FELASA/AALAS
Working Group on Transportation

Animal Transportation Association Annual Conference

Budapest, Hungary

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Cases for Review – Roses and Thorns

Successes

- Case 1: Cross-Country Vivarium Move

Opportunities

- Case 2: Documentation Management
- Cases 3 & 4: Monitoring and Control of Temperature during transport
- Cases 5 & 6: Monitoring and Planning for Extreme Temperature
- Case 7: Inconsistent Importation Requirements between countries
- Case 8: Missing Equipment

One company's approach to Continuous Improvement

OUR WARMEST THANKS TO OUR COLLEAGUES
WHO ACCEPTED TO SHARE THEIR EXPERIENCE!!

Case 1: Cross Country Vivarium Move

- **What was the plan? Route, modes, plan, species**
  - Assist in moving a customer's rodent vivarium across country via air shipment. This was the first time our company has partnered with a customer to do this type of animal move.
- **What happened?**
  - Several weeks planning the move
  - Provided necessary shipping supplies
  - Sent staff to assist in packing the animals.
  - Applied risk mitigation strategy to reduce potential loss: Broke the job into 4 parts over 2 weeks
- **What was the unintended consequence?**
  - N/A
- **Can you quantify the impact?**
  - In-depth planning allowed for animal safety and biosecurity during move of hundreds of animals. Animals are now housed in their new facility.
- **What were the lessons learned and mitigation strategy?**
  - Appropriate Planning and Preparation leads to successful shipments.
    - Providing appropriate packaging/shipping material, standard labeling for cage and animal tracking, separate shipments to mitigate risk, constant shipping monitoring and efficient communication between shipping supplier, Operations teams and the customer.

Case 2: Lost Paperwork

- **What was the plan? Route, modes, plan, species**
  - Regularly ship mice and rats from multiple origin sites around the world via air transport.
- **What happened?**
  - Customs paperwork lost
- **What was the unintended consequence?**
  - Serious concerns to animal welfare for lab animals as animals are packed with a finite amount of feed/nutrition for transit and cannot be opened until they reach their destination.
- **Can you quantify the impact?**
  - Subjects ~30K-40K mice/rats annually to unnecessary risk.
- **What were the lessons learned and mitigation strategy?**
  - **Lost Paperwork:** Defined process to work with our local USDA office to recertify copies of paperwork that have gone missing. Documents are regenerated and overnighted to destination.

Importance of Testing Equipment and Processes Cases: Climate control failure

- Reliance on technology:
  - Air handling
  - Temperature tracking
  - Alarm systems
  - Redundancy
- Reliance on people
  - Cleaning
  - Validating
  - Logging
  - Training
  - Testing
- Redundancy and alarms because even the best equipment or processes can fail. When failure happens, backup plans matter. At that point, the weakest link is the link that matters most.

Case 3: Climate Control Failure

- What was the plan? Route, modes, plan, species
  - Rodent shipment: A regularly scheduled, ground route suffered equipment malfunctions a short time after trip departure.
- What happened?
  - Refrigeration unit malfunctioned resulting in the unit blowing excess heat into the cargo area of the delivery van.
  - Malfunction did not trigger the unit's controls to show an error code: driver unaware of the extreme temperature until trying to unload the animals at a customer's facility (roughly 2 hours from trip start).
- What was the unintended consequence?
  - To work promptly with the global transport supplier to error-proof temperature monitoring/control.
- Can you quantify the impact?
  - Risk mitigation across an entire fleet of delivery vehicles (roughly 100 vans)
- What were the lessons learned and mitigation strategy?
  - **All Vehicles now equipped with:** Redundant thermostat gauges within cabin for driver to monitor and centralized alarm controls communicating temperature irregularities to dispatch.
  - **Long Haul/Overnight vehicles equipped with:** Multiple redundant systems including secondary power sources and backup heat/air conditioning units.
  - **Future/Ongoing plans and initiatives:** Currently re-evaluating all systems and processes for monitoring temperature control in transit as well as Preventative Maintenance practices. In addition, our transport supplier is working with a global provider of temperature monitoring services to develop a best in class custom solution for monitoring environmental conditions while in transit.

Case 4: Addressing Climate control failure

- Is there a backup unit? Has it been tested for use if needed?
  - Yes, and it receives regular maintenance and testing.
- Is there a person available to deploy the backup unit? Do they have a clear SOP and are they trained on this process?
  - Yes. There is a nearby, trained person on call, phone charged and on.
- How does the person know they need to deploy?
  - An alarm notifies that temperature is out of range.
    - Audible in room or vehicle (person not present to hear it).
    - Electronic communication sent to 24/7 security office, which can notify on-call person.
    - Electronic communication sent to other personnel as backup.
- Does the alarm notification work?
  - It is tested weekly.
  - During testing, an audible alarm goes off locally.
  - An electronic message is also send to the tester.
- What is missing? Where is the weak link?

Case 4: Addressing Climate control failure (cont.)

- What is missing?
  - No verification that 24/7 Security office receives alarm notice.
- Result:
  - Temperature escalation. Late response due to 24/7 Security office not receiving notification.
  - Alarm was tested via 2 of 3 pathways (audible, and electronic notice to tester), but not to the exact pathway that matters in an emergency.
- Lessons learned:
  - Scenario planning: Carefully trace the chain of possible events in an emergency.
  - Routinely test and maintain ALL links in THIS chain.
  - Do not assume that because one event, piece of equipment, or process works, it translates to ALL events, equipment, or processes.
- Mitigation:
  - Additional redundancy of notification system.
  - Correction of testing process.
  - Additional review of other process (such as how to reach on-call person)

Case 5: Air temperature extremes in Air Travel

- Temperature restrictions for moving animals by air
  - Restrictions apply to departure, connection, and arrival airport
  - Animals must be tendered > 4 hours prior to flight
  - Animals often start journey several hours or more before tender to airline
- Weather must be predicted in 3 locations, at least 24 and often 48+ hours in advance.
  - For trans-global shipments, the perfect combination is often possible only a few weeks of each year
  - Animals are tendered based on best prediction, often within very short seasonal window of opportunity

Case 5: Air temperature extremes in Air Travel (cont.)

- If weather forecast changes once animals are en-route to airport, at airport, or waiting for connecting flight:
  - Animals may be held LONGER in uncontrolled conditions than if delivered to aircraft immediately
    - Holding areas in MOST airports are open warehouses
    - Not all animals can return to point of origin (example: lab animals, animals waiting for connecting flights)
  - There is no waiver for special handling that can prevent some of these issues, such as for handling by animal lounges with climate-controlled vehicles
  - Animals must sometimes be euthanized due to lack of options once underway

Case 6: Air Embargo due to Air Temperature

- **What was the plan? Route, modes, plan, species**
  - Regularly ship mice and rats from multiple origin sites around the world via air transport.
- **What happened?**
  - Common problems maintaining appropriate climate controls throughout journey and airlines having inconsistent embargo process.
- **What was the unintended consequence?**
  - Concerns to animal welfare for lab animals as animals are packed with a finite amount of feed/nutrition for transit and cannot be opened until they reach their destination.
- **Can you quantify the impact?**
  - This subjects ~30K-40K mice/rats annually to unnecessary risk.
- **What were the lessons learned and mitigation strategy?**
  - **Inconsistent Embargo Processes**: We have developed our own inhouse process to self impose our own embargos when we believe the temperatures are out of specification.
    - The process factors in Wind Chill (cold) and Humidity (Heat) to listed temperatures and we shut down shipping operations when temperatures are outside of our set points.
    - For times when temperatures are borderline and there is a chance there may be an airline embargo, we have developed a “Pack and Hold” process where orders are packed (to keep on schedule) but not released from the source location until flights are confirmed.

Case 7: Inconsistent Customs Requirements

- **What was the plan? Route, modes, plan, species**
  - Regularly ship mice and rats from multiple origin sites around the world via air transport.
- **What happened?**
  - A wide range of import requirements varying by country (even within the EU), maintaining appropriate climate controls throughout journey and airlines having inconsistent embargo process.
- **What was the unintended consequence?**
  - Serious concerns to animal welfare for lab animals as animals are packed with a finite amount of feed/nutrition for transit and cannot be opened until they reach their destination.
- **Can you quantify the impact?**
  - ~30K-40K mice/rats annually to unnecessary risk.
- **What were the lessons learned and mitigation strategy?**
  - **Inconsistent Customs Requirements:**
    - Maintain an inhouse catalog of requirements by country for all of the areas that we ship to by Origin and Destination countries.
    - Partner with strong delivery agents that are well versed in requirements for times when we are shipping to areas that we are unfamiliar with.

Case 8: Missing Equipment

- **What was the plan? Route, modes, plan, species**
  - 115 NHPs from Mauritius via CDG, leaving Mauritius on Feb, 13th 2019
  - Planned to land in CDG on the 14th and leave the same day to ORD
- **What happened?**
  - On the 14th the aircraft from CDG to ORD has been **cancelled** due to technical issue
  - Animals had been repositioned on a flight leaving CDG on the 15th and arrive at ORD on the same day. **Monkeys spent the night at the animal station**
  - On the afternoon of the 15th (Friday), the second flight has also been **cancelled**.
  - No possibility to keep the monkeys longer at the animal station because nobody is working during the weekend
  - No possibility to unload the shipment in France (or any European country) for several reasons:
    - CITES was established for US
    - French importation certificate was mentioning the final destination in US
    - The re-shipping later is impossible - CDG can only receive imports – exports is not permitted
  - The monkeys were **shipped back to Mauritius**
- **What was the unintended consequence ?**
- **Can you quantify the impact?**
  - The monkeys came back to Mauritius -
  - Welfare impact: The monkey have been shipped a second time one month later
  - Financial impact: the breeder had to pay a large part the 1st shipment as well as associated expenses
  - However monkeys arrived well in Mauritius, good health and quiet behavior
- **What were the lessons learned and mitigation strategy?**
  - Mitigation: returning back to Mauritius worked well
  - Better options such as rerouting to Spain or France were not possible due to administrative limitation (CITES, Shipping restrictions at the airport, French certificate)

Discussion

One company’s approach to Continuous Improvement

Case Submission and process for consideration

Successes

- Eliminate mortality during transportation

Opportunities to learn

- Common preventable risks during transportation
- Reducing or eliminating mortality during transportation
- Continuous improvement strategies via lean six sigma principles

Case Outline

- Elimination of preventable mortality of rodents
- Scope- includes only truck transportation
- Incidences of high mortality in rodents
- Unintended consequences that could be prevented
- Utilization of LSS principles and continuous improvement strategy

Case

- Catastrophic events during transportation via truck
  - One or more incidences of high mortality (100+) of rodents globally
- Root causes
  - Refrigeration (reefer) break down
  - Driver inadvertently turned off the reefer
  - Lack of knowledge to act immediately during a truck mechanical break down
  - Lack of knowledge of SOP for inspection of truck before, during and after trip

5 Step process- continuous improvement

- Define
- Measure
- Analyze
- Improve
- Control

……..called DMAIC process

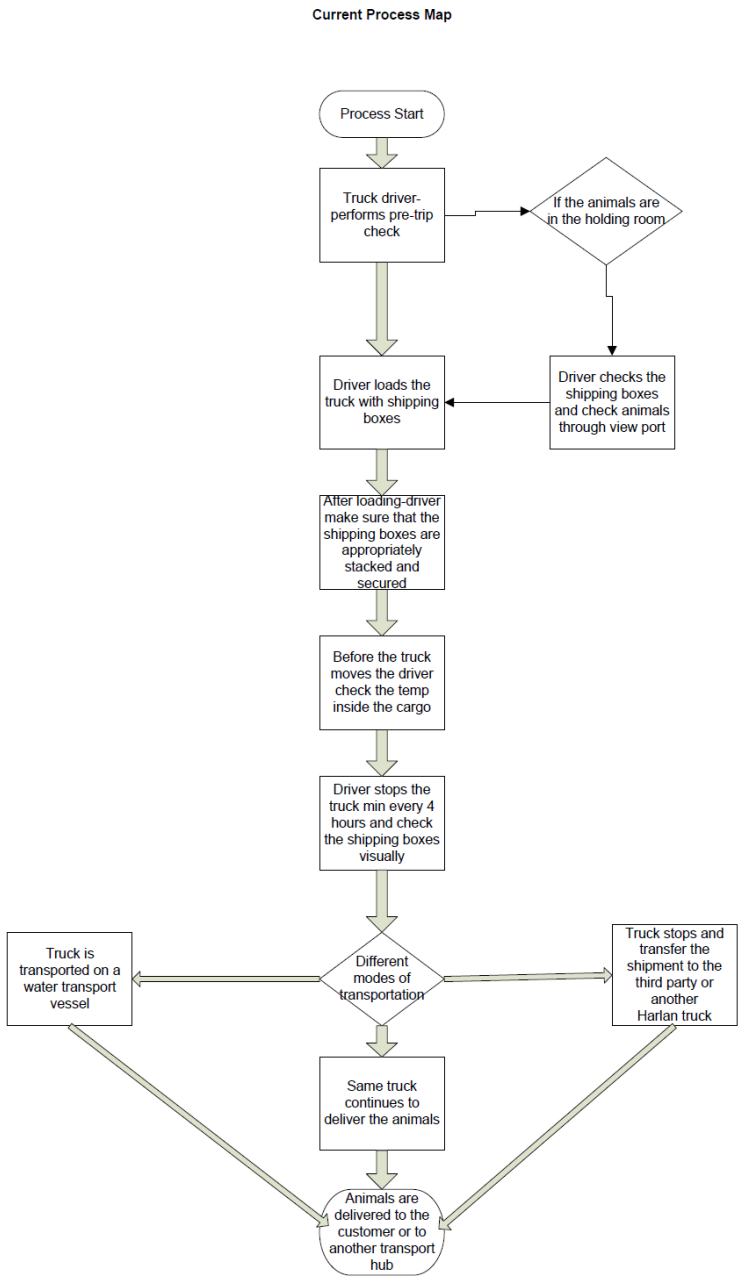
Define

- Description of the project:
  - Problem statement
  - Goal statement
  - Baseline data collection

Measure

- Process mapping- current state
- Document, validate and confirm the current process
- Data collection on waste and defects

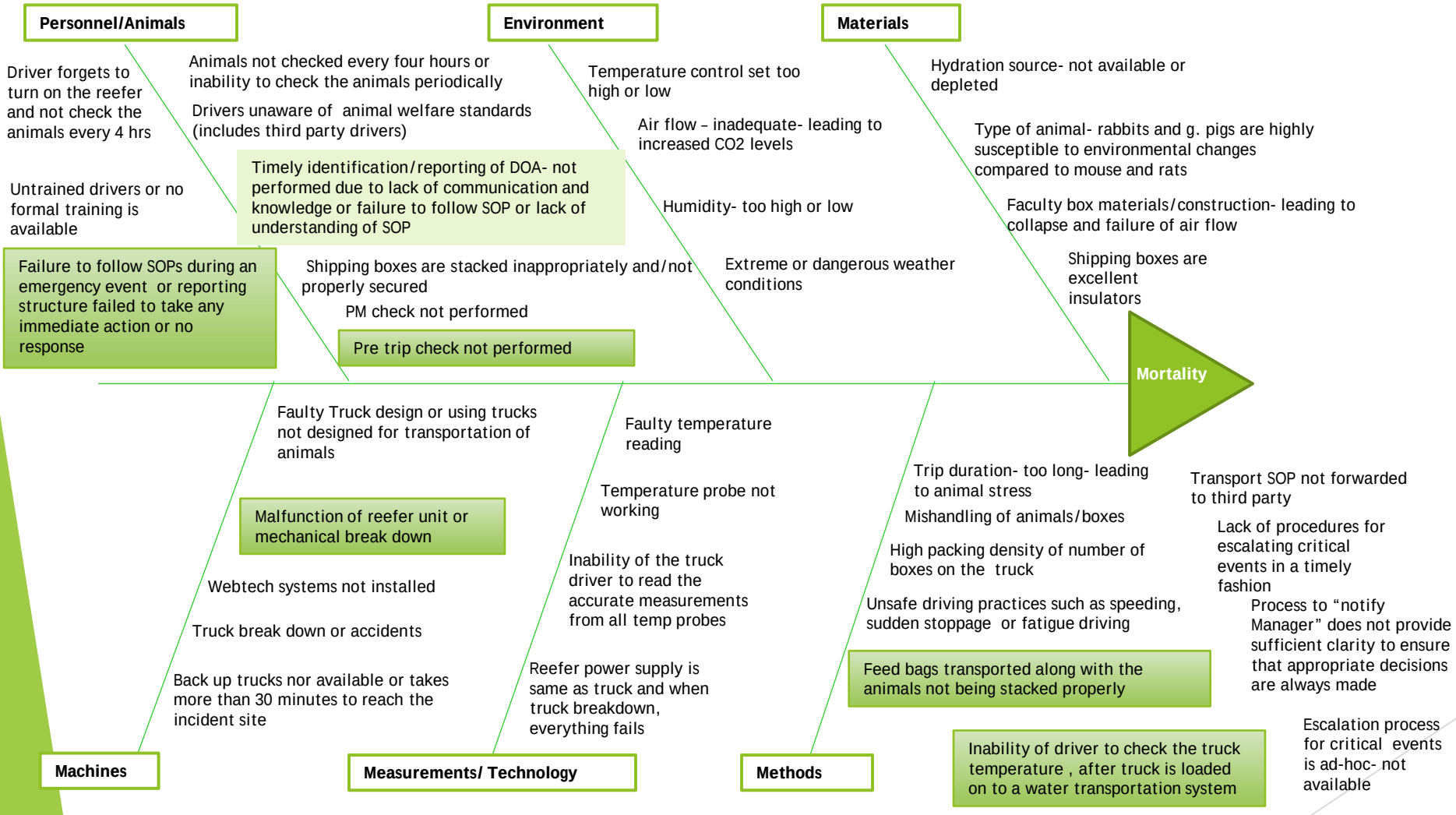
Process Map


Current Process Map
Process Start
Truck driver- performs pre-trip check
If the animals are in the holding room
Driver checks the shipping boxes and check animals through view port
Driver loads the truck with shipping boxes
After loading-driver make sure that the shipping boxes are appropriately stacked and secured
Before the truck moves the driver check the temp inside the cargo
Driver stops the truck min every 4 hours and check the shipping boxes visually
Different modes of transportation
Truck is transported on a water transport vessel
Truck stops and transfer the shipment to the third party or another Harlan truck
Same truck continues to deliver the animals
Animals are delivered to the customer or to another transport hub

Four Voices

Voice of the Customer:	*Voice of the Process:*
Animal welfare issues due to DOA, Problems of the clients associated with the regulatory oversight (such as home office or OLAW), Problems with the IACUC, Problems associated with the delay in starting the study or project, Wastage of time and resources, Risk of losing the project or study due to delays, Risk of emotional disturbance with the employees, Risk of increasing sensitivity towards animal rights group	Risk during the tranportation with reference to problems associated with the reefer, equipment malfunction, measurement errors, mishandling the boxes or improper stacking of the boxes
Voice of the Employee:	*Voice of the Market:*
Animal welfare issues with DOA, Problems associated with maintaining good realtionship with the employer, Risk of losing job, Risk of losing the business with the customer, Risk of losing the contract with the employer, risk of exposing the incident with animal rights group, risk of losing USDA registration or license, need of more training associated with the animal welfare and regulatory process	Need to maintain high standards of animal welfare, catastrophic DOA can lead to problems with the IACUC, Problems associated with the delay in starting the study or project, Wastage of time and resources, Risk of losing the project or study due to delays, Risk of emotional disturbance with the employees, Risk of increasing sensitivity towards animal rights group, risk of canceling the contract or further orders

Fishbone – Overview causes of mortality

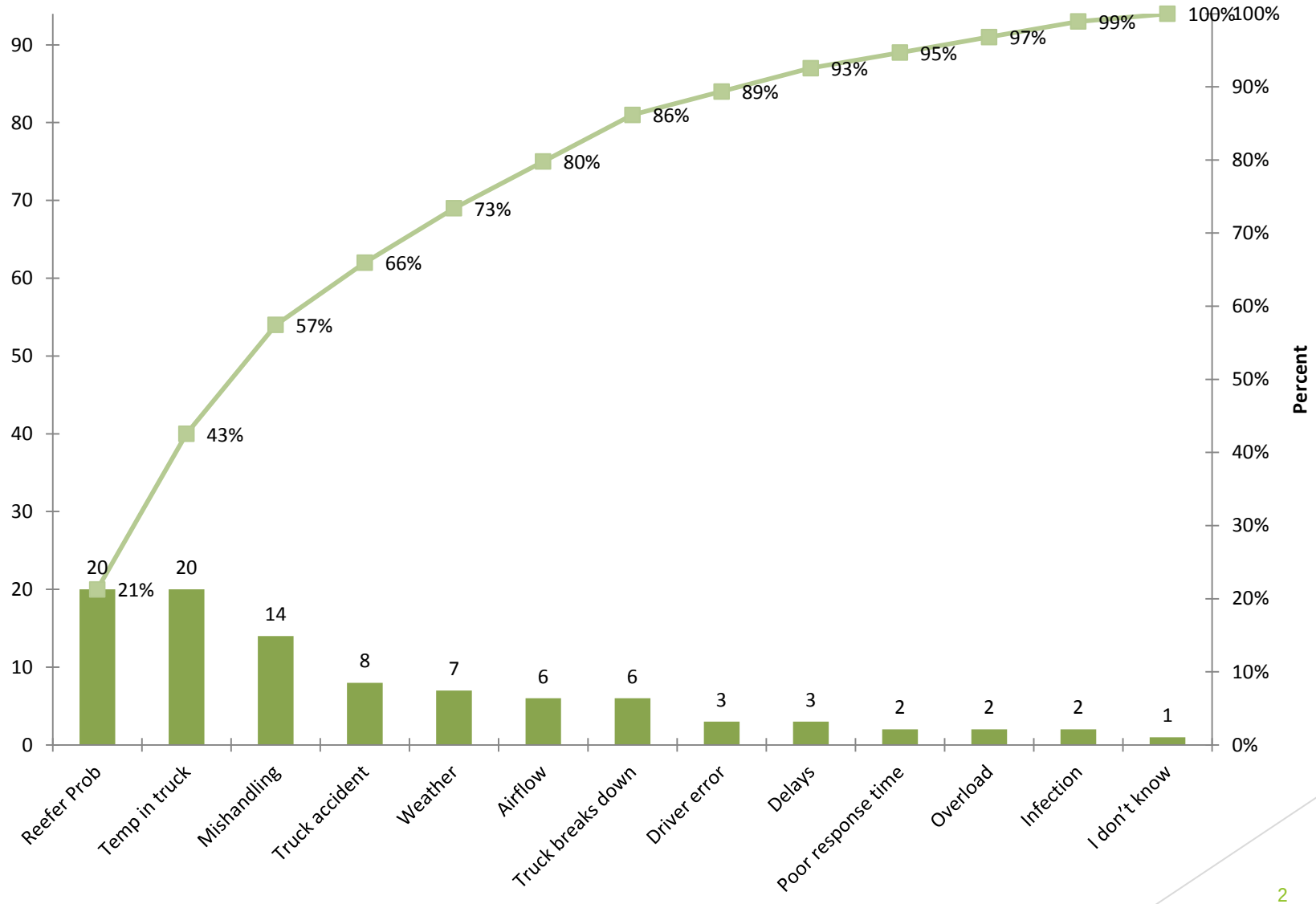


Survey questionnaire for drivers

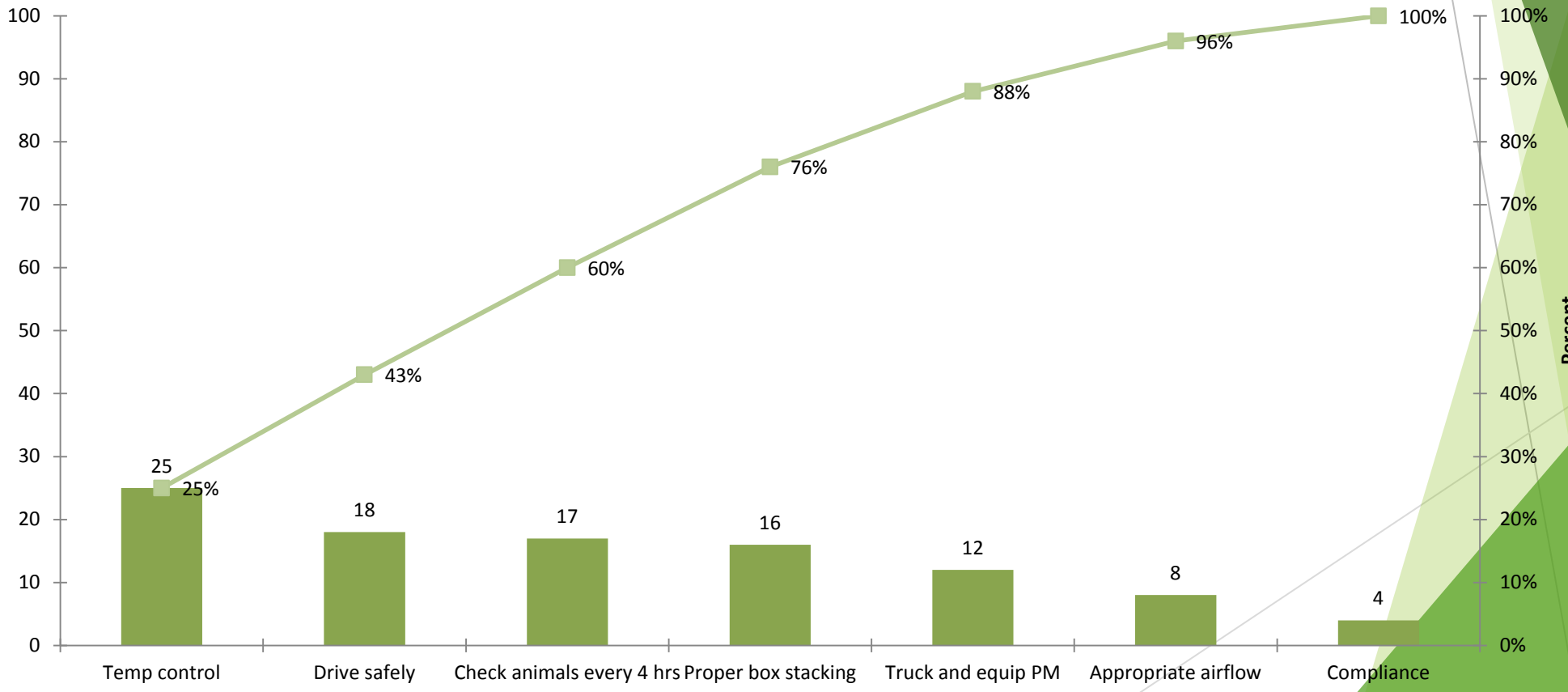
- Due to your experience handling company animals we are asking for your input as part of an initiative to prevent catastrophic loss of animals while in transit. Please take a few minutes to answer the following questions

- Do you feel as though there is an animal welfare issue associated with mortality?
- How long have you been transporting animals for the company?
- Have you ever experienced mortality while in transit? Yes___ No____. If yes, what causes do you think contributed to the mortality?
- What do you think could lead to a catastrophic loss of animals while in transit?
- While transporting live animals what can you do to prevent catastrophic mortality?
- Do you think driver training is sufficient to prevent catastrophic mortality?
- What steps could the company take to prevent catastrophic mortality?

What do you think could lead to a catastrophic loss of animals while in transit



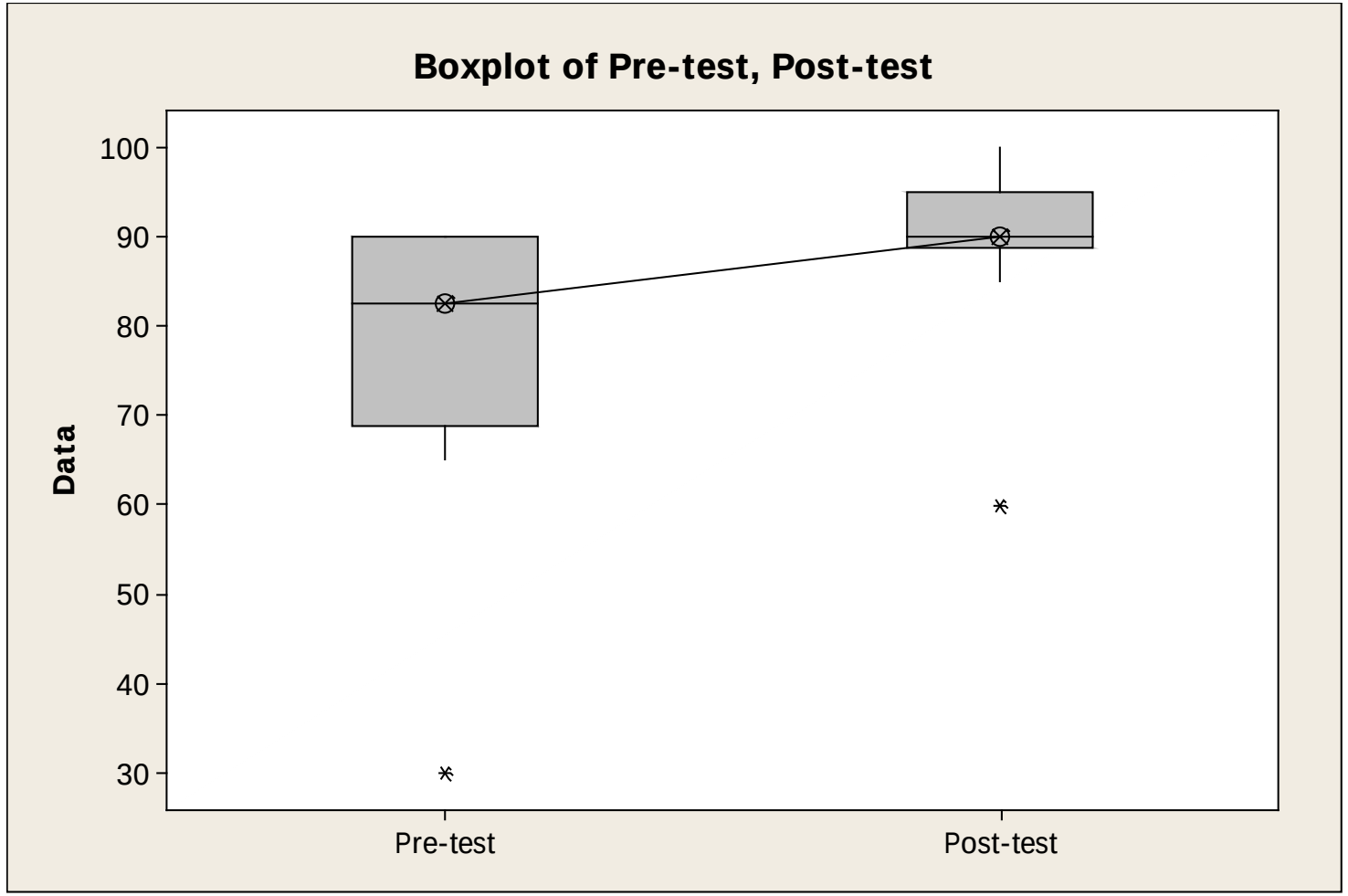
While transporting live animals what can you do to prevent mortality



Improvement

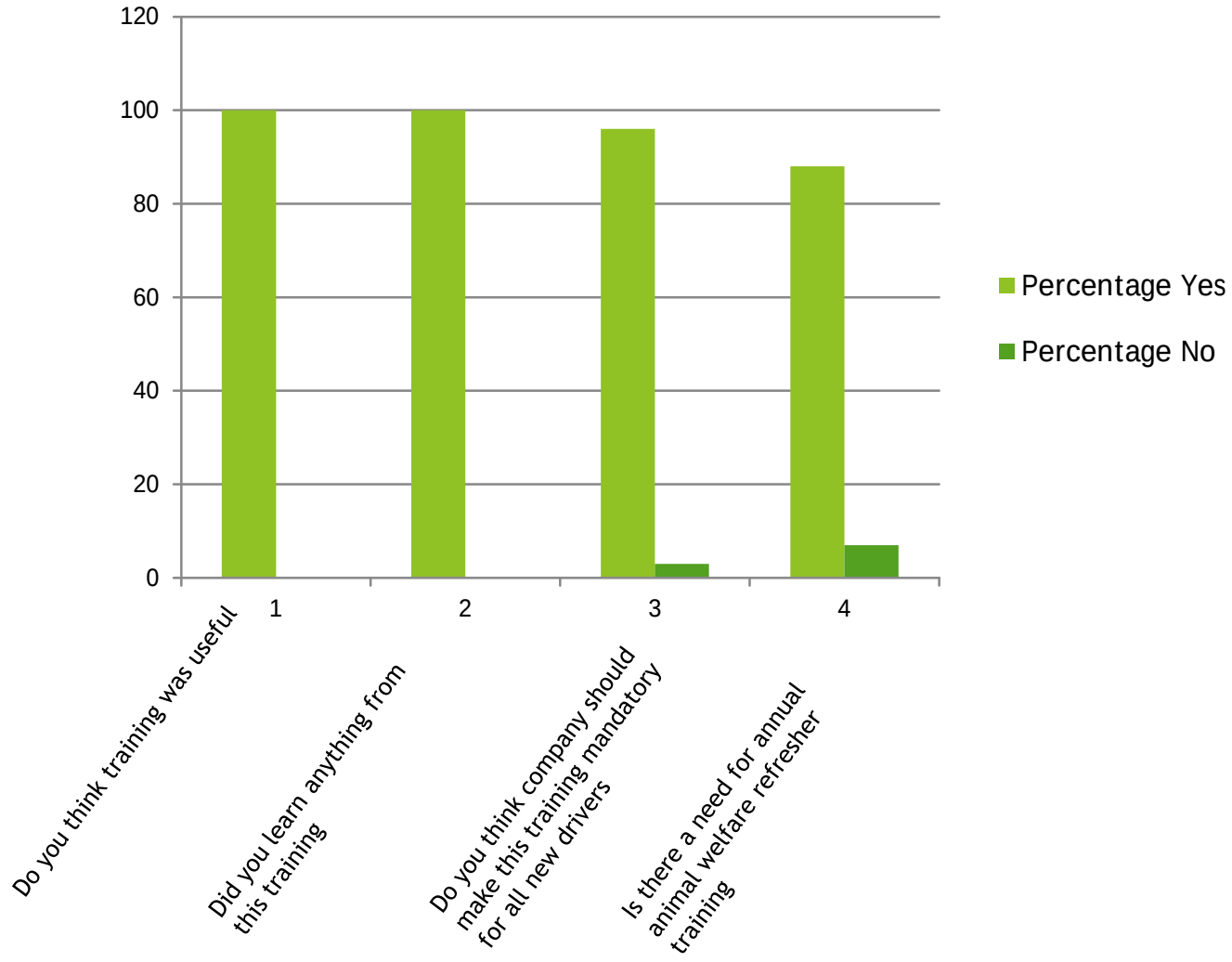
- Animal welfare training for drivers
- Steps to be taken immediately during crisis via check list
- Providing check list for drivers
  - Pre-trip
  - During trip
  - Post-trip

Performed test pre-training and post-training



Significant improvement in knowledge of animal welfare during transportation

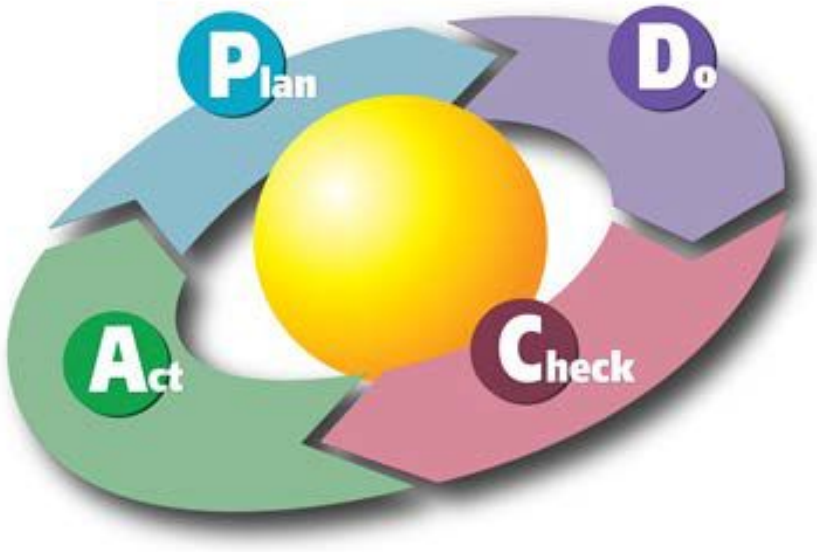
Survey Results- Improvement Data (pilot study)



Conclusion

- There is an increase in testing scores, indicating improved awareness among the drivers
- There is an overwhelming support from the drivers on the training program

Control



- Monitor for any mortality
- Act on the situation
- Analyze the cause
- Act on the RC

Key points that we addressed

- Training on drivers on what animal welfare means during transportation
- Development of a check list in case of an emergency situation
- Development of animal welfare check list as part of the pre-trip (before loading the shipping boxes into the truck)
- Assemble Emergency Crisis Management (ECM) team with a command center to deal with an impending crisis or emergency situation

Solution ideas

- Consider entire transport process from door to door. How will an unexpected embargo affect an animal at each step? How can guidelines reflect best choice for each scenario?
- Consider a requirement that ground handlers must meet a target of < X minutes Y% of the time, for transfer to aircraft. Often airlines do not have sufficient control over ground handling to influence this on their own.
- Require shade to be provided at a minimum, for all transit. This level of infrastructure is always available, but often the closest cart (which may not have shade) is the easiest one to select, and there is no rule to stop this.
- Consider an exemption to temperature restrictions if a climate-controlled vehicle is used for transfer to aircraft.
- If an animal is in transit and held in a non-climate-controlled warehouse, immediate transfer to aircraft in covered vehicle should be considered over longer holding.