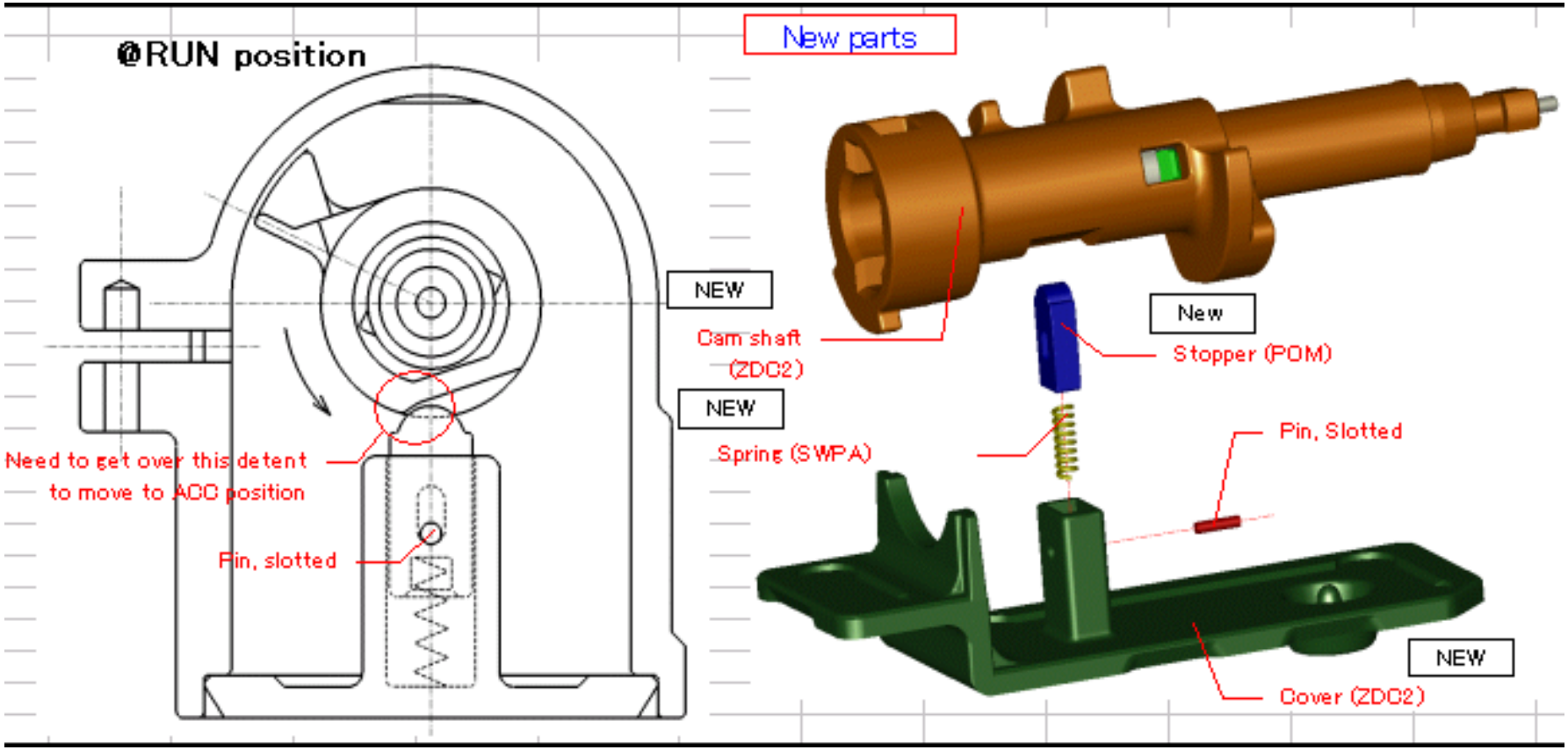
GMX001 Lock Module Detent in RUN

First Design Concept

- Detent between lock cover and cam shaft:



GMX001 Lock Module Detent in RUN

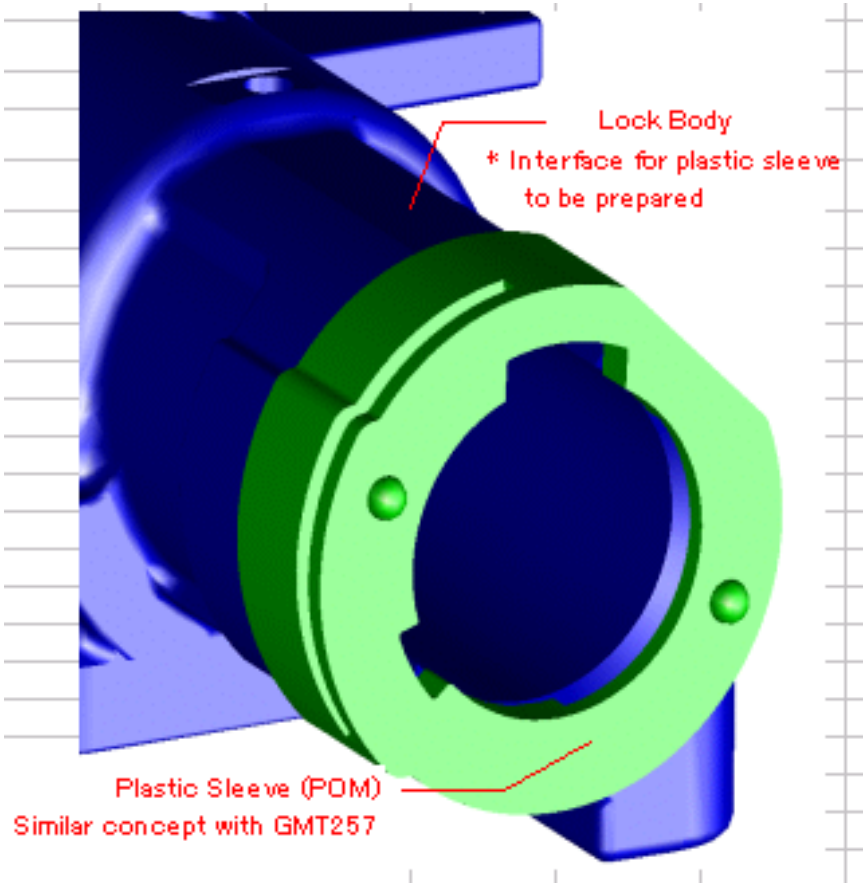
- Design Evaluation (Engineering and Cost)
  - The most preferred by supplier

Engineering		*Cost & Timing*		
Benefits	**Concerns**	**Piece Cost Increase**	**Tooling**	**Lead Time**
No interface tuning required (between lock housing and cylinder)	-A few new components are needed - Torque specification needed by supplier	$0.5716	179143 (new tooling)	About 1 year

GMX001 Lock Module Detent in RUN

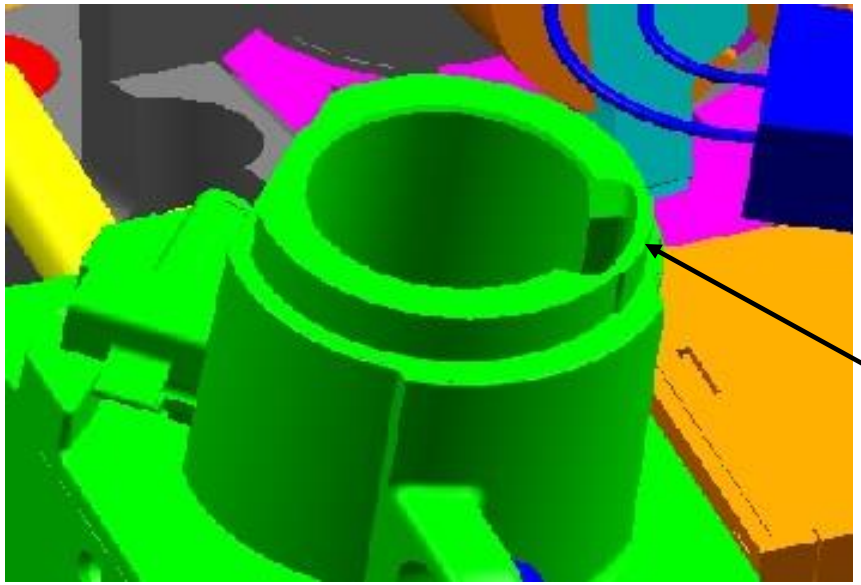
Second Design Concept

➢ Adding a plastic sleeve to the lock housing-lock cylinder interface:



GMX001 Lock Module Detent in RUN

- Design Evaluation
  - Main concern with trimming of the lock housing to accommodate plastic sleeve



GMT 257 UG Data Shown

GMX001 Lock Module Detent in RUN

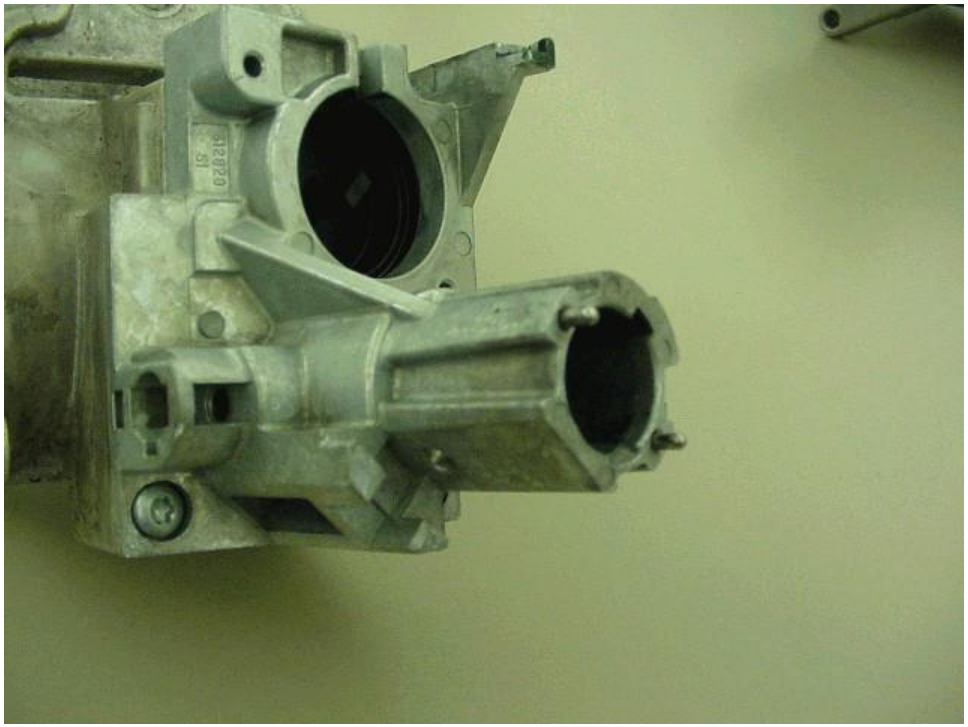
- Design Evaluation (Engineering and Cost)

Engineering		*Cost & Timing*		
Benefits	**Concerns**	**Piece Cost Increase**	**Tooling**	**Lead Time**
Design cncept already proven to work for GMT257	- Not enough material to trim from the lock housing in order to accommodate sleve. - Simultaneous tuning effort from lock cylinder engineering and lock housing supplier - No specification available	$0.2758	$152,145 (new tooling)	About 1 year

GMX001 Lock Module Detent in RUN

Other Design Solution Discussed (Ruled out)

- Adding spring loaded pins to the lock housing:

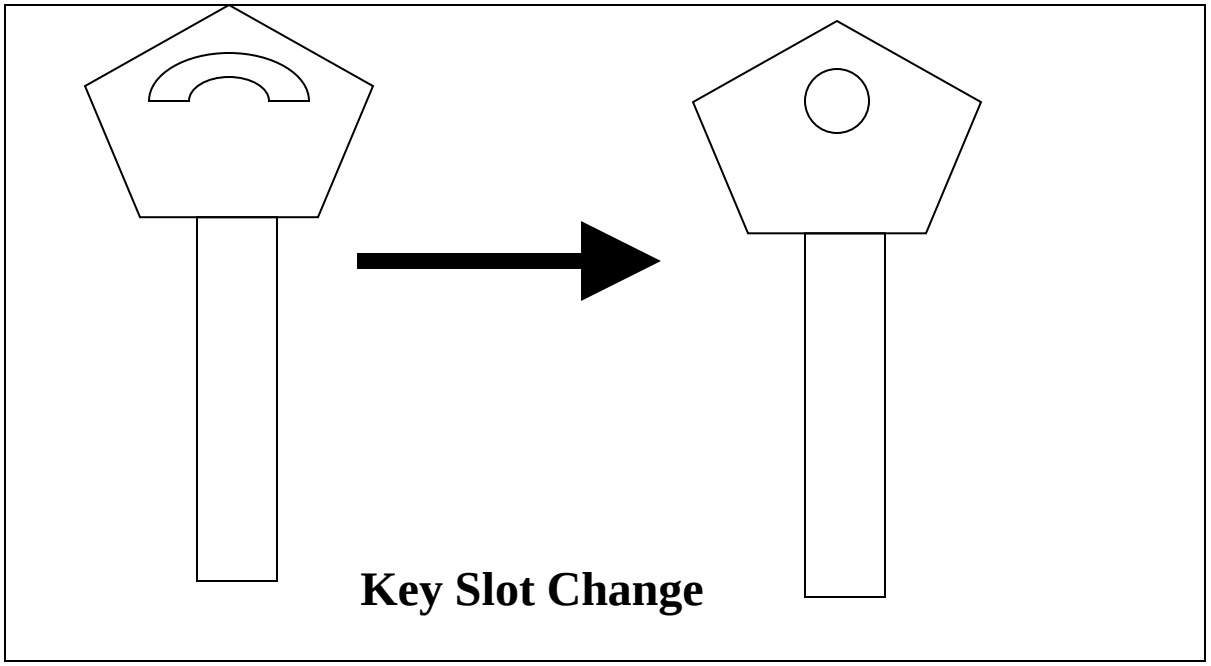


  - Main concern with complexity in warranty.
  - Ruled out by lock housing supplier

GMX001 Lock Module Detent in RUN

Other Design Solution Discussed (Ruled out)

➢ Changing the slot in the key in order to reduce lever arm and thus the torque:



- It was determined that the lever arm still present due to the fob ring.

GMX001 Lock Module Detent in RUN

Other Design Solution Discussed (Ruled out)

- PK3+ Detent Investigation (Direction from last CPIT meeting)
  - It was determined PK3+ detent is not related to the locking mechanism detent

GMX001 Lock Module Detent in RUN

Conclusion (Best Solutions)

➢ Modification of the lock housing cam shaft seems to be the most feasible and the preferred one by supplier.

- Concern with the higher price increase
- Concern with lack of specification

➢Adding a plastic sleeve to the lock housing -to-cylinder interface.

- Concern with the material thickness of the lock housing
- Concern with the lock housing-lock cylinder tuning coordination between two suppliers
- No specification available