# Data Management: Vault Implementation for Start-Ups

Andrew Pisula
Director Technical Services

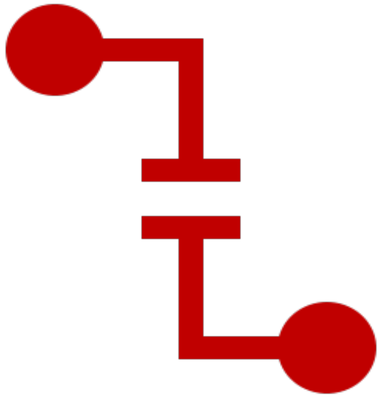
Alex Yang
Senior Product Engineer

AUTODESK. UNIVERSITY

KETIV

Rebound Technologies

Data is the nucleus of every business



1 in 3 companies say they have worked on wrong/outdated data

We are here to show you how to leverage this information

# Andrew Pisula

## Director Technical Services

As Director of Technical Services at KETIV, Andrew is focused on empowering today's innovators though Autodesk's Production & Design Manufacturing collection by concentrating on what makes our customers successful today and capturing what can be improved moving forward.

He has 18 years experience in engineering and manufacturing process optimization, data management, CAD/CAM/Simulation automation, and mentoring.

KETIV

# Alex Yang

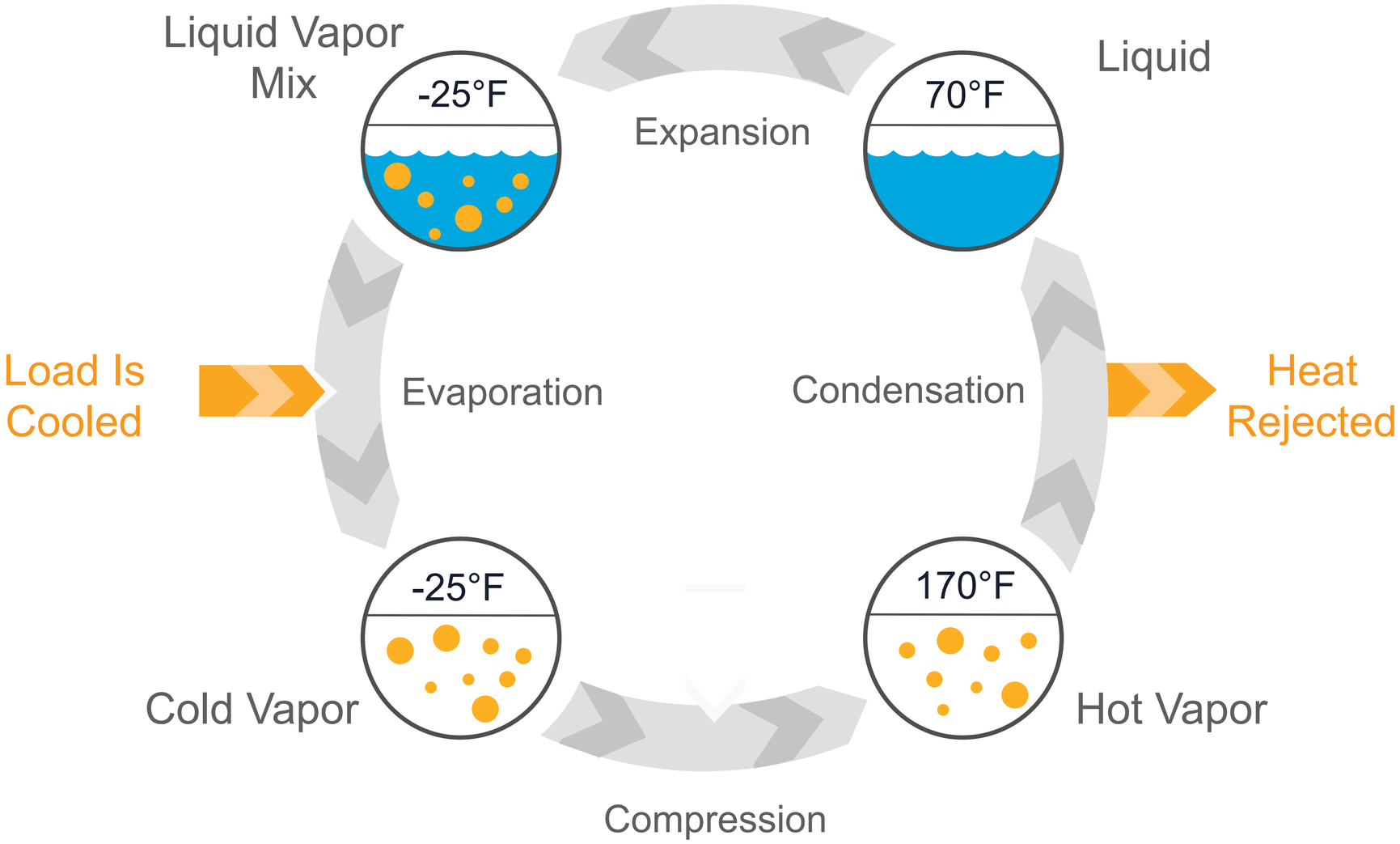
## Senior Product Engineer

As Rebound's Senior Product Engineer, Alex brings seven years of product development experience, with an emphasis on technical design and analysis with computational and probabilistic methods. His systems integration experience and hardware verification and validation expertise enable his role for clean sheet design on the IcePoint system at Rebound Technologies.

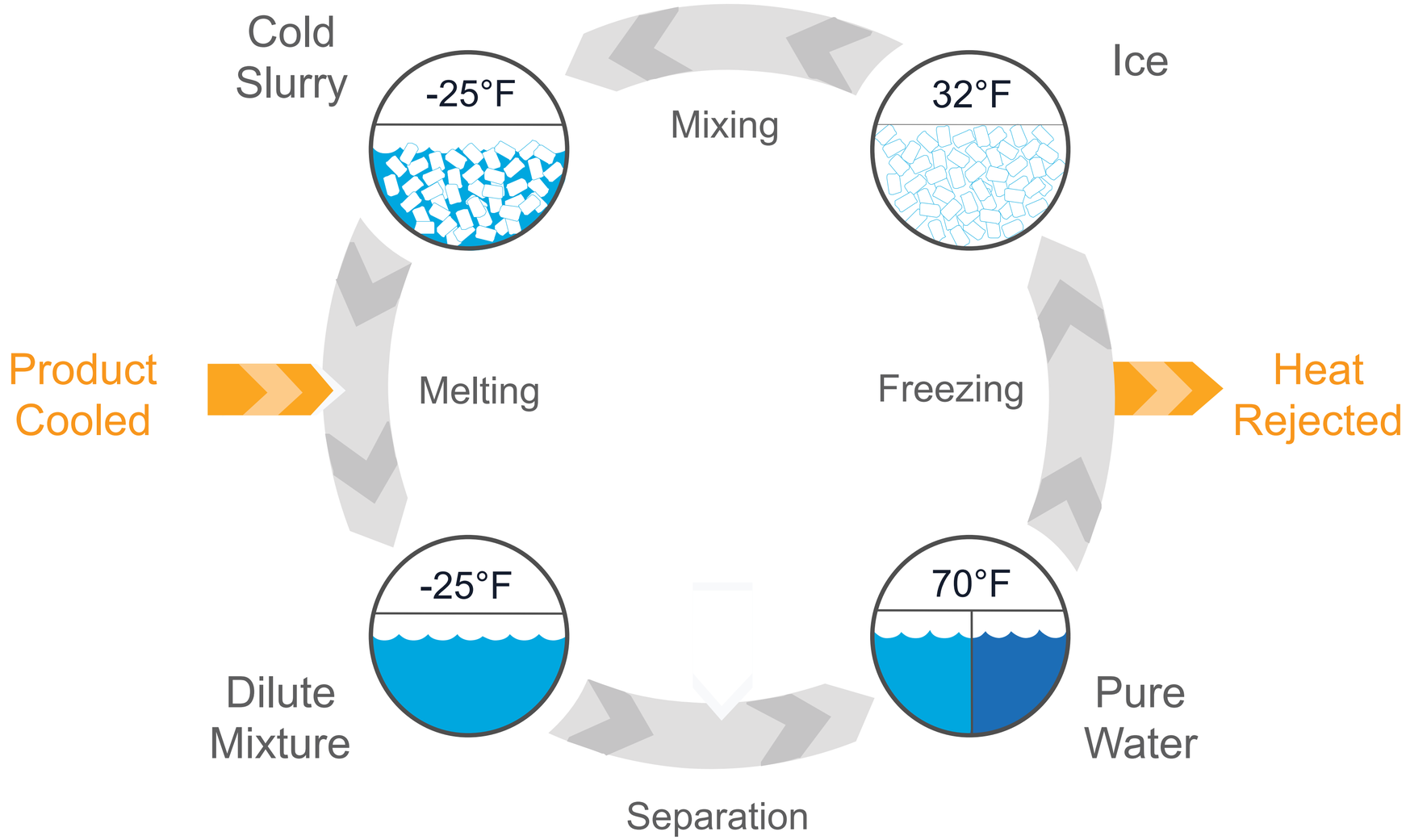
Alex holds a Master's in Applied Systems Engineering at the Georgia Institute of Technology, and a Bachelor's of Science in Mechanical Engineering at Cornell University.

Rebound Technologies

# Vapor Compression Cycle

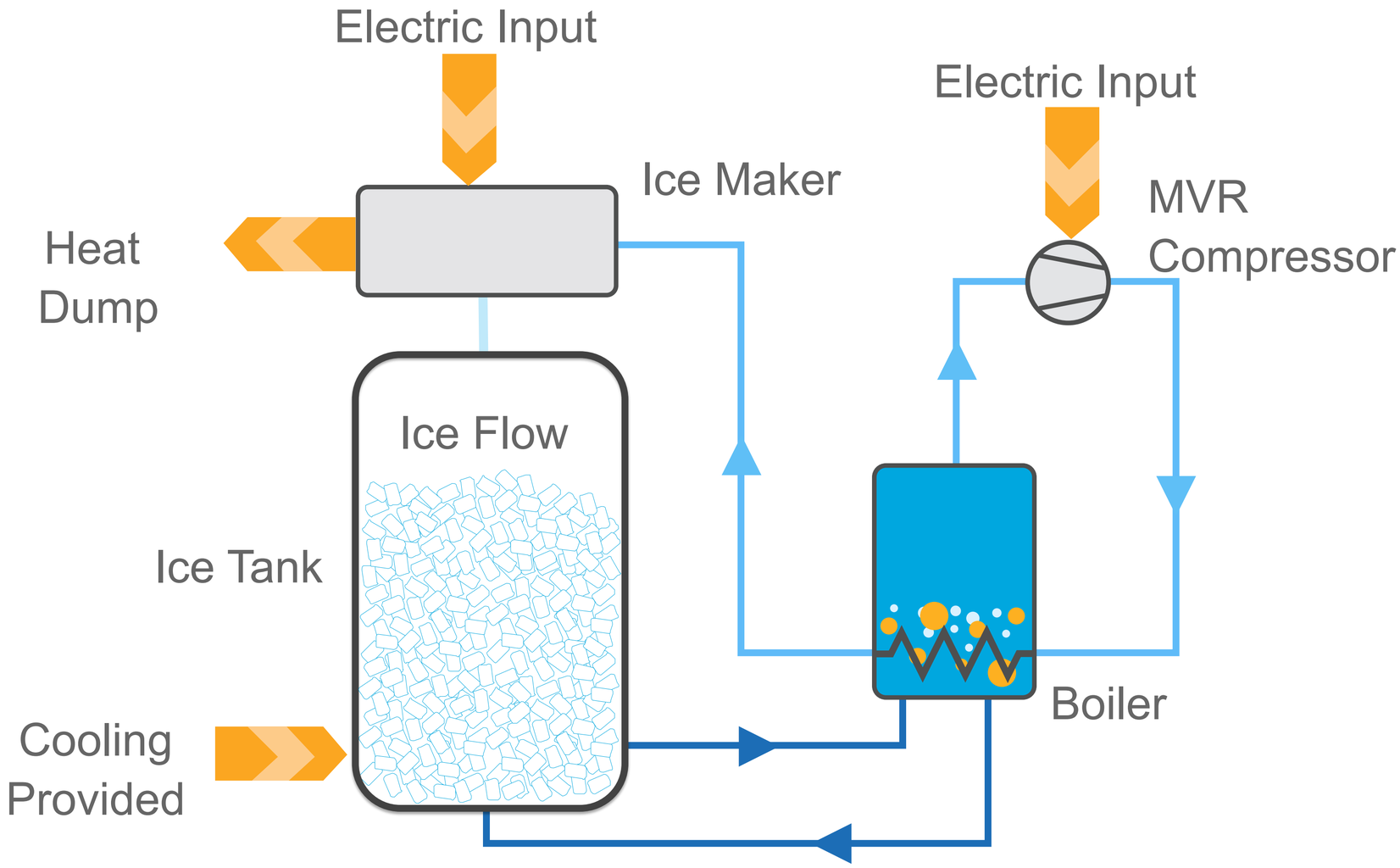


# Freeze Point Suppression Cycle



# Freeze Point Suppression Cycle

Rebound Technologies



# Technology Progression

## Proof of Technology

**Thermal Capacity: 2 kW**
**Storage Capacity: 12 hr.**
**3rd-party Validated**

## 10kW Pilot

**Thermal Capacity: 10 kW**
**Storage Capacity: 6 hr.**
**Installed and Operational**

## 100kW Commercial Scale


**Thermal Capacity: 100 kW**
**Storage Capacity: 6 hr.**
**Commissioning In-Progress**

# Common PDM Alternatives

## Dropbox

**Highlights**:

- Ideation, Scoping
- General/Informal collaboration

**Lowlights**:

- Change management workflows not native
- Manual BOM entry

## Google Docs

**Highlights**:

- Version Control but generally Microsoft/Google Docs Exclusive

**Lowlights**:

- Change management workflows not native
- Manual BOM entry

## Evernote

**Highlights**:

- Optimized for authored content
- Excels as a library

**Lowlights**:

- Lacking BOM management capabilities
- Minimal associated properties

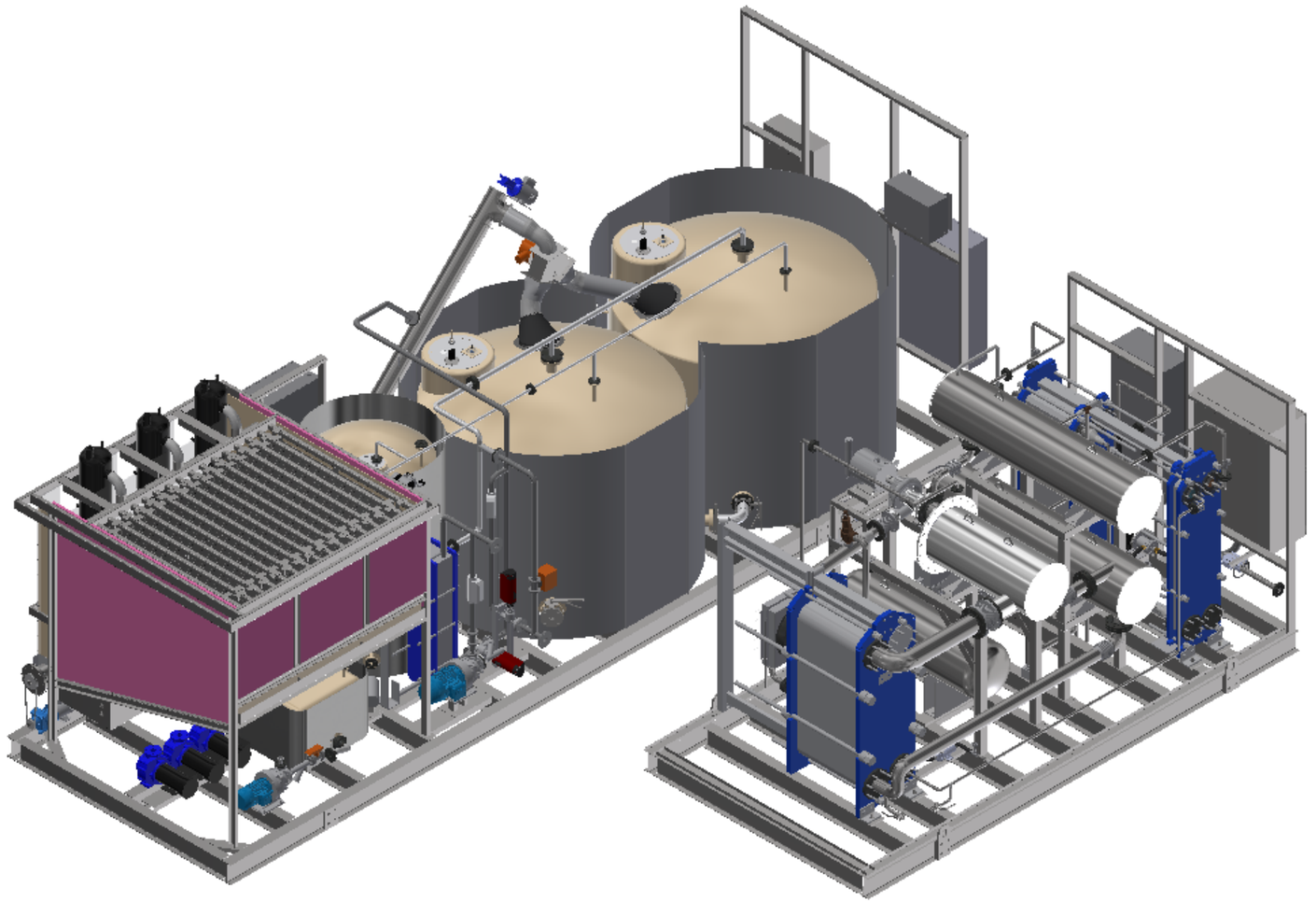
Measure Material Appearance Clear Adjust Application Options Document Settings Migrate Settings Autodesk App Manager Customize Links Add-Ins Macros VBA Editor Copy Cut Paste Special Find Component Load Full

Model Vault

- IP-001-SK-000091.iam
  - Relationships
  - Representations
  - Origin
  - IP-001-IM-000083:1
    - Relationships
    - Representations
    - Origin
    - IP-001-SK-000061:1
    - IP-001-IM-000065:1
    - IP-001-IM-000159:1
    - IP-001-IM-000199:1
    - IP-001-IM-000201:1
    - IP-001-IM-000194:1
    - IP-001-IM-000195:1
    - IP-001-IM-000196:1
    - Roof Paneling
    - 7.2 Panel Cladding
    - PN-800-01-000093:1
    - PN-800-01-000092:1
    - PN-100-01-000013:1
    - IP-001-PB-000373:1
    - IP-001-PB-000374:1
    - Work Axis4
    - Work Point2
    - Work Axis9
    - Work Axis11
    - Work Point5
    - ASME B16.5 Flange Socket Welding - Class 150 2:1
    - ASME B16.5 Flange Socket Welding - Class 150 2:2
    - ASME B16.5 Flange Socket Welding - Class 150 1 1/2:8
    - ASME B16.5 Flange Socket Welding - Class 150 1 1/2:11
    - ASME B16.5 Flange Socket Welding - Class 150 1:3
    - ASME B16.9 Straight Tee 1 1/2 x 0.109:4
    - Work Axis14
    - Work Plane14
    - ASME B16.5 Flange Socket Welding - Class 150 1:4
    - ASME B16.9 Reducer 1 1/2 x 1 - Schedule 10:1
    - ASME B16.5 Flange Socket Welding - Class 150 3/4:2
    - ASME B16.9 Straight Tee 3/4 x 0.083:1
    - ASME B16.9 Straight Tee 3/4 x 0.083:2
    - PN-400-01-000032:1

360

PRO



# The PDM Process

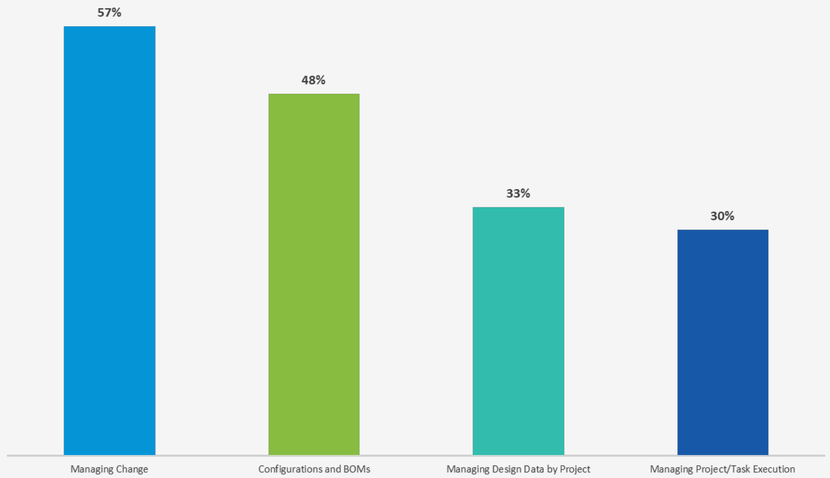
## Control engineering processes

**57%**

of companies have issues managing change and release

Other notable challenges include reviews and approvals, project management, and bills of materials

### % of Companies Reporting Workflow Challenges



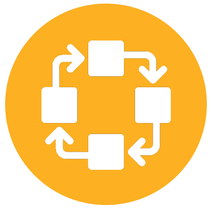

Source: Extending PDM Beyond Design Data Management, Tech-Clarity, Inc. 2019.

# The PDM Process

## Control Engineering Processes

## COMMON CAUSES OF WORKFLOW CHALLENGES

Non-engineering staff cannot participate efficiently in design reviews and approvals



Difficult to interpret lifecycle states when there are multiple versions of a design file

BOMs are manually managed in a spreadsheet, disconnected from design data

Managers cannot easily monitor overall project status

Source: Extending PDM Beyond Design Data Management, Tech-Clarity, Inc. 2019.

# The PDM Process

## Control Engineering Processes

## COMMON CAUSES OF WORKFLOW CHALLENGES

Non-engineering staff cannot participate efficiently in design reviews and approvals

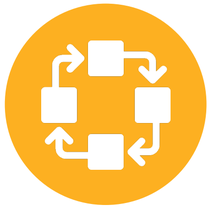
- Field and Site Staff
  - Field-routing condensate, load lines
  - State – or site – specific code requirements
- Manufacturing Technologist Input
  - Designated shop-floor continuous improvement lead
  - Manufacturing continuity for working documents

Source: Extending PDM Beyond Design Data Management, Tech-Clarity, Inc. 2019.

# The PDM Process

## Control Engineering Processes

## COMMON CAUSES OF WORKFLOW CHALLENGES



Difficult to interpret lifecycle states when there are multiple versions of a design file

- Iterative and Concurrent Design
  - Critical in adding cutting edge technology while minimizing system exposure to risk
  - Example: Incremental Compressor Development
    - Materials Selection and Compatibility
    - Implementation Specific Auxiliary Systems
      - Cooling, Lubrication, Electrical

Source: Extending PDM Beyond Design Data Management, Tech-Clarity, Inc. 2019.

# The PDM Process

## Control Engineering Processes

## COMMON CAUSES OF WORKFLOW CHALLENGES

BOMs are manually managed in a spreadsheet, disconnected from design data

- Supply Chain & Sourcing
  - Transition from standard as-needed ordering with challenging lead times and manual materials planning
  - Automated BOM with concurrent engineering
  - Potential to implement lean inventory management techniques

Source: Extending PDM Beyond Design Data Management, Tech-Clarity, Inc. 2019.

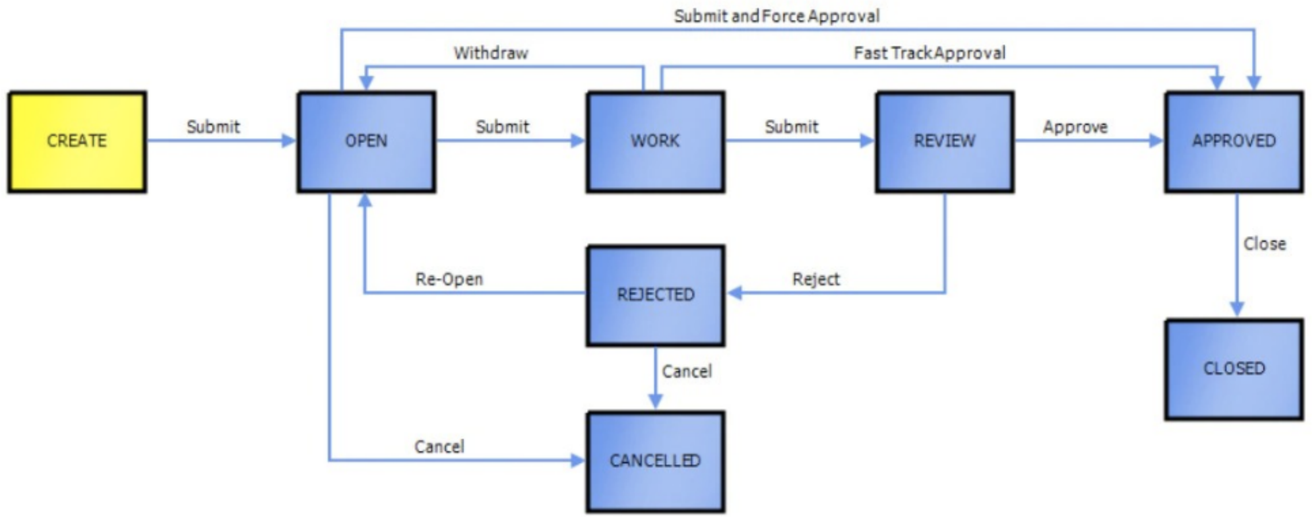
# The PDM Process

## Control Engineering Processes

## COMMON CAUSES OF WORKFLOW CHALLENGES

Managers cannot easily monitor overall project status

- Stakeholder Involvement During Development Process
  - Milestone Tracking, Objectives & Key Results/Metrics




Source: Extending PDM Beyond Design Data Management, Tech-Clarity, Inc. 2019.

# Phases of PDM Implementation

## USE CASE IDENTIFICATION

Evaluate how the software will be utilized

## NEED-BASED APPROACH

Establish how the software can be implemented based on use-case identification

## PROCESS IMPROVEMENT

What process improvements can be implemented moving forward? Is this congruent with the organization’s goals?

- Tactical (1-2 years)
- Strategy (2-5 years)
- Vision (5+ years)

## STEADY STATE FLOW

Continued success, with incremental updates per industry best practices and business-specific needs.

This is the easy part!

# Impact of Content Center

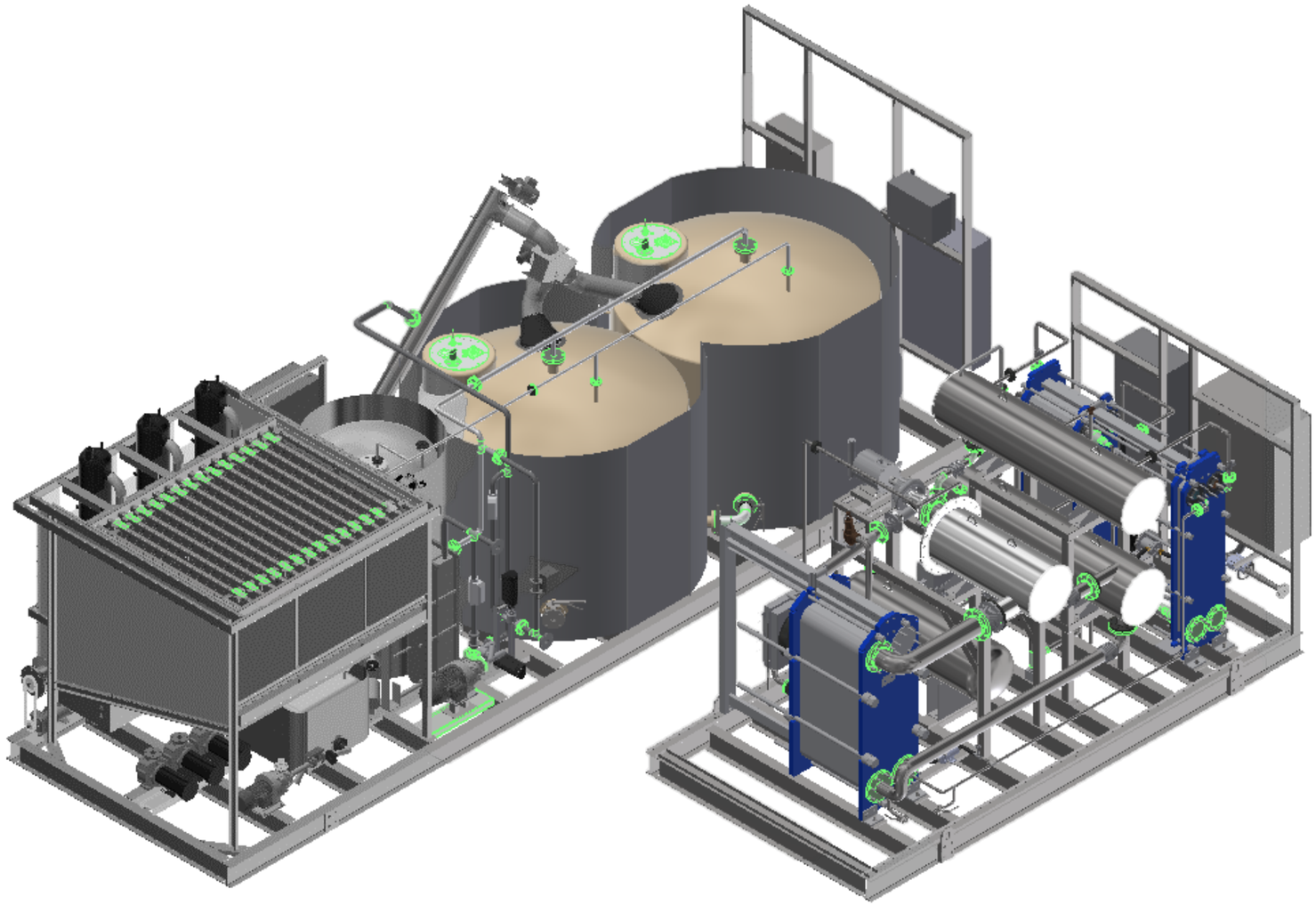
Database (not parts)

Creates Part Files

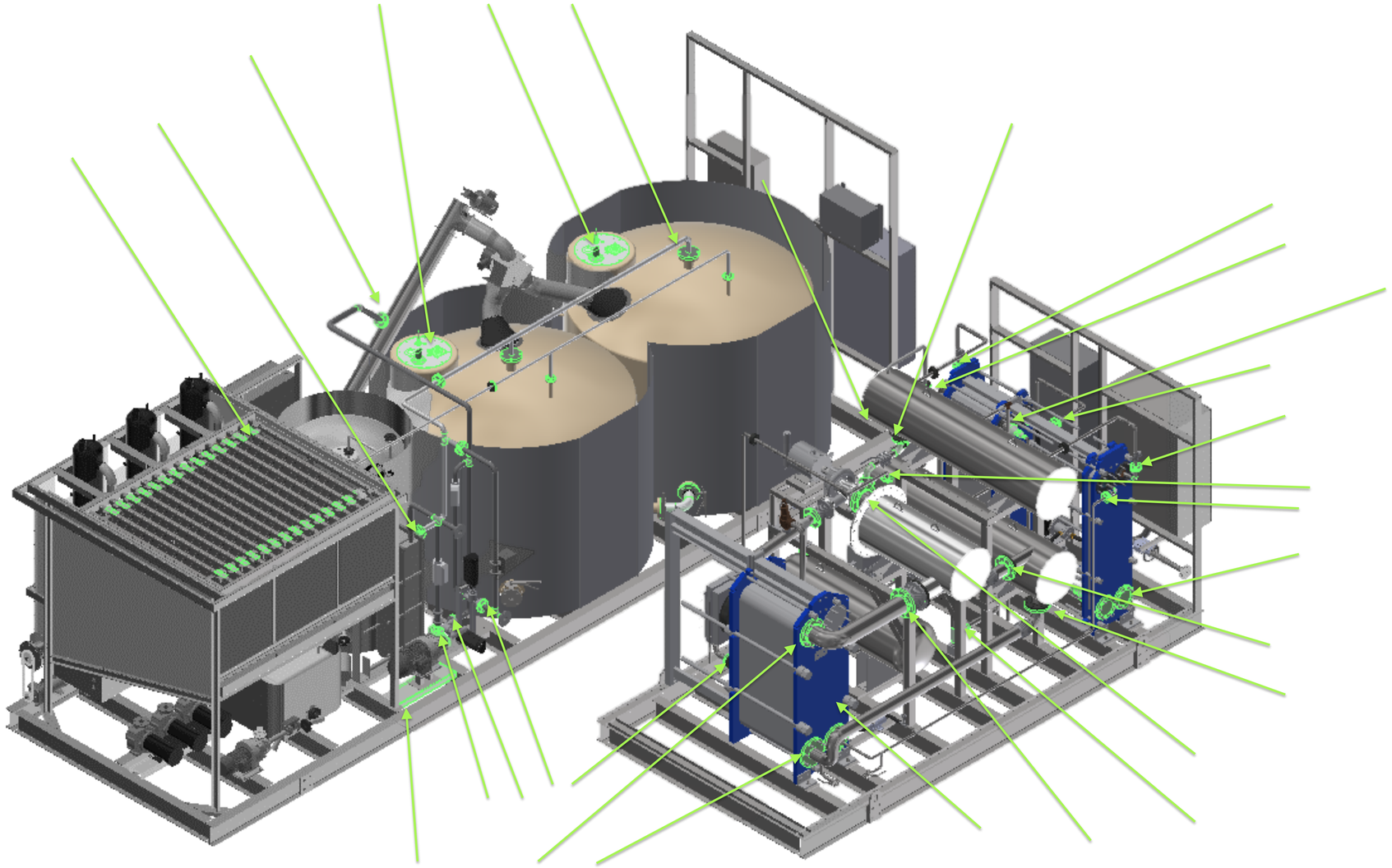
Time Savings in Design

Codes and standards

# Impact of Content Center



# Impact of Content Center



# Rebound Technology’s Content Center Utilization


## % Content Center

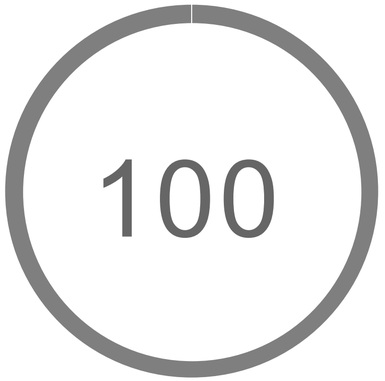
Commonly used parts in Content Center provide quick design turnaround


## % COTS

Commercial Off The Shelf components enable low-risk system integration


## % Custom Parts

Higher risk, but necessary for new technology/clean sheet hardware design




## % Code Compliance

Ensures safety, provides customer peace of mind

# Continuous Improvement, Change Management

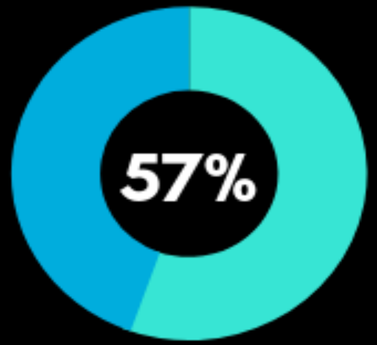
- **How to plan for future and change management during Vault implementation**
  - Configuration management
    - Digital Twin implementation
    - Site-specific implementation
  - Design reuse in future units

## COMMON CAUSES OF WORKFLOW CHALLENGES

### DID YOU KNOW?

57% of companies have issues managing change and release

Other notable challenges include reviews and approvals, project management, and bills of materials



AUTODESK FOUNDATION

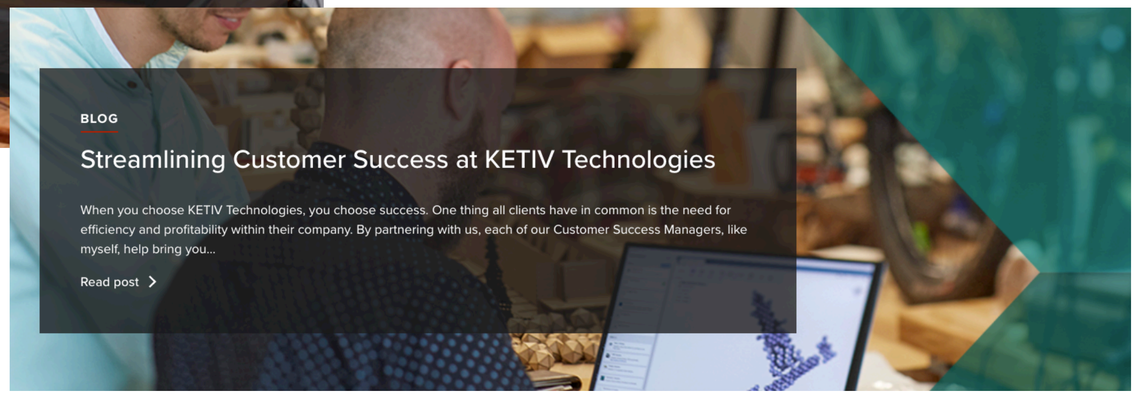
$20 million to 60+ organizations globally that are helping solve climate change inequality

$115 million in software donations

130,000 employee volunteer hours supporting 1,500+ organizations globally


BLOG
KickStart International and KETIV Partner to Help African Farmers
In 2016, an Autodesk Redshift article written by Ken Micallef, “How KickStart International Is Pumping Up Entrepreneurial Spirit in Africa,” reported, “Although Africa holds more than half of the world’s arable land, its small-scale...
Read post


BLOG
KETIV’s Nathan Eliason: Impacting Kayamandi, South Africa
In partnership with Team4Tech, volunteers from KETIV, Autodesk and Adobe focused on deepening technology skills and introducting key STEM learning tools to the small Kayamandi township.
Read post


BLOG
Streamlining Customer Success at KETIV Technologies
When you choose KETIV Technologies, you choose success. One thing all clients have in common is the need for efficiency and profitability within their company. By partnering with us, each of our Customer Success Managers, like myself, help bring you...
Read post

AUTODESK®

Make anything™

# Impact of Content Center