Ergonomics
Skeletons

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Cargill Protein
Agenda

- Current Innovation Projects
- Prevention Challenges
- Reactive Challenges
- Proactive Challenges
- Design/MOC Challenges
OneGlove Design Testing

Partnership with Wells Lamont
Purpose of Project

- Reduce number of glove layers required on knife hand to improve grip, dexterity, and warmth
- Create a single glove that is cut resistance, thermal, and water resistant
- Partner with Wells Lamont’s design team to find a glove to fit employee needs and EHS/FSQR requirements
Measures

- Employee Surveys
- Thermal Imaging
- EMG Analysis (muscle activity)
Respondent Demographics

**Sex**
- Female 50%
- Male 50%

**Department / Job**
- Butt Trimmer 50%
- Flat Dropper 50%

**Glove Usage**
- 3 Gloves: Cut-Waterproof-Cotton
  - 70%
  - 20%
  - 10%
Q1: While wearing the gloves, your overall comfort was

Current Glove Comments
“Sometimes I am given a smaller glove than I need.”
“The grey [cut] glove was worn out because I got there late.”

ONE Glove Comments
“It didn’t sweat your hand. Needs a longer cuff.”
“It felt like I didn't have anything on, like I was at home cutting meat.”
“[I] need a tighter fit.”
Q2: While wearing the gloves, your ability to move your hand was

Current Gloves

ONE Glove

Current Glove Comments
“Restricted mobility”

ONE Glove Comments
“Much easier.”
Q3: While wearing the gloves, your ability to grip the knife was

Current Glove Comments
“Lack of control”

ONE Glove Comments
“Sometimes it felt like my knife would be slipping.”
Measurement Approach
Average Temperature

- Current Gloves
- ONE Glove
- -2% (M) & -14% (F) Reduction in Dexterity
- -33% (M) & -39% (F) Reduction in Dexterity
EMG Data Collection

Measure muscle activation levels while employee is performing task
## Preliminary Results – Butt Trimmer

### Intra-Subject Changes

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Next Steps...

- Full Analysis and Report will be ready in early March
- Additional testing of gloves in plants will occur in Q4
Kinetica Labs

iPhone App Overview

1. RECORD VIDEO
   Kinetica provides video guidelines to ensure best results. The app allows you to trim video to a specific part of the job.

2. UPLOAD VIDEO
   Just click on the UPLOAD button in the app and Kinetica processes it.

3. REVIEW VIDEO
   Watch the video to observe the body parts at risk based on the color codes (default is REBA but the color ranges can be customized in the app. Scroll through the graphs for 8 major body parts.

Processed Video
Color-coded skeleton superimposed on top of video

Screen Captures
To include in reports

Data File
Frame by frame body angles for 8 major body parts

EXPORT VIDEO AND DATA
Kinetica allows you to export to common applications (e.g., email, Slack) or save locally to the phone.
When viewing a processed video, the user sees the video with skeleton along with graphs for each body part.

Above graph of the body angles you can see the max angle, frequency and duration for the relevant body part.

The downloadable data file is a csv file that can be formatted in Excel as shown here; frame by frame the angles of the major body parts are shown.
Video Analysis – Kinetica Labs

Automate portion of data collection
Exoskeletons
Reducing the load on our employees
Battery Powered Grip Force

Reducing the load on our employees
MSD Control Levels

- Preventive Methods
- Reactive Methods
- Proactive Methods
- Advanced Methods

Hazard
Preventive Ergonomics

- Training
- Ramp-in
- Work hardening / Wellness
- Knife sharpness

- High turnover rate
- Low skill/work capabilities in recruited populations
Reactive Ergonomics

• Incident investigations – root cause is difficult to determine, as cause is often cumulative vs immediate
• Expertise in assessing MSD events
• Building long term solutions vs quick fixes
Proactive Ergonomics

- Evolving from RFR to Risk
- Design tasks to fit employees
- Eliminate unnecessary forces and repetitions
  - MMH activities
  - Knife sharpness
  - Rework
- Balance line workloads

- Automation will solve certain concerns, but need to manage risk between now and then…
• Enabling project engineers to incorporate ergonomic design principles
• Timeline to implement changes is often rapid – ergonomics considerations must be engrained in process or they will be reactive
Enable Zero

Thank you
Questions?