

The Economic Benefits of Proper Animal Welfare

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Animal welfare is an issue that the meat industry must take very seriously. First of all, treating animals in a humane manner is the right thing to do and secondly, good animal welfare can have many economic benefits for the industry. There are five major areas where good welfare will pay for itself. They are: 1) reduce damage to carcasses by reducing bruises and injuries plus help preserve meat quality by reducing dark cutting (DFD) and pale soft exudative (PSE) meat. 2) Improve employee safety by reducing accidents during stunning and handling. 3) Reduce labor requirements because the animals will move through the pens, races and restrainer more easily. 4) Reduce costly line stoppages which are caused by delays during stunning or handling. These delays are usually caused by faulty equipment design, poor equipment maintenance or careless employees. 5) Improve the public's perception of the meat industry and serve as a marketing tool. Good welfare will also prevent costly bad publicity.

BRUISES, CONDEMNATIONS AND LOSS OF MEAT QUALITY

Injuries, bruises and abuse of crippled and downed animals cause much pain and suffering and tremendous monetary losses to the beef and pork industries. Installation of a modern cattle-handling system and extensive retraining of employees resulted in a substantial reduction of bruises. For every 100 cattle slaughtered, there was a savings of \$50.

Bruises on fed steers and heifers cost the U.S. beef industry \$1.00 for every animal marketed, according to the 1992 National Beef Quality Audit conducted by Colorado State University for the National Cattlemen's Association. The audit was conducted at major packing plants all over the U.S. This adds up to a loss of \$22 million per year for the fed beef industry. This figure does not include old cows and bulls. The really bad news is that bruises have stayed at the same level during the last 20 years. The Livestock Conservation Institute made a similar estimate 20 years ago. Aus-

tralian figures show that they lose \$36 million annually due to bruises (Blackshaw et al., 1987). The reason the beef industry has failed to stop this terrific loss is a lack of accountability. As long as bruise losses can be passed on by the producer into the slaughter plant, there is no motivation to reduce them. Over 10 years ago, I conducted a survey that showed that cattle sold live weight had twice as many bruises compared to cattle sold in the carcass (Grandin, 1981a). When cattle are sold in the carcass, the producer has to pay for the bruises and this provides a great economic incentive to reduce them. When one large cattle producer started getting bruise deductions on his cattle payments, he stopped rough handling and purchased new vehicles for transporting the animals.

The 1993 Strategic Alliance Field Study indicated that cooperation between all segments of the industry can reduce bruises. Bruises were reduced by 15% when cattle feeders and slaughter plant management worked together to improve handling. The average for severe bruises on U.S. fed cattle is 4.9% (Colorado State University, 1993). Rough handling, either at the slaughter plant or in the feedlot, will double bruising (Grandin 1981a, 1993). Contrary to popular belief, cattle can be bruised right up to the moment of slaughter (Meischke et al., 1974).

Australian research has shown that both overloading and underloading of trucks increases bruises (Eldridge et al., 1988). Their research indicated that there is an optimal density for loading cattle. The space guidelines in Grandin (1981b) were used for the optimal density loads in this study. Grandin (1981a) also found that one or two extra on a load doubled bruising.

The 1994 National Nonfed Beef Quality Audit, also conducted by Colorado State University and sponsored by the National Cattlemen's Association, showed that bruising is extremely high in cows. Many slaughter plant managers and industry leaders were interviewed for the survey. They stated that excessive bruises were a major problem facing the cow and bull processing industry. Thirty-one percent of all cows slaughtered had major bruises. The survey was done at 21 major cow and bull slaughter plants. Bruises on cows and bulls cost the beef industry \$3.91 for each animal marketed. Today, cows are made into much more than hamburger. Much of the loss is due to devaluation of the primal

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cuts. For non-fed animals, the loss adds up to almost \$30 million each year. Quiet handling of both cattle and pigs will also help reduce petechial hemorrhages in the meat. Calkins et al. (1980) found that eliminating electric prods reduced bloodsplash. Hemorrhages in the meat is an expensive cosmetic defect that causes meat to be downgraded. Hemorrhages are costing the U.S. pork industry 26¢ per pig (National Pork Producers Council, 1994). Careful, quiet, gentle handling of cattle during ritual slaughter improves welfare and petechial hemorrhages. Hemorrhages can be reduced by installing pressure regulators to prevent excessive pressure from being applied to the body and quiet handling to minimize excitement (Grandin and Regenstein, 1994).

The audit also showed that crippled downer cattle which were unable to walk were 1% of the beef cows and 0.8% of the beef bulls. Non-ambulatory dairy cattle were about the same, with 1.1% of the cows and 2.6% of the bulls. The final conclusion is that the dairy and beef industries are equally responsible for non-ambulatory cattle. The audit team encourages on-farm euthanasia of downers. The audit team also tabulated the percentage of severely lame cattle to be 2.9% of the beef cows and 4.7% of dairy cows. Among bulls, 7.1% of the beef bulls were severely lame and 10.5% of the dairy bulls. A survey done in Canada indicated that the vast majority of lame or downer cattle were in very bad physical condition before they left the farm or ranch of origin.

A total of 1.6% of all beef cow carcasses were condemned due to severe necrotic cancer eye. Very skinny bone rack emaciated cows were also a problem. Three and one-half percent of the beef cows and 4.6% of the dairy cows had poor body condition scores. The audit team concluded that the number one problem facing the cow and bull beef industry is the failure of some producers to market their animals in a timely manner. Cows and bulls must be marketed before they become debilitated and physically unfit. Whole carcass condemnation costs the U.S. beef industry \$11.99 for every cow or bull marketed.

This completely disgraceful neglect of crippled downer cows occurs because producers are not held accountable for the losses. While most large slaughter plants have stopped accepting emaciated or crippled downed animals, there are still a few places where unscrupulous producers can sell them. The implementation of mandatory identification of all cattle and pigs which will allow traceback to the farm of origin will be required to hold producers accountable for both the economic losses and animal abuse. Unfortunately, the U.S. does not have a nationwide mandatory system of animal identification. Both abuse and monetary losses will continue as long as the losses can be passed on to the next segment in the marketing chain.

The rapid vertical integration of the pork industry has improved transport, handling and slaughter procedures because the farm production unit and the slaughter plant are owned by the same company. The large integrator companies have learned that rough handling and failure to rest

pigs at the slaughter plant results in higher PSE levels. Some of the large integrator companies have been leaders in training employees and implementing improved pig handling and transport standards. When they implemented improved handling procedures, they quickly saw the economic benefits of reduced death losses, bruises and PSE. The 1994 National Pork Chain Quality Audit shows that PSE costs the U.S. pork industry 34¢ per pig and bruises cost 8¢ per pig. Unfortunately, these improvements in welfare do not extend to cull sows and boars. These animals are sold to a non-integrator owned plant and there is no economic incentive because the losses can be passed on to the next segment. Some sows from integrator companies are sold for slaughter while they are still in milk. This results in a tremendous loss to the slaughter plant because the belly meat has to be trimmed off. I predict that if a large integrator company bought their own sow slaughter plant, welfare of cull sows would greatly improve.

Another factor which is detrimental to both animal welfare and meat quality is breeding of very excitable pigs and cattle which are extremely difficult to move quietly at the slaughter plant. These animals are more likely to panic and become extremely agitated when they are brought into the novel environment of a slaughter plant or feedlot (Grandin, 1994a). The increase of excitability is associated with selection for lean animals with rapid growth. Excitability problems can be genetic selection for temperament and training animals to handling procedures. Doing this will require co-operation between the producer and the slaughter plant. Observations in pork slaughter plants in the U.S. indicate that some lean hybrid pigs have much higher death losses. They also have a tendency to have more PSE. Even though British producers raise the same hybrid pigs, death losses in England are very low compared to the United States and Canada. Warriss and Brown (1994) surveyed eight plants in England and the total death loss on the trucks and at the plant was only 0.072. Death losses in the U.S. and Canada were around two per 1000 in surveys done over 10 years ago (Grandin, 1981; Holloway, 1980). Today, some U.S. truckloads of hybrid slaughter weight pigs double the death loss compared to 10 years ago. The differences between U.S. and English figures may be partially due to differences in farm production practices, which would produce a calmer, easier-to-handle animal. The two major differences in farm practices are provision of straw bedding and a slower growth rate due to limit feeding. This is an area that should be researched.

Improved handling and transportation practices will also improve welfare and reduce losses in poultry. One large poultry company in Canada was able to pay for new trucks within a few months. Even though the new trucks held fewer birds, innovations in design greatly reduced death losses, broken wings and bruises. Why is management sometimes slow to adopt new animal-friendly methods when there is a clear economic benefit? The problem is that it is easier to count the pennies and forget about the dollar bills. Quantifi-

fying the number of animals in a truck is much easier than accurately quantifying losses in meat quality or bruises. There is a tendency in the meat industry to quantify the things that are easy to quantify, such as line speeds, and to fail to quantify more important things, such as customer satisfaction with the product.

EMPLOYEE SAFETY

Improvements in the design of races, pens and restraint systems will improve both welfare and employee safety. During the last 20 years, equipment for handling cattle has really improved. In one large plant which slaughtered 165 cattle per hour, replacement of multiple animal stunning boxes with a conveyer restrainer eliminated at least one very serious accident per year. The double rail restrainer system for cattle provides both welfare and safety advantages compared to the old V-conveyer restrainer. Stunning accuracy was improved and strain on the stunner operator's back was reduced because he could stand closer to the animal (Grandin, 1991).

Careful training of employees and good maintenance of stunning equipment will also improve both welfare and safety. In large U.S. plants, the main cause of bad captive bolt stunning which fails to instantly induce unconsciousness is poor maintenance of pneumatic stun guns. Stun guns require careful maintenance to maintain maximum hitting power and to reduce recoil. Excessive recoil from a poorly maintained pneumatic captive bolt can injure an employee's back or shoulder. This is especially a problem in plants where over 1,000 cattle per day are slaughtered.

Automation of stunning for both cattle and pigs may also improve both welfare and safety in very large plants. Employees who stun over 1,000 animals per 8-hour shift are more likely to become careless. Automation would also be better for the employee's psychological well-being. Employees who shoot hundreds of cattle per day often become rough and careless unless they are very strictly supervised. Employees have commented to me that they preferred an automated stunning system because the "box" does the final deed.

In the U.S., some plants hang fully-conscious cattle, calves and sheep upside-down by one back leg prior to ritual slaughter. Ritual slaughter is exempt from the U.S. Humane Slaughter Act. In Canada, England and many countries in Europe, shackling and hoisting prior to ritual slaughter is banned. Hoisting fully-conscious animals results in great animal suffering and is dangerous for plant employees. Installation of a well-designed upright restraint system will reduce accidents. In one plant where cattle were hung upside down, the employee holding the animal's head was cut so badly that he almost bled to death. Concerns for employee safety motivated three large U.S. kosher slaughter plants to install upright restraint equipment. In a kosher veal slaughter plant, replacement of shackling hoisting with a double rail restrainer system resulted in a great reduction in accidents. Records from the plant revealed that for an 18-

month period prior to the restrainer installation, there were 126 working days lost to accidents. There were three serious accidents and one person had to have knee surgery. For an 18-month period after the restrainer was installed, there was only one bruised hand which required two days off (Grandin, 1990).

REDUCED LABOR REQUIREMENTS

Improvements in welfare can also reduce labor requirements. Well-designed facilities often make it possible to remove one or two people. Employees will also have a better attitude because animals will move more easily. Simple modifications of facilities that improve animal movement will reduce balking and animals turning back on the person driving them. Elimination of distractions that make animals balk, such as shadows, sparkling reflections on the floor, air hissing and high-pitched noise, will improve animal movement (Grandin, 1994-1993). Changing ventilation so that it does not blow into the faces of approaching animals will also prevent balking. Other inexpensive modifications are the installation of solid sides on races and restrainers to prevent animals from seeing people deep inside their flight zone. Training of employees to use animal behavior principles while driving animals will improve movement. The most common handler mistake is moving animals in too large a group. Sometimes efficiency of animal handling can be improved by repairing and painting existing facilities to provide a more pleasant environment. People will have a better attitude if management shows their appreciation by keeping facilities well maintained.

REDUCED LINE STOPPAGES

Well-designed equipment will help reduce expensive gaps in the production line caused by an animal's refusal to move through a system. In large U.S. slaughter plants, a one-minute delay can cost \$100 to \$200. In one beef plant, a double rail restrainer conveyor paid for itself by reducing line stoppages caused by poorly-stunned cattle. Stunning accuracy was improved in the new system. Unfortunately, there are no immediate economic incentives to handle downed crippled animals in a humane manner. When an animal goes down and blocks a race, employees sometimes abuse it or drag it to get the line going again. Mistreatment of downed, crippled cattle is a major problem area. Approximately 75% of the downed, severely crippled cattle were in very poor condition when they left the farm. Mandatory identification back to the farm of origin could be used to hold producers accountable. This would provide an economic incentive to send old cows and bulls to slaughter before they become weak or debilitated.

PUBLIC PERCEPTION AND BAD PUBLICITY

One scene on national television of a crippled animal being abused can cause millions of dollars worth of bad publicity. During the last 10 years, U.S. slaughter plant man-

agers have become more aware of the need to handle and stun animals humanely. Unfortunately, there are still some old-fashioned thinkers who do not care. Some people in the industry have attempted to deal with animal welfare issues by slamming their door shut and trying to keep television cameras out. As an industry, the good operators need to stand up and speak out against the few bad operators who continue to abuse animals. We need to clean up our house and be willing to show a clean house to the public. In 1991, the American Meat Institute published animal handling guidelines (Grandin, 1991). This is the first step in self-policing. Europe and Canada are way ahead of the U.S. on dealing with welfare issues.

The public is becoming increasingly concerned about animal welfare. This concern is especially evident in young people. A survey published in the *Wall Street Journal* indicated that 41% of teenagers support animal welfare. During my numerous trips on airplanes, I have talked to many fellow passengers. I have found that young professionals in their 20's and early 30's are much more concerned about welfare than older people. Attitudes are gradually changing and yesterday's accepted industry practices will become tomorrow's cruelties. Two examples in the U.S. are hot-iron branding and castration of heavy bulls without anesthetics. Slaughter plants are the only segment of the U.S. meat industry covered by federal regulations to protect animal welfare.

I have observed that the number one cause of bad animal welfare is a plant manager who thinks that animal welfare is stupid. During 20 years of visiting slaughter plants, I have found that the attitude of management is the single most important thing which determines how animals are treated (Grandin, 1994a). I have seen handling improve with a change of management and I have seen rough handling increase when a good manager left. The manager who is most effective in maintaining high standards of animal welfare is a person who is involved enough in day-to-day operations to care, but not so involved in actual slaughtering procedures that he becomes numb and desensitized to animal suffering (Grandin, 1994b). The manager who is effective also must have the power to fire employees who abuse animals. Plants with the best animal welfare enforce strict rules for employee conduct. The best equipment in the world is worthless unless it has good management to go with it (Grandin, 1988). To maintain high welfare standards requires management that cares. Improving attitudes can be easily done and does not require expenditure of large amounts of money.

CONCLUSIONS

Improving animal welfare in many cases will also improve meat quality and prevent losses due to bruises and injuries. It can also reduce costly injuries to employees. Pro-

gressive managers have recognized that good animal welfare makes good economic sense. Fortunately, most animal welfare problems in slaughter plants can be fixed very economically. I have conducted animal welfare audits all across Canada and in some plants in the U.S. The most common problems which would be severe enough to make a plant out of compliance with the U.S. Humane Slaughter Act are rough handling by unsupervised employees, poor stunner maintenance, slick floors which cause animals to fall down and dragging or other abuse of downed, crippled animals. Most of these problems can be solved by either improving plant management or doing less than \$1000 worth of repairs or modifications.

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ANIMAL WELFARE SUMMARY

During the past 10 to 15 years, animal welfare issues in North America and Europe have become more prevalent and complex. A combination of cultural changes, technological development, economics, special interests and scientific discovery have contributed to this complexity. Although information currently exists regarding the positive effects of proper animal handling techniques, equipment design and use, and good management on improving the welfare of livestock, there is still room for improvement and more pro-active implementation among the various sectors of the meat industry. A resistance to acknowledge that proper animal welfare can be compatible with production efficiency and profit can impede progress. A voluntary acceptance by industry management to invest in training personnel in proper animal handling, well-designed animal facilities and equipment can have economic payoffs.

Temple Grandin presented specific information regarding economic losses within the meat industry due to poor animal welfare practice. Utilizing figures from the 1992 National Beef Quality Audit and the 1994 National Nonfed Beef Quality Audit, sponsored by the National Cattlemen's Association and conducted by Colorado State University, Dr Grandin emphasized the economic losses due to bruising, injuries, condemnation of carcasses, and loss of meat quality (see paper). Changes in practice would result in economic gain through reduction of losses from bruises, PSE and dark cutting. Welfare improvement can also improve employee safety, reduced labor requirements, reduced line stoppage, and public perception.

Mr. Geoff Harrington, Research Director, Meat and Livestock Commission of the United Kingdom, provided a brief overview of recent events concerning animal welfare regulation and the transport of animals in the U.K. Mr. Harrington presented the main areas of concern expressed by British consumers as: close confinement systems, transport—particularly across water from the U.K. to continental Europe, abuses at time of slaughter, mutilations (e.g. castration, de-horning, etc.), and unnatural practices introduced for reasons of efficiency or to cut costs (e.g. early weaning programs, drug treatments, etc.). Citing cultural differences taken from the European Union Image of Meat Survey (1995), Mr Harrington suggested that Southern Europe is not as welfare conscious as Northern Europe, causing dissension within the EU over potential regulations and creating public concern over the fate of livestock exported to those countries. In closing, Harrington questioned whether consumer attitudes displayed toward animal welfare and spending habits will be consistent enough to sustain British animal industries (who implement the high standards of animal welfare demanded by their consumers).

Participants in the reciprocation sessions represented a number of different countries including Denmark, the United

States, Australia, Spain, Canada and the United Kingdom. Cultural differences concerning what constitutes proper animal welfare and the level at which government should be involved in regulating welfare were apparent. However, questions and comments fielded by both presenters reflected the frustration felt by some participants of the perceived failure to convince the meat industry of the need to consciously and consistently improve animal welfare. One observer placed Europe 10 years ahead of the United States in terms of implementing progressive animal welfare policy with Canada intermediate between the two. However, one area of consensus emerged in all three sessions: the need for accountability among all sectors of the meat industry.

The need to build accountability for proper animal welfare into the meat marketing structure (regardless of voluntary or involuntary regulations) seems to be well understood but problematic in implementation. Vertical integration is one example where maximum control can be exerted with consistency from beginning to finished product. The large integrators in the swine industry are an example of where improvements have been made in implementing good animal handling techniques which have decreased bruising. However, it is more problematic to reward or enforce good animal welfare in systems where segmentation occurs and one party simply hands off financial loss onto the next.

It seems clear that livestock producers also must be more accountable for the animals that they market. Although reputable meat plants no longer accept downed livestock, there are still a number of less-than-reputable plants that will. Producers' attitudes need to change and they must commit to marketing livestock before they reach a state of being down or debilitated. The timely marketing of livestock would then eliminate a "black market" of buyers and processors of downed livestock. A change in producer attitudes toward marketing and handling of animals could lead to a domino effect up through the system. Each segment would be shouldering accountability throughout the system to produce a safe and quality meat product under conditions of proper animal welfare.

Legislative action, for many, is largely ruled out as an effective way to induce attitudinal change. Incentive programs are deemed as being more likely to effect change. Industry-developed incentive programs that clearly reward outcomes of proper animal welfare could have a positive impact on management to invest in and enforce proper animal welfare. The perceptive impact on the consumer could be impressive. Some large buyers of meat products are already forcing their suppliers to enforce proper animal welfare standards.

Finally, related but no less important issues still continue to rear their head: proper stunning techniques, use of tethers, and the development of automated stunning systems

for cattle to reduce stress on employees. Ultimately, a reasonable recommendation from this reciprocation session is for the meat industry to be a proponent of and invest in proper animal welfare practice. Likewise, livestock producers should be equally vested in order to complete the chain of accountability. The outcome can prove to be successful from the

standpoint of the production of a quality meat product and a positive perceptive influence on the consumer. However, it will be up to both producers and processors to work together cooperatively to make proper animal welfare the rule instead of the exception.