

MODULAR MATERIAL (MMAT)

Stake Holder requirement

Enhance the User Experience of the MMAT

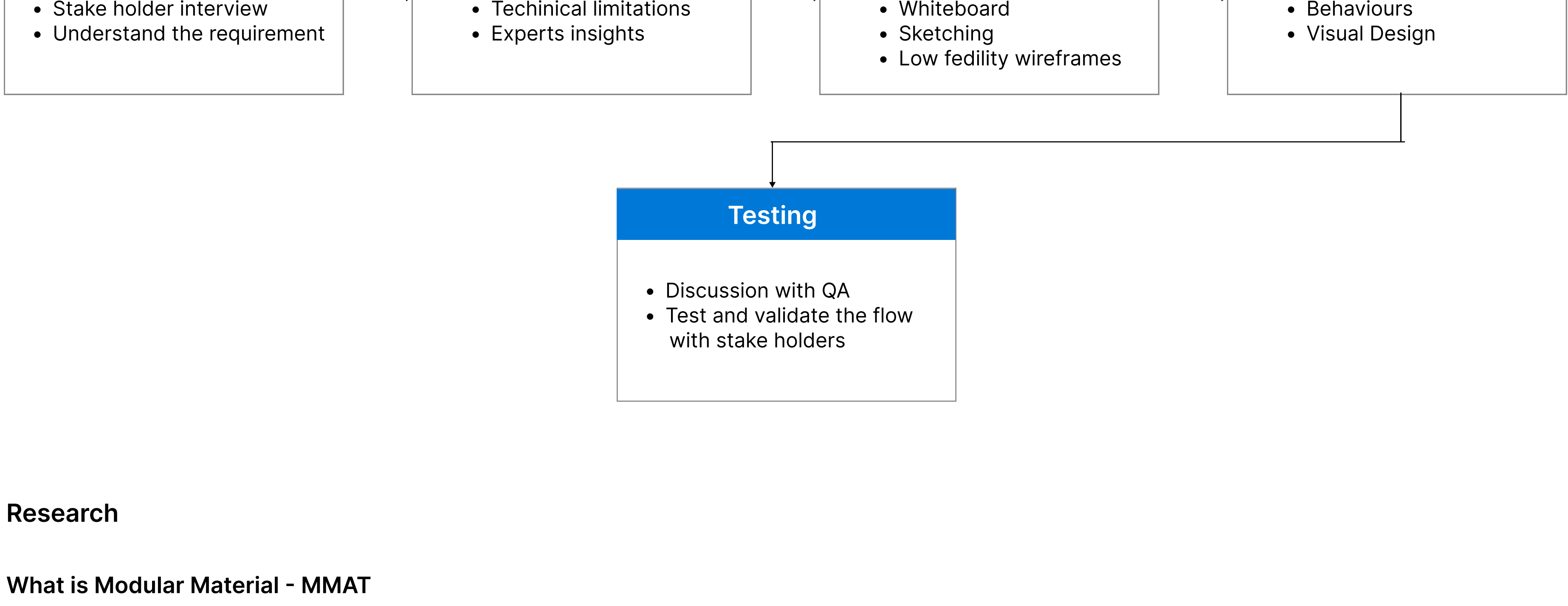
Purpose of the project

Reduce the User Experience and add User interface of the feature and make easily understandable and userfriendly.

Solution

Virtual performance solution

Design Process



Research

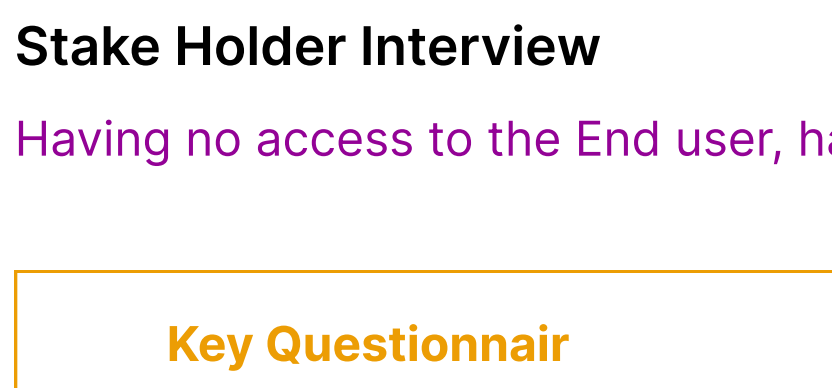
What is Modular Material - MMAT

Modular material is to overcome the limitations of packaging material attributes and numerical control parameters in specific material models per element type

Main Objectives of Modular material.

- Increase flexibility of material modeling for new materials by selecting and combining attributes of existing material models (building blocks or modules).
- Reduce maintenance efforts on material databases by sharing the same physical properties for 2D and 3D elements, i.e., shells and solids.
- Simplify model assembly and variants' creation by separating physical material properties (MMAT) and mesh-dependent numerical parameters (NUMPAR).

Who are the customers ?



Who are the Users ?

Physist/Automobile Engineer/Scientist

Stake Holder Interview

Having no access to the End user, had to consider QA folks as users, all the questions were framed accordingly *

Key Questionnaire

- If you are a new person for MMAT would you be able to use ?
- What is your end goal as a user ?
- How do you expect to add or delete anything within the tables?
- If you have freedom to change anything in the Dialog what would it be?

Painpoint of users

- Difficult to use and learn
- Confuses with interactions
- Add and delete of the properties is hidden
- visual layout feels cluster
- Difficult to understand for the new users

Problem statement

For the new users it is difficult to use and learn because the future is not self explanatory, important actions like **Add** and **Delete** options are hidden (Available only on the right click)

Persona

Jhon Doe

Gender : Male Age : 42 years Role : Physist/Engineer/Scientist

Company : Audi Qualification: Masters in Physics Experience: 20+ Years

Industry : Automobile manufacturing

Goals :
Research on the material properties using Virtual simulation softwares and provide the best material combination for the manufacturing.

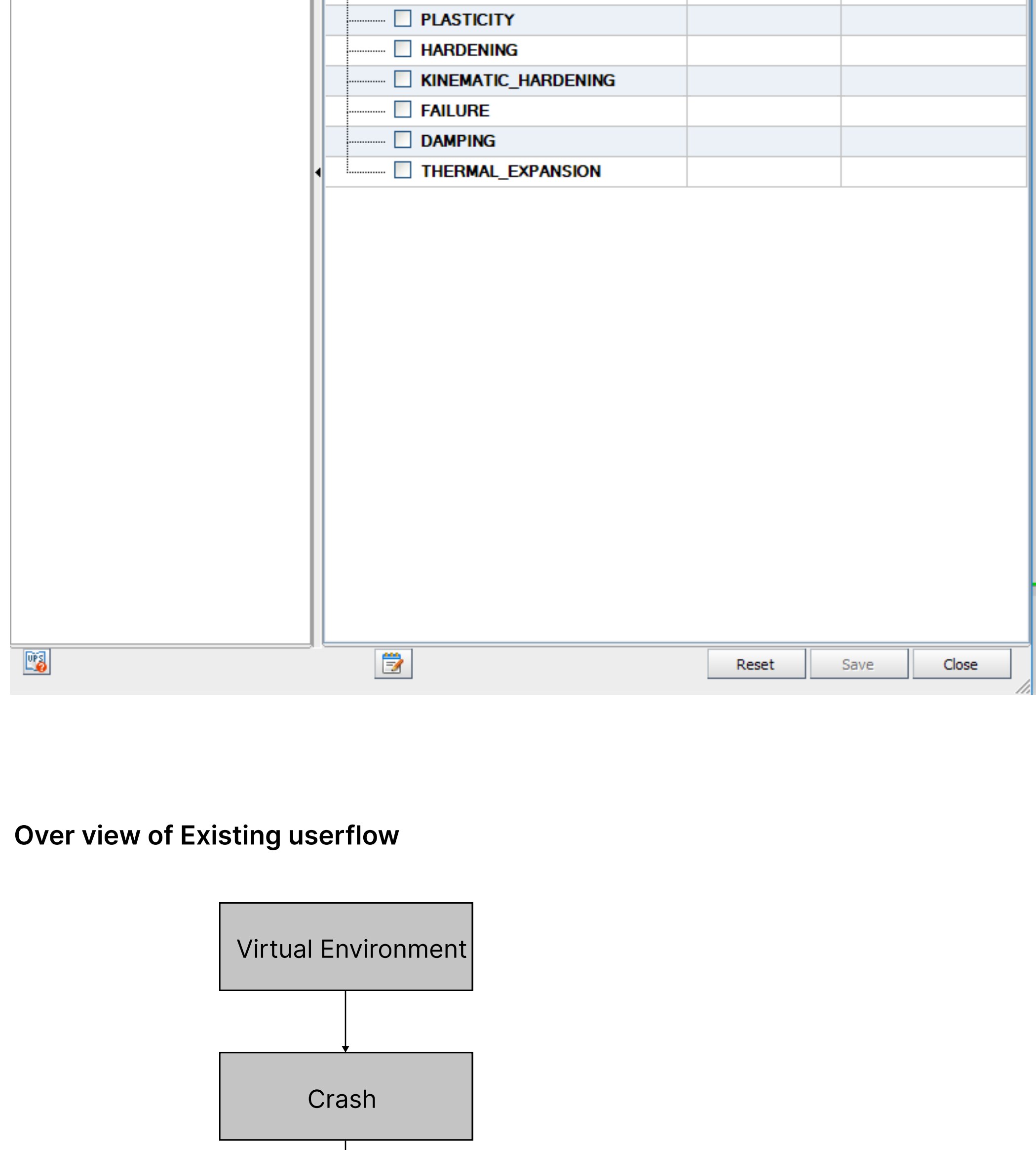
Painpoints :

- Have to go through lot of material combinations at once.
- Interaction is difficult sometimes, but used to it.
- poor eyesights
- sometimes it takes lot of time to finish the task because of complicated interactions.

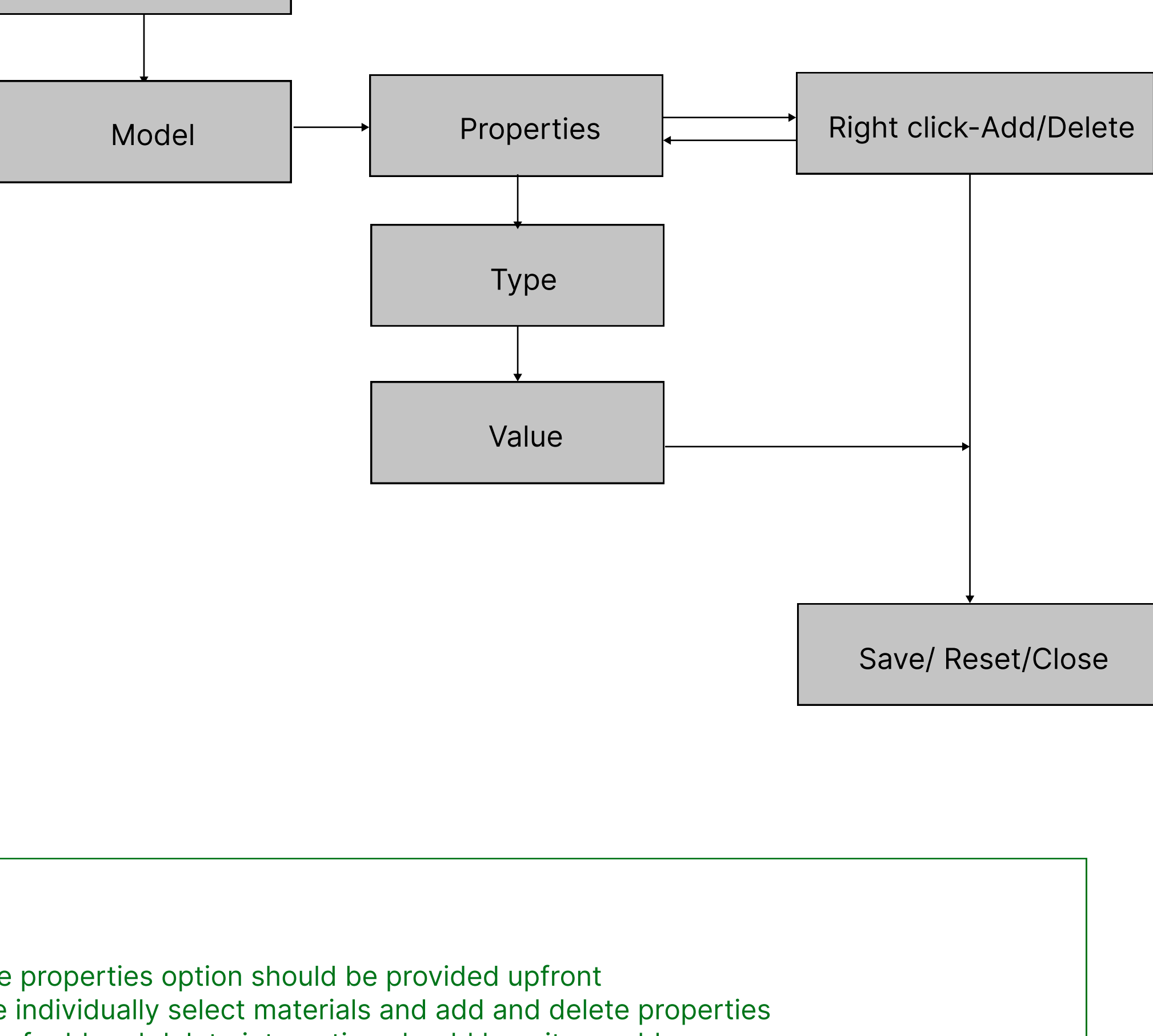
Limitations

- Secure material conversion is not supported.
- Only signOPTN=Yield stress/CURVE/POWER/KRUPK options are supported.
- Python variables assigned in MATER/MMAT cards are not supported.

Existing MMAT



Over view of Existing userflow

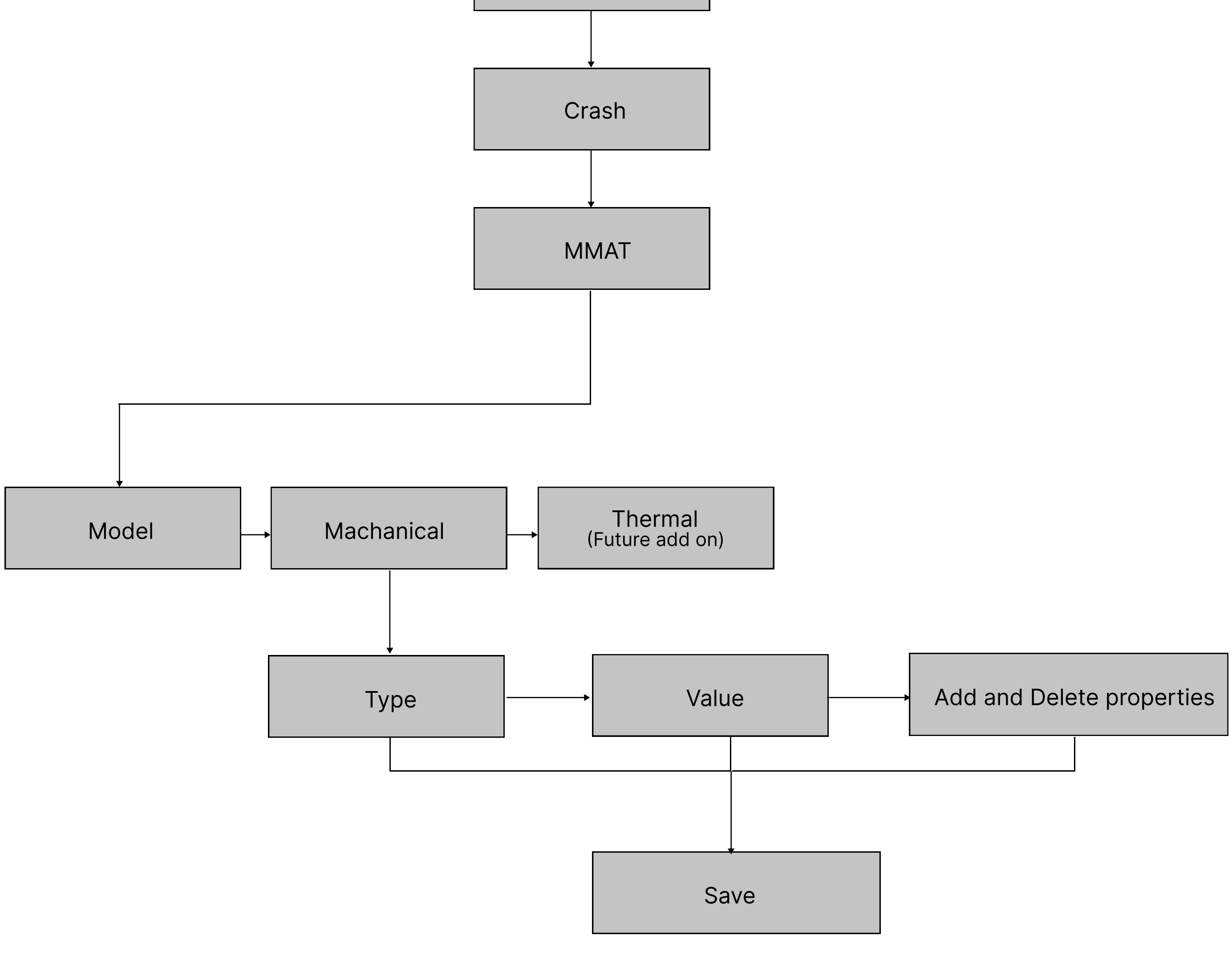


Design Goals

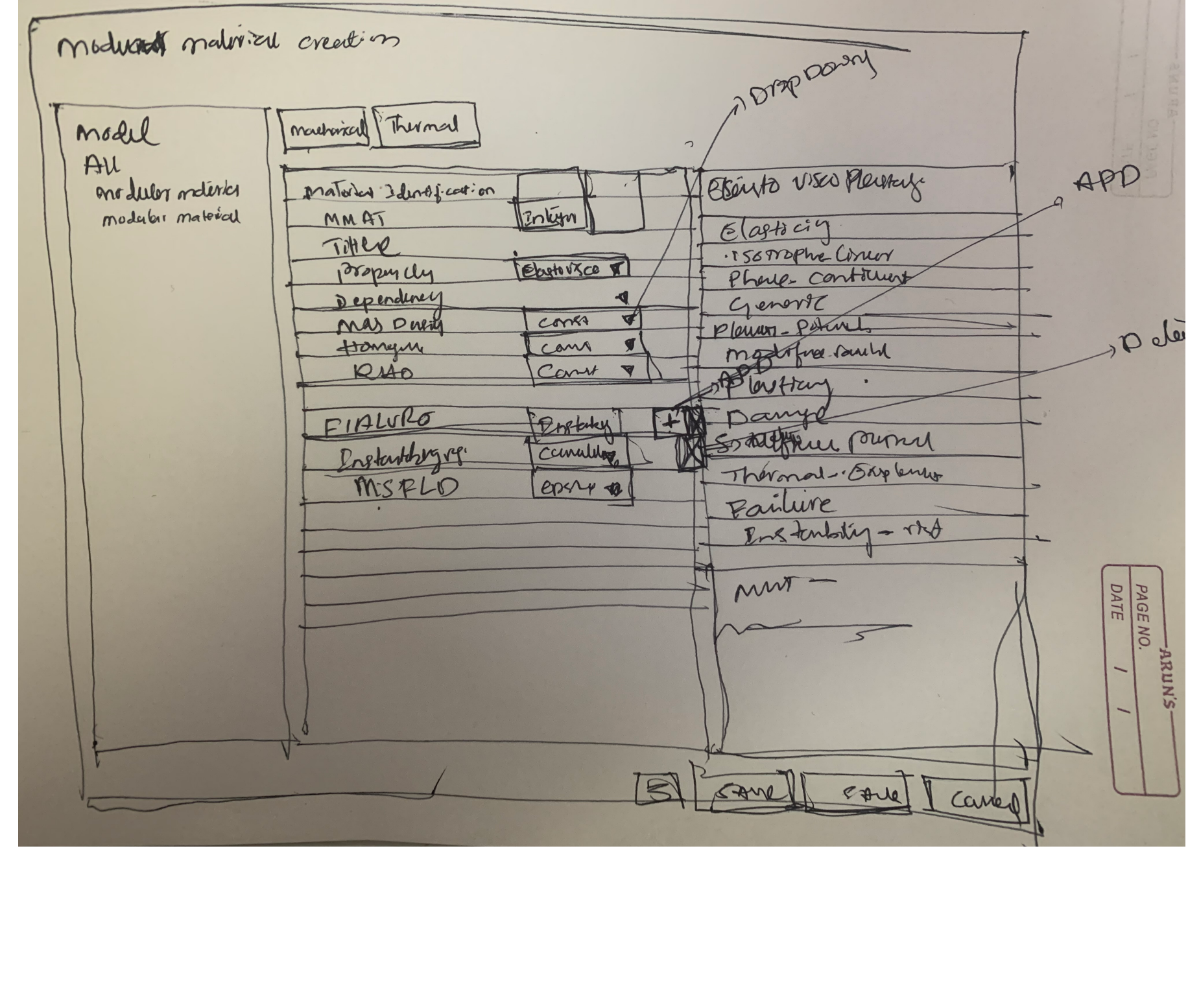
- Add and Delete properties option should be provided upfront
- User should be individually select materials and add and delete properties
- The behaviour of add and delete interaction should be witnessable
- Refine the User experience
- Irrespective of any data visual appearance should be neat and clean
- Flow should be self explanatory

Design Solution

Overview of Redesigned User flow



Sketch



Wireframe

Modular Material Creation

Model

All Modular material

Modular material_1

Property	Type	Value
Material Identification		
ID_MMAT	Integer	1
TITLE		Modular material_1
Property class name	Elasto_visco...	
Dependency		
Mass_density	Const.	
Homo_genous	Const.	
RHO	Const.	
FAILURE_1		
Instability_risk	Cumulative	
MSPLD	Extended...	
Instability_evolution	Poststecking	
Poststecking_grav_andres		
LC	Const.	1
Failure_risk	Extended...	
Failure_evolution	Instant	
FAILURE_2		
Instability_risk	Cumulative	
MSPLD	Extended...	
Instability_evolution	Instant	

ELASTO VISO PLASTICITY

Elasticity

 Elasticity_linear

 Phase_coefficient

 Plasticity_yield_condition

 Von_mises

 Plasticity_potential

 Modular_material_hardening

 Plasticity_isotropic_hardening

 Johnson_cook

 Plasticity_combined-rate_hardening

 Damage

 Plastic_strain_softening

 Damping

 Stiffness Proportional

 Thermal_expansion

 Isotropic_coefficient

 Failure

 Instability_risk

Reset

Save

Cancel

Final Design Proposal

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Instability_risk	Cumulative	
MSPLD	Extended...	
Instability_evolution	Poststecking	
Poststecking_grav_andres		
LC	Const.	1
Failure_risk	Extended...	
Failure_evolution	Instant	
FAILURE_2		
Instability_risk	Cumulative	
MSPLD	Extended...	
Instability_evolution	Instant	

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