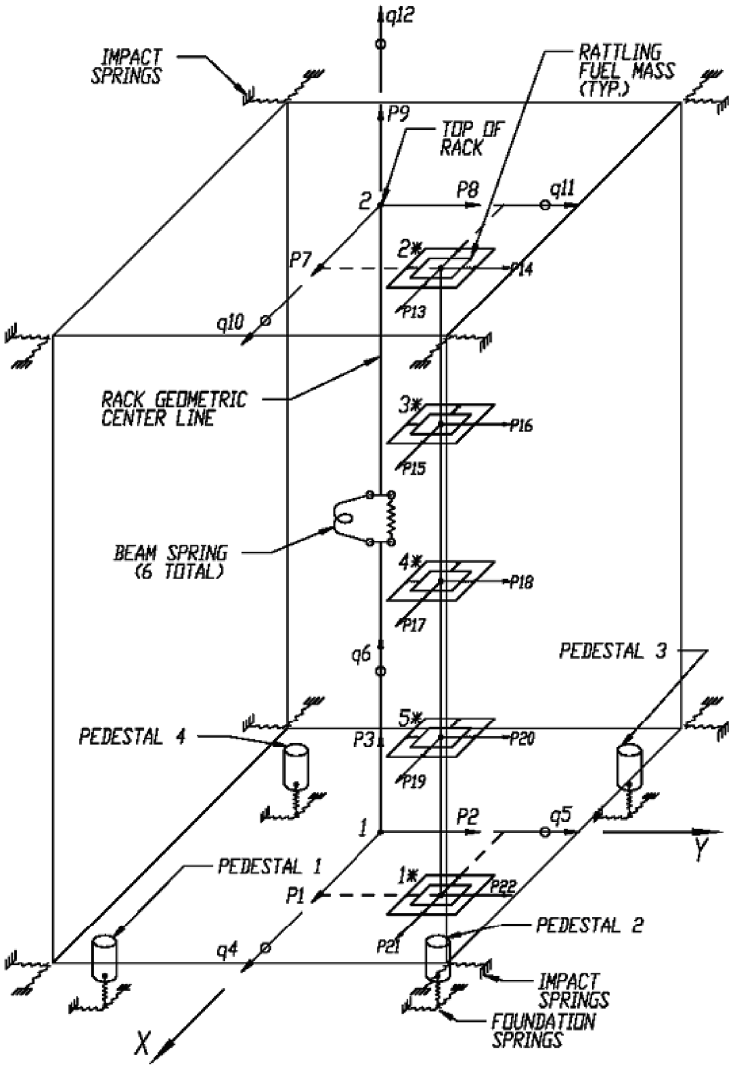
History of Use

- First Introduced by Holtec in 1980
- Used by Holtec on more than 50 spent fuel rack licensing applications
- Over the years DYNARACK has been audited by multiple agencies, including the NRC, Bell Labs, Brookhaven National Lab, and Franklin Lab

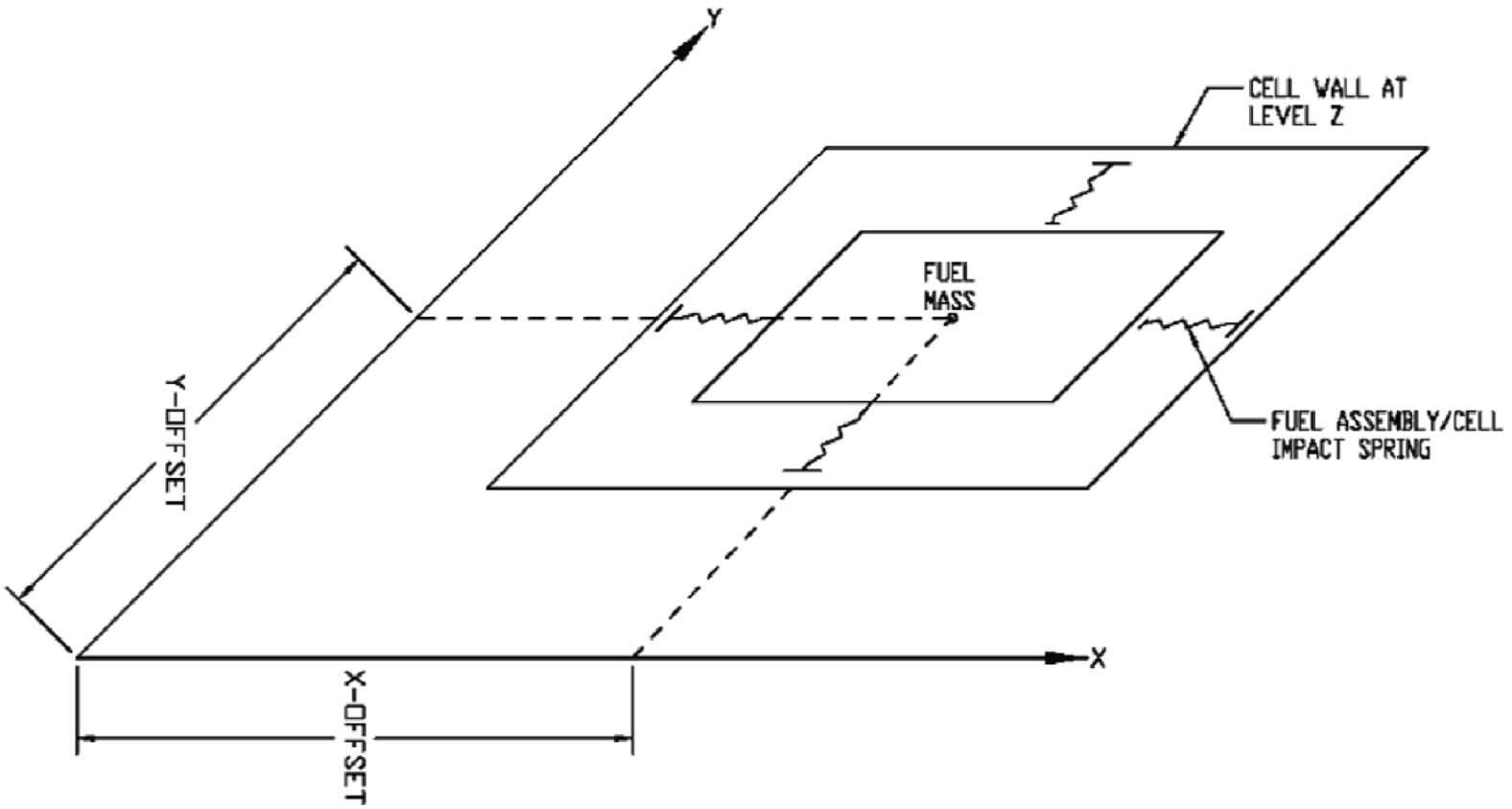
Basis for DYNARACK Methodology

- Rack Cellular Structure is modeled as a beam member based on guidance in SRP 3.8.4:
  - "Design, fabrication, and installation of spent fuel racks of stainless steel material may be performed based on ASME Code, Section III, Division 1, Subsection NF requirements for Class 3 component supports."
- Soluiton method is based on "The Component Element Method in Dynamics" by Levy & Wilkinson
- Spring stiffnesses used to characterize the spent fuel rack are based on "Seismic Responses of Free Standing Fuel Rack Constructions to 3-D Motions" by Drs. Singh and Soler

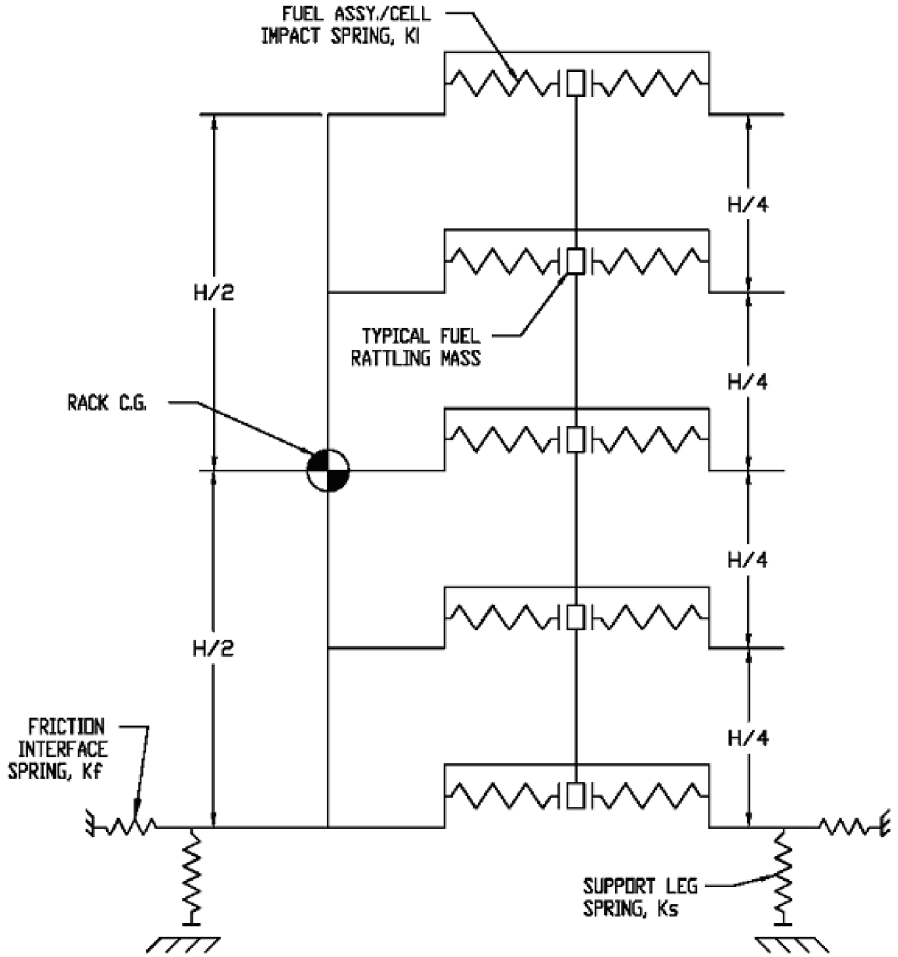
DYNARACK Model



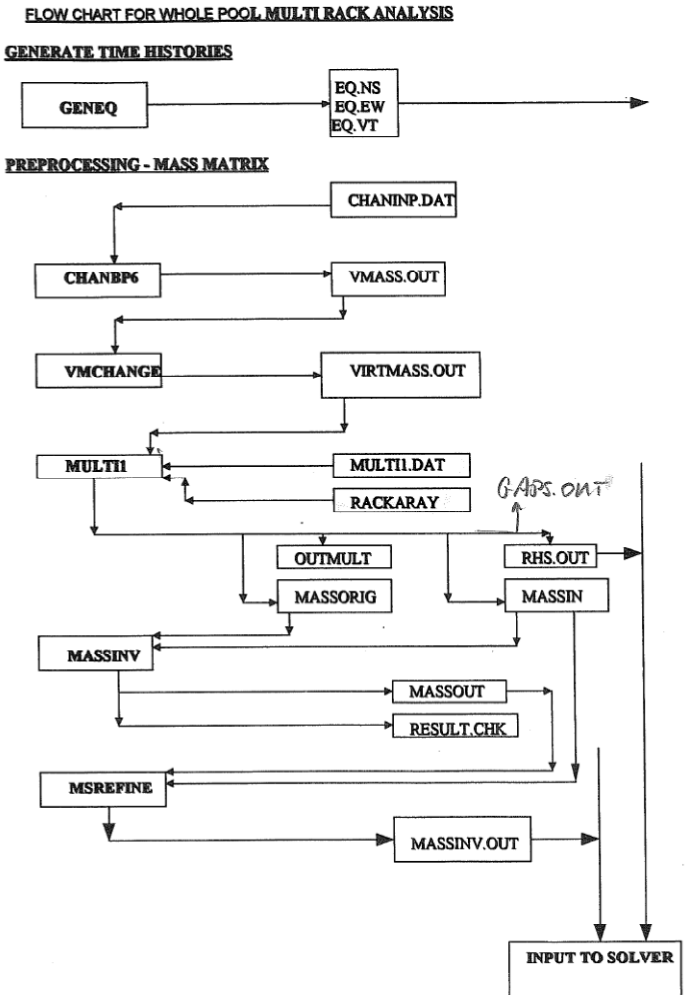
DYNARACK Model (cont.)

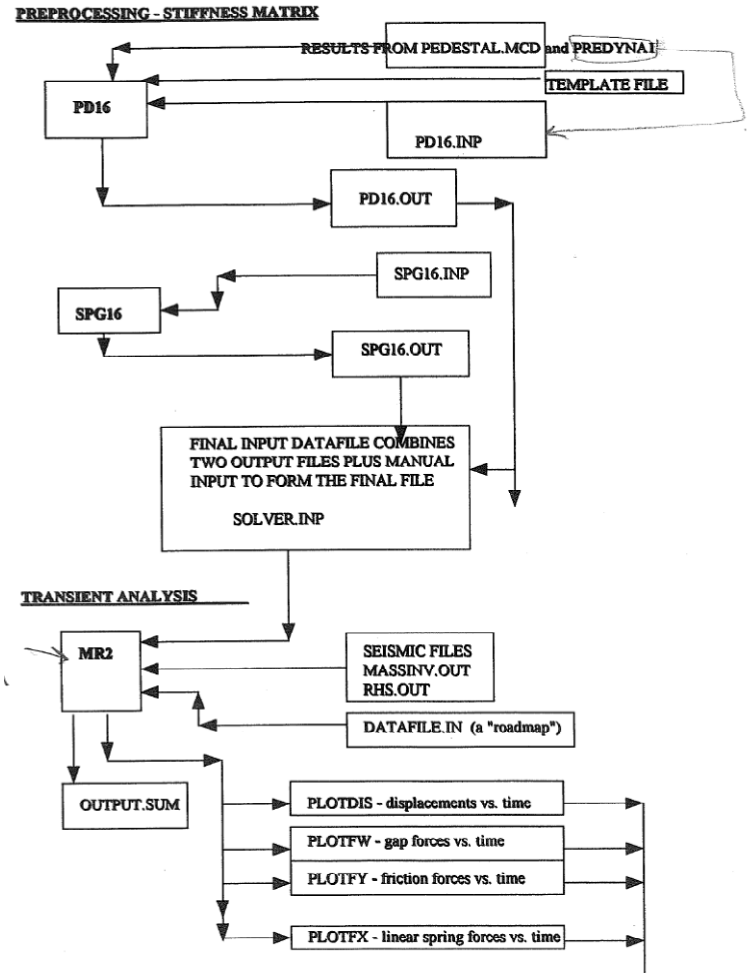


DYNARACK Model (cont.)



Program Execution





DYNARACK Validation

- Holtec Report No. HI-91700 demonstrates capabilities of DYNARACK solver by comparing numerical solution with published solutions for a wide range of dynamic problems
- Latest version of DYNARACK (aka DYNAMO) is validated in Holtec Report No. HI-2114848
- DYNARACK model has also been validated through comparisons with LS-DYNA 3-D finite element solutions