

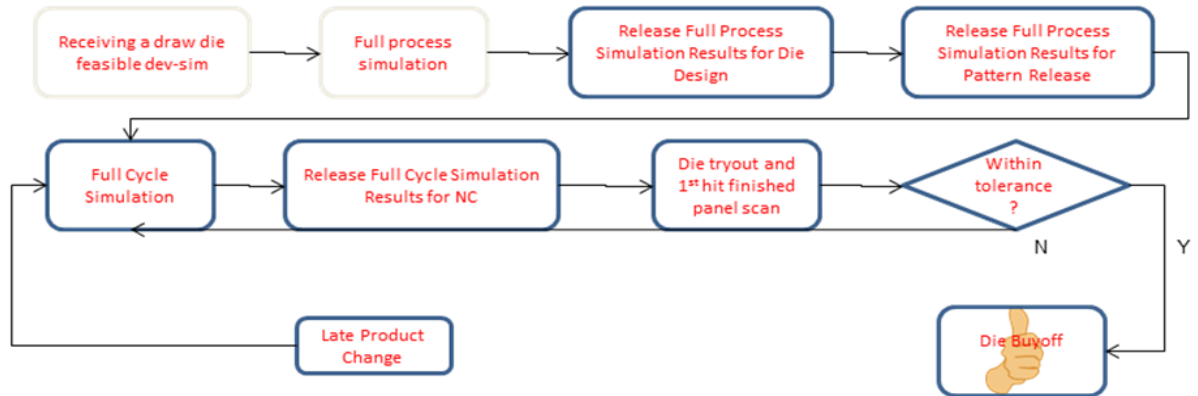
## Full Cycle Simulation, Virtual Tryout and Reality Check

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Full Process Simulation is the Simulation on all line dies (all nominal design dies) with formability results and final springback results at the end of the line. Full Cycle Simulation is the Simulation on all line dies (all compensated dies) with formability and springback results on panels from each operation. The final operation panel must meet the GD&T tolerance requirements. The final surface quality must meet the NC programming quality requirements. The operation panels must meet nesting/fitting tolerance requirements. This full process full cycle simulations presented tremendous challenges to Chrysler stamping simulation engineers. In Chrysler, we did full process full cycle simulation on all of our in house stamping line dies, hoping that we will achieve significant improvement in our stamping dimensional quality. The reality is available now to be shared with the stamping simulation community.

In this presentation, a typical full cycle simulation flow is included to show how the virtual tryout is iteratively performed to achieve dimensional accuracy. CMM data are collected after real tryout and summary of the CMM data is included to show the reality check. Room for improvement is obvious after reviewing the reality check.

### Full Process-Full Cycle Simulation Flow Chart:



Part Number -	Part Name	% of CMM points within +0.5mm	% of CMM points between +0.5mm and +1mm	% of CMM points o/s +/- 1.0mm
68082250AA	Panel Frt Floor Tunnel	66%	26%	8%
68084434AA	Reinf Frt Floor Tunnel	90%	10%	0%
68082290-1AA	Panel Front Floor Pan R/L	77%	19%	4%
68082299AA	Panel Ctr Floor Pan	65%	29%	6%
68082306AA	Panel Rr Floor Pan	61%	31%	8%
68081973AA	Cross-member Dash Panel Lower R/L	61%	39%	0%
68082314-5AA	Panel Cowl Side Inner R/L	53%	33%	14%
68082341AA	Cowl Plenum Lower	66%	23%	11%
68081975AA	Cross- member Plenum Lwr	86%	14%	0%
68082009AA	Panel Dash	43%	10%	63%
68082296AA	Cross-member Rr Kick Up	98%	2%	0%
68082298AA	Reinf Rear Kick Up	65%	18%	17%
68082206-7AA	Panel Rear W/Hse Inner R/L	39%	24%	37%
68082148AA	Panel Rear Rail Lower R	52%	25%	23%
68082149AA	Panel Rear Rail Lower L	52%	27%	21%
68082166	Panel Rear Rail Up R	59%	22%	19%
68082167	Panel Rear Rail Up L	61%	23%	16%
68086994-5	Panel Rear Rail Front R/L	83%	17%	0%
68081838AA	Panel Front Side Rail Inner R/L	69%	25%	6%
68081839AA	Panel Front Side Rail Inner R/L	79%	17%	4%
68082334/5AA	Sill Inr Rr R/L	70%	20%	10%
68087914-5AA	Rail - Frt Floor Pan R/L	100%	0%	0%

