How Autodesk can streamline the Automotive Clay studio workflows

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About the speaker

Samarth Gupta

Samarth is a Technical Specialist for Industrial Design & Visualization at Autodesk. Prior to this he has 10 years of professional experience working within the Industrial Design departments of various Automotive OEM’s like Tech Mahindra, General Motors and Hero Motors where he had his first stint with Alias digital tools.
About the speaker

Dushyant Atara

Dushyant Atara serves as a Technical manager for Autodesk India for digital manufacturing group MAKE Product. He works closely with the DMG sales team and Make partners to help new and existing customers meet their business objectives with Autodesk’s Make portfolio.
Challenges?

Shorter Development Times, Cost Reduction, Greater Complexity

*Net of inflation
How To Differentiate?

Technology

Manufacturing

Brand Values

Design

Technology

Design

Brand Values

Manufacturing
Design studio process

SKETCH
CREATE
SHAPE
VALIDATE
EXPERIENCE
COLLABORATE
**Sketch**  
**Digital Model**

**Challenges**
- Capture 2D Design intent into a 3D Digital Model
- Software skill reqd
- Design decision delays

**Improvements**
- SketchBook on Mobile devices
- Photoshop integration
- SubD modelling toolset
- Dynamo Player
Digital Model

- Same digital environment
- Data associativity between Alias & VRED
- Synchronised workflows
- Unified user experience

Visualisation
Digital Model  Physical Model

- Challenges
  - Disjointed design process
  - Time consuming to converge
  - Use of many different tools, formats, creates data complexity
  - Uninformed Decision making
Why Clay?
Executive decision making on physical model

- Clay is still being used for executive reviews
  - Clay effectively communicates design intent accurately & provides experiential reality
  - Clay is a collaborative tool – helps in brainstorming ideas
  - Helps assess the form, shape & proportion and accelerates decision making
Auto clinics / auto shows to get feedback

- Clay models for customer reviews
  - Companies sometimes base production decisions on the audience feedback
  - Helps build brand connect to stay ahead of competition
  - Greatly influences purchase decisions

Image courtesy – www.team-bhp.com
Challenges for Digital Model ↔ Clay

- Adjusting “Clay” to a “Modified Digital Model”.
  - Advanced skills required for Clay Modelling
  - How to accurately detect areas of changes?
  - How can “Clay Milling” be optimized?
  - How to speed up the process?
Challenges for Clay ↔ Digital Model

- Adjusting Digital Model to a “New/modified Clay Model”
  - Often rework is needed, no reuse of original data.
  - Time consuming to detect and capture changes.
  - Data accuracy
Improvements for Digital Model ⇄ Clay

- Adjusting “Clay” to a “New Digital Model”.
  - Seamless Alias – PowerMill integration
  - Easy to handle smaller changes
Clay Milling Utility

- Fusing digital to physical
- Integration and automation for accelerated production
- Domain specific tool to simplify the CAM and machining workflow
- Generate NC Code
- Drive CMMs for milling based on PowerInspect
Why Clay Milling utility

- Simplify and speed up the process of turning your digital models into physical ones
- Shortened time to first toolpath and machining
- Wizard steps for easy machine and tool calibration process
- Generate NC code for CMMs and machines quickly
Hardware Support

- Studio machines from Kolb, Wenzel and Stiefelmayer
- Milling machines including Fooke, Zimmermann, Taurus
- Robotics including Kuka, ABB, Fanuc
- 3-5 Axis support for Studio and Milling machines
- Support for manually indexed and motorized milling head
- Up to 18 Axis for Robotics
Clay Milling Utility Workflow with Alias

- Domain specific user interface
- Simple to use and easy to learn
- Configure the milling heads
- The alignment tools for a CMM
- Model viewing option

Video link

https://drive.autodesk.com/de29e55e5/g/shares/SH56a43QTfd62c1cd9686f9ecf0268bf5e99
Interoperability with other CAD tools

- CAD Data import
- ALIAS wire File import
- CATIA, NX and others
- Shading mode

Video link

https://drive.autodesk.com/de29e55e5/g/shares/SJ56a43QTfd62c1cd968f598aef1b3da7044
Reduced time from design to machine

- Define workplane
- boundary for machining
- Toolpath creation
- Toolpath to output

Video link

https://drive.autodesk.com/de29e55e5/g/shares/SH56a43QTfd62c1cd96841aa4d0813b90078
Machine tool integration built-in

- Toolpath Simulation
- Visualised and verified for collisions
- NC program generation

Video link

https://drive.autodesk.com/de29e55e5/g/shares/SH56a43QTfd62c1cd968f520249a025f5678
Clay Scanning

- Integrated Workflow
- Creaform Devices integrated in Design Workflow
- Single Coordinate System
- Simple to use
- All Tools in one environment
- Scanner
- Mobile tactile probes
Clay Digitizing

- Mark out package plan
- Digitizing tools for marking out and acquiring “tape” information
- Export digitized “tape” to Alias or PowerMill / Clay Milling
- Mirror digitized information's / mark out on other side
Improvements for Clay ↔ Digital Model

• Improved Workflow in ALIAS
  o Live Scan
  o Digitizing key design features like feature lines in clay
  o Scanned model aligned to design coordinates
  o Quick Surface generation from Mesh in Alias
  o Surface Refit
  o SubD Retopology
Improvements for Clay ↔ Digital Model

- Immersive visualization using HMDs
  - Enhanced experience in 3D immersive environment
  - Spatial knowledge
  - Stakeholders / Executive decision making
Class A

- **Any surface which is visible to the product user and impacts the overall perceived quality of the product**
  - Surfaces meet aesthetic, engineering, ergonomic and marketing requirements of the said product
  - Behavior of shadows, reflections, and highlights can be reviewed and optimized
  - Helps assess the perceived quality of the craftsmanship
Perceived Quality

The term "perceived quality" refers to the quality that customers acknowledge via the look, the touch, and the feel of a car.

• Leveraging Class A tools in Alias
  o Panel Gaps / Shut Lines
  o Surface highlights
  o Evaluation of overall aesthetics

• Leverage Visualisation tools in VRED – Virtual Prototype
  o Overall aesthetics / Craftsmanship
  o Evaluate Material appearance & behavior
Perceived Quality ?
A continuous process from concept to Class A
Preserve design intent and maximize data reuse

More iterations
Preserve design intent
Maximize data reuse
Faster decisions
Unique Benefits

- Synchronized Digital – Physical environment
- Increased innovation capacity
- Increased flexibility and agility
- Hardware agnostic
- Increased productivity
- Informed decision making
- Accelerate the time to market