Poultry Welfare: Transportation

Richard Mack, President
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Agenda

- Technology and advancements in equipment
- Handling techniques
- Load management
- Data – in numbers we trust
- Improving bird welfare and decreasing DOAs
Technology and Advancements in Equipment – over the years

- Understanding air flow through trailers

- Understanding heat distribution

** From Poultry Transport Research Group, University of Saskatchewan
Technology and Advancements in Equipment – over the years

Traditional Passively Ventilated Tarp Trailers
(full tarp set up or hard top roof)
Technology and Advancements in Equipment – over the years

• Power Ventilated Hard Top Roof Trailers
Technology and Advancements in Equipment – over the years

• Climate Controlled Trailer
Handling Techniques

Previously, persons handling or loading poultry:

- any person that could fog up a mirror in the cold
- Any person on sidewalk corner hired
- Stigma of alcoholics/drug users
- No handling training provided
- Many non-returning members of crew
- Low paid work = little care
- No stakeholder pressure (government, processor)
- “Get the birds out” mentality
Handling Techniques

Responsibilities that have been set out by Government Regulation and/or Industry

All persons working with poultry MUST understand and accept their responsibility to prevent any form or avoidable suffering. Before they are assigned to their duties, workers should be adequately *instructed* and have *knowledge* of the basic needs of the poultry entrusted to their care.

Staff should be able to recognize obvious behavioural signs that indicate health problems and/or discomfort.

Staff are NOT to load any birds that are not expected to make the trip (ie. Processor or Transfer) or may experience undue suffering in transit (ie. Fractures, severe lameness, illness).
Responsibilities that have been set out by Government Regulation and/or Industry

Training and evaluation of catching personnel is the responsibility of the catching crew operator. This means a commercial crew supervisor or even a producer/farmer hiring his own staff.

The producer (or a representative) should be available for the entire catching and loading process.

All information on the flock should be confirmed prior to loading – number of birds, weight, flock health concerns, special requirements, etc.
Handling Techniques

Industry Resource Material

Poultry Handling and Transportation Manual

SHOULD THIS BIRD BE LOADED?
A guide for preparing, loading, and transporting poultry

DO NOT LOAD DO NOT TRANSPORT

Environmental
- Weak and/or not alert
- Diarrhea
- Coughing and sneezing

Individual Bird
- Minor trauma, wounds or bleeding

Birds not loaded should be segregated according to on-farm protocol. Notify farm manager of birds left on the farm before leaving.

SHOULD THIS BIRD BE LOADED?
Guidelines for Transporting Poultry

CAUTION
Conditions requiring assessment before loading

Environmental
- Wet birds in cool or cold weather
- Heat and/or humidity
- Cold and/or wind chill
- Road closures

Individual Bird
- Minor trauma, wounds or bleeding (including injury due to handling)

Assessment and joint decisions should be made by the producer, catching crew, hauler and processing plant when faced with CAUTION conditions.

LOAD & TRANSPORT HEALTHY BIRDS

DO NOT
- Load or transport a bird in a way likely to cause injury or suffering
- Crowd birds to such an extent as to cause injury or possible suffocation

www.inspection.gc.ca

Violators of the Health of Animals Act:
- Fines up to $10,000
- Increased fines for repeat offenders
- Repeat offenders posted on CFIA website

See the "Should This Bird be Loaded?” Handbook for more Information.
Handling Techniques

Current handlers and loaders of poultry:

- Regular workers on crew
- Handling training provided
- More scrutiny in hiring
- Foreign worker programs enlisted
- Background checks completed
- Stricter stakeholder involvement (government regulations, processor’s customer)
- More care of/for bird that is shipped
- INCENTIVES for good performance
Load Management

Items to Consider:

• Equipment configuration (trailer design and ventilation, container design)
• Bird gender and weight
• Bird health (pre-existing condition, recent mortality, flock history, injury, stress, nutrition, genetics, barn conditions, flock management)
• Grower/shipper history (weights, counts, conditions)
• Catching quality
• Loading time (day or night)
• Container size (floor space, adequate height, density)
• Environmental conditions (temperature extremes, precipitation, humidity, wind chill)
• Distance to travel and time in transit (expected delays)
• Feed withdrawal
• Lairage time expected and conditions at lairage (monitoring)
Greatest challenges with transport:

• Temperature Extreme
  – Cold Management
    • goal is to manage microclimates (uneven heat/moisture build-up)
    • Birds can give off 5-6X more heat than at normal barn temperature (moisture production as well)
  – Heat challenges – especially severe if trailer is stationary during loading for long period of time – goal is to minimize heat build up in center of load using air flow
The Studies...

- **Determinants of Mortality (broiler chicken)**
  - Review specific customer data over a period of time
  - Isolate key variables and hold others constant
  - Determine what each variables impact is on death loss

- **Determinants of Grade (turkey)**
  - Review specific customer data over a period of time
  - Isolate key variables and hold others constant
  - Determine what each variables impact is on grade value of turkey
The Mortality Study

Mortality Studies

• Rather than looking at existing research, prepared using data from other provinces/countries, with different climates, distances and equipment, we decided to use the data we have, from our customers to analyze the determinants of bird mortality

• We shared the results with our customers and made changes in decision making processes.

• Some excerpts from the analysis below

Very Cold (under -15C)  Moderate (-5C to +5C)  Very Hot (over +25C)

[Graphs showing data analysis for different temperature ranges]
The Grading Study – What is It?

• Analyzed ~1,600 pickups (3.5 years) into Customer to learn about determinants of downgrading
• A statistician tested each variable against downgrades
  o Built two models to test impact on: (a) Catching downgrades, and (b) Stuffing downgrades
  o Able to learn about each variable’s direct relationship on downgrades, by holding all other variables constant
• Models highlighted variables linked with increases/decreases in downgrading (beyond chance)

Raw Pickup Data
1,579 pickups
Jan-12 to Oct-15

1. Variables collected include: bird weight, temperature, bird age, distance to farm, weight per bin, and grade data per Intellemetrics
2. Using statistical models, determined which variables are linked to downgrading (beyond chance)
3. For variables linked with downgrading, able to graph the relationship predicted by our model
"The BIG Learning": Downgrades fluctuate dependent on bird size and density loaded

**Raw Data:** Downgrades vs. Birds-per-Bin

- Smaller Birds (n=551)
  - Higher BPB...
  - Less Downgrades...

- Bigger Birds (n=87)
  - More Downgrades...
  - Higher BPB...

**Model:** Downgrades vs. Bird-Per-Bin

- Raw data translated into a "Model" that illustrates the effect of a single variable on downgrades – in this case, effect of ONLY density on downgrades

Note: From Figure 9 in Grading Study; Based on Raw Data

Note: From Figure 3 in Grading Study; Stuffing Model Prediction Curve
Average density up 0.79 BPB (4.5%)

13,817 birds upgraded

Observed a 0.6 percentage point (11.8%) improvement in live haul grades

Observed a 0.001 percentage point (3.7%) increase in DOA’s

Note: (1) For smaller birds, represents weighted average for the month
### Actual vs. Estimate by Flock – Bird Weight

#### Distribution of Variances – Actual Kg/Bird vs. Estimate

- **a** In 19% of flocks, birds weigh 3% or more below estimates
- **b** In 18% of flocks, birds weigh 3% or more above estimates

#### Distribution of Absolute Variances – Actual Kg/Bird vs. Estimate

- **a** In 56% of flocks, growers are within 3% of weight estimates
- **b** In 19% of flocks, birds weigh at least 5% above or below estimates

**n = 1,209**
Actual vs. Estimate by Flock – Bird Count

**Distribution of Variances – Actual Birds/Flock vs. Estimate**

- In 8% of flocks, estimates are within 3% of estimates.
- In 2% of flocks, there are at least 3% more birds than estimated.

**Distribution of Absolute Variances – Actual Birds/Flock vs. Estimate**

- In 90% of flocks, estimates are within 3% of estimates.
- In 5% of flocks, bird count is at least 5% above or below estimates.
Bird Weight and Lairage – DOA impact

**DOA% by Avg. Bird Weight**

Note: We excluded DOA loads >1% from the dataset.

**DOA% by Lairage Time (hours)**
### Grower / Shipper History

#### All Customers -- Farms Ranked by Size with Variances

**Time Period: December 2015 to November 2016 (12 Months)**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Farm</th>
<th>Number of Trailers</th>
<th>Count Variance</th>
<th>ABS Count Variance</th>
<th>Weight Variance</th>
<th>ABS Weight Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grower A</td>
<td>221</td>
<td>(0.7%)</td>
<td>1.0%</td>
<td>1.8%</td>
<td>3.1%</td>
</tr>
<tr>
<td>2</td>
<td>Grower B</td>
<td>196</td>
<td>(1.0%)</td>
<td>1.2%</td>
<td>(0.2%)</td>
<td>3.4%</td>
</tr>
<tr>
<td>3</td>
<td>Grower C</td>
<td>196</td>
<td>(2.0%)</td>
<td>2.8%</td>
<td>2.1%</td>
<td>3.3%</td>
</tr>
<tr>
<td>4</td>
<td>Grower D</td>
<td>188</td>
<td>(5.1%)</td>
<td>10.1%</td>
<td>2.4%</td>
<td>10.1%</td>
</tr>
<tr>
<td>5</td>
<td>Grower E</td>
<td>162</td>
<td>(1.1%)</td>
<td>1.2%</td>
<td>(0.5%)</td>
<td>2.9%</td>
</tr>
<tr>
<td>6</td>
<td>Grower F</td>
<td>156</td>
<td>(0.6%)</td>
<td>3.0%</td>
<td>3.9%</td>
<td>6.0%</td>
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<tr>
<td>7</td>
<td>Grower G</td>
<td>145</td>
<td>(1.0%)</td>
<td>1.3%</td>
<td>(0.3%)</td>
<td>4.2%</td>
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<tr>
<td>8</td>
<td>Grower H</td>
<td>125</td>
<td>(1.6%)</td>
<td>2.3%</td>
<td>1.7%</td>
<td>4.2%</td>
</tr>
<tr>
<td>9</td>
<td>Grower I</td>
<td>116</td>
<td>(2.8%)</td>
<td>4.0%</td>
<td>(2.9%)</td>
<td>4.0%</td>
</tr>
<tr>
<td>10</td>
<td>Grower J</td>
<td>113</td>
<td>(1.3%)</td>
<td>1.3%</td>
<td>(0.7%)</td>
<td>2.7%</td>
</tr>
<tr>
<td>11</td>
<td>Grower K</td>
<td>94</td>
<td>(1.0%)</td>
<td>1.2%</td>
<td>(0.5%)</td>
<td>3.1%</td>
</tr>
<tr>
<td>12</td>
<td>Grower L</td>
<td>87</td>
<td>(1.9%)</td>
<td>2.2%</td>
<td>(0.6%)</td>
<td>2.7%</td>
</tr>
<tr>
<td>13</td>
<td>Grower M</td>
<td>80</td>
<td>(1.1%)</td>
<td>1.5%</td>
<td>1.4%</td>
<td>2.4%</td>
</tr>
<tr>
<td>14</td>
<td>Grower N</td>
<td>74</td>
<td>(0.9%)</td>
<td>1.2%</td>
<td>1.4%</td>
<td>2.2%</td>
</tr>
<tr>
<td>15</td>
<td>Grower O</td>
<td>73</td>
<td>(0.4%)</td>
<td>1.0%</td>
<td>(4.1%)</td>
<td>4.7%</td>
</tr>
<tr>
<td>16</td>
<td>Grower P</td>
<td>73</td>
<td>(0.8%)</td>
<td>2.4%</td>
<td>0.5%</td>
<td>2.8%</td>
</tr>
<tr>
<td>17</td>
<td>Grower Q</td>
<td>72</td>
<td>11.2%</td>
<td>13.9%</td>
<td>(4.8%)</td>
<td>6.1%</td>
</tr>
<tr>
<td>18</td>
<td>Grower R</td>
<td>71</td>
<td>(1.2%)</td>
<td>1.3%</td>
<td>1.6%</td>
<td>4.1%</td>
</tr>
</tbody>
</table>
Grower DOA Rankings

- Look at distribution of DOA’s on a per-grower basis
- According to their DOA% ranking, the increase in DOA% across ranking groups is not linear – top percentage of growers have DOA% almost twice as high as the next bracket.
- The distribution of DOA’s is very top heavy

DOA% by Grower Ranking – August 2017

### >1% DOA Loads Included

<table>
<thead>
<tr>
<th>Grower Ranking</th>
<th>% Loads</th>
<th>% Birds</th>
<th>% DOA’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>15%</td>
<td>15%</td>
<td>42%</td>
</tr>
<tr>
<td>11-20</td>
<td>15%</td>
<td>15%</td>
<td>19%</td>
</tr>
<tr>
<td>21-30</td>
<td>19%</td>
<td>19%</td>
<td>15%</td>
</tr>
<tr>
<td>31-40</td>
<td>17%</td>
<td>17%</td>
<td>10%</td>
</tr>
<tr>
<td>41-50</td>
<td>15%</td>
<td>15%</td>
<td>8%</td>
</tr>
<tr>
<td>&gt;=51</td>
<td>19%</td>
<td>18%</td>
<td>6%</td>
</tr>
</tbody>
</table>

### >1% DOA Loads Excluded

<table>
<thead>
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<tbody>
<tr>
<td>1-10</td>
<td>15%</td>
<td>14%</td>
<td>37%</td>
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<td>15%</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>21-30</td>
<td>19%</td>
<td>20%</td>
<td>16%</td>
</tr>
<tr>
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<td>11%</td>
</tr>
<tr>
<td>41-50</td>
<td>15%</td>
<td>15%</td>
<td>8%</td>
</tr>
<tr>
<td>&gt;=51</td>
<td>19%</td>
<td>18%</td>
<td>7%</td>
</tr>
</tbody>
</table>
DOA Trends – Temperature and Farm Distance

• When the effects of temperature and distance are taken together, a few patterns can emerge.

• Temperatures at either extreme of hot or cold (<-10°C and >20°C) are associated with higher mortality.

Note: Temperatures are ambient air temperatures from closest weather station to Processor.
The relationship between DOA%, temperature, and distance also depends on the type of bird being shipped.

Note: Temperatures are ambient air temperatures from the London airport weather station at loading time.
DOA Trends – Bird Weight and Farm Distance

• For heavier birds weighing, DOA% is higher than the overall averages for most distance and temperature combinations.

Note: Temperatures are ambient air temperatures from the London airport weather station at loading time.
DOAs – So WHAT is the RESULT...

- In 2016 Customer DOA% was .080% vs. Ontario (ex Customer) of 0.155% and 0.127% for Canada (ex Customer)
  - Customer performed better than the industry in all quarters in 2016

**DOA% Compared to Industry**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Canada*</th>
<th>Ontario*</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1-16</td>
<td>0.186%</td>
<td>0.160%</td>
<td>0.075%</td>
</tr>
<tr>
<td>Q2-16</td>
<td>0.130%</td>
<td>0.102%</td>
<td>0.070%</td>
</tr>
<tr>
<td>Q3-16</td>
<td>0.136%</td>
<td>0.118%</td>
<td>0.081%</td>
</tr>
<tr>
<td>Q4-16</td>
<td>0.169%</td>
<td>0.130%</td>
<td>0.095%</td>
</tr>
<tr>
<td>Annual 2016</td>
<td>0.155%</td>
<td>0.127%</td>
<td>0.080%</td>
</tr>
</tbody>
</table>

**Loads >1% Compared to Industry**

<table>
<thead>
<tr>
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<th>Ontario*</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1-16</td>
<td>1.0%</td>
<td>1.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Q2-16</td>
<td>0.3%</td>
<td>0.2%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Q3-16</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Q4-16</td>
<td>0.8%</td>
<td>0.6%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Annual 2016</td>
<td>0.6%</td>
<td>0.6%</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

*Obtained from CPEPC data.
DOA Monthly Summary – August 2017 vs August 2016

- Overall, DOA’s have improved slightly in August 2017 vs. the same month last year, with 2017 down 0.003%.
- Performance was similar for both years in terms of loads above key DOA thresholds.
- In addition to the aggregate figures below, several other metrics and their relationship with DOA’s were examined.
Questions?

THANK YOU!