

## **Agricultural Hazard Surveillance Training**

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**MR. SESTITO:** Our next speaker is Dave Pedersen. David is an industrial hygienist in our surveillance branch in Cincinnati. Dave has been working for over three years with us under the farm program in conjunction with many of our collaborators to develop an agricultural safety and health hazard training program. He is going to share a little bit with you today, what we pulled together collectively with many of you in the hall. So, Dave, if you would like to spend some time with us.

**MR. PEDERSEN:** Good morning. As John just said, what I am going to try and talk to you about is an agricultural hazard surveillance training program. I have three things I would like to try and accomplish in this presentation. First, to describe the reasons for this type of training. Second, to very briefly describe the development of such a training curriculum, and finally to give you a fast look at the contents of the course as it was developed.

The course came to be known as the Cooperative Agricultural Surveillance Training (CAST) Program because it was indeed a cooperative effort. It is a component of the Farm Family Health Hazard Surveillance Project within NIOSH, and that particular program involves six States: Colorado, California, Iowa, Kentucky, Ohio, and New York. There are two major components within that program: an assessment of health status and the demographics in the agricultural sector, and an assessment of the hazardous exposures that are known to exist or should be known to exist in the agricultural sector.

The intentions of the course that was ultimately developed was to address knowledge gaps. By this I mean the interface between traditional occupational safety and health and the knowledge that resides in the agri-

cultural community. What we have found in a cooperative sense was that there had been a lack of communication in those two major discipline areas that needed to be addressed. We cooperatively wanted to provide basic, and I do emphasize basic instruction, in this interface area; to essentially acquaint occupational health specialists with conditions in the agricultural sector and, conversely, to provide some information to agricultural specialists, specifically in hazard surveillance, about the techniques that had been utilized in the past.

We also wanted to provide a mechanism for standardizing survey protocols across the six States that were participating in this effort, and finally, in a developed package, we wanted to provide assistance to any other efforts that might be ongoing in agricultural hazard surveillance.

Very briefly, let me describe the process that we went through in developing the curriculum for this course. The topic or lecture recommendations came cooperatively from the six States that were participating in this project, and from every one of the six research divisions within NIOSH. All of these recommendations were collated and discussed at an open forum, two-day meeting in Cincinnati, from which we derived a list of the lectures in general, the specific topics

within those lectures, and identified people with adequate expertise to address the topics that we needed. I would emphasize that those lectures came from the agricultural sector, from within NIOSH, and from experts who provided their services by contract in order to obtain needed expertise.

Finally, all the lecture materials, as developed, were reviewed by panels consisting of individuals from both the agricultural sector and from within NIOSH. They were edited in accordance with these reviews, and ultimately presented at a week-long classroom setting in Cincinnati.

As it ultimately evolved, the CAST or Co-operative Agricultural Surveillance Training consisted of 18 presentations or lectures. You can loosely divide these into five categories with the understanding that there is a lot of overlap between these particular categories. Basically, there were three lectures in background information, five in safety hazards, six in health and safety hazards, two specific lectures in protective equipment, and two in standard protocols. These lectures range from 30 minutes to 110 minutes in length, in final edited form.

Let me then give you some idea of the specific content of each of the lectures. The three lectures within background information consisted of agricultural health problems, which was an overview of health effects in the agricultural sector, and discussion of specific health effects and their causes in agriculture. Agricultural ethnic considerations was an examination of the unique cultural characteristics in the agricultural sector and how they might affect the conduct of on-site hazard surveillance activity.

The interview techniques lecture provided basic information for the conduct of onsite interviews to include preparation, the actual conduct of interviews, and control of those interviews.

The second category of safety hazards consisted of five lectures. The first two of these concerned general safety, providing an overview of occupational safety concerns and an examination of safety concerns as they exist in the agricultural sector.

The second of the five lectures dealt with Buildings and Structures. This concerned itself with the design and construction of buildings, building use, and retrofit or utilization of agricultural structures for purposes they may not have been intended for originally. Safety hazards associated with agricultural building safety was also covered in some detail.

As an example, let me show you a couple of slides that derived from the materials for that lecture; a directional force diagram, displaying the stresses that are put upon buildings in agricultural use. A fairly decent example of a hazard is a collapsed silo. The hazards are obvious.

The third of the five lectures concerns itself with commodity handling and storage, and contained generic discussions of the common practices, equipment and structures, and health and safety hazards in the area of commodity handling. Again, let me show you a couple of examples of the illustrations from this lecture. First, typical grain handling operations, and a discussion and diagrammatic representation of grain entrapment.

The fourth of the five lectures was *Implementations and Mobile Equipment*, which provided an overview examination of farm equipment, and in-depth discussion of specialized equipment related hazards, and over-the-road transport. Examples of the illustration from this lecture include power take-off (PTO) shaft entrapment and tractor overturn.

The fifth lecture was *agricultural electrical systems*. This is concerned with typical service installation, maintenance, electrical hazards in an agricultural setting, power tool use, and general shock/electrocution hazards. Example illustrations include diagrammatic layout of a farm electrical system, and an example of a hazardous agricultural electrical system. This particular lecture has a slide that the lecturer is particularly fond of, which he refers to as the flying switch. That is where, there is an off/on switch hanging in space, suspended from two pieces of wire running from either side of the room.

Within the category of health and safety hazards there are six lectures. The first of which is *agricultural welding*, providing information on welding, soldering, and brazing, and spoke of welding equipment operations, both in industry and in agricultural settings. Finally, the specific hazards as they exist for the utilization of welding equipment in agriculture were discussed.

The *animal handling and treatment* lecture spoke to the structures and facilities used in agriculture for animal handling and treatment. The safety hazards of animal handling range all the way from hazards associated with buildings, to human hazards resulting from the fact that you are handling

animals. There was a specific and very interesting section on *veterinary treatments and medicines* which included a discussion of zoonosis. Let me show you some example illustrations from that lecture. These include a schematic diagram for typical and fairly high grade animal housing, and a very nice example of proper veterinary medicinal storage.

The third and fourth lectures in this particular category included *agricultural chemical and fuel storage*, and *respiratory hazards*. The lecture on chemical storage dealt with common practices, and proper storage of chemicals and fuels.

The lecture on *agricultural respiratory hazards* gave a lot of very valuable information on the hazards of respirable dust and the sources of those dusts. It also provided specific information on biological dust hazards, dust sampling, and exposure measurement.

This particular lecture was interesting in that it really represented the cooperative nature of this training course in that the material was about half from expertise in the academic agricultural sector, and half from expertise within NIOSH.

The fifth and six lectures in this series, concerned themselves with *agricultural confined spaces and ergonomics*. The confined spaces lecture discussed confined spaces as generally understood, and then specifically discussed them as seen in the agricultural sector.

The *ergonomics* lecture provided discussion of cumulative trauma disorders, occupational factors leading to those disorders, and a discussion of proper tool designs and the rede-

sign of work processes which could avoid the onset of cumulative trauma.

An example illustration from the confined spaces lecture was a schematic for manure pit operation, which displays the gas hazards that are relevant to that situation.

Finally, the two lectures within protective equipment, included a lecture generically entitled, "Personal Protective Equipment," which subdivided itself into a discussion of respirator selection, fitting and maintenance, and more specifically, agricultural applications for such respirator equipment.

It also contains a discussion of general personal protective equipment, as well as the use and suitability of such equipment in an agricultural setting.

The agricultural noise exposure lecture gave us information relating to the effects of varying sound levels on hearing, agricultural noise sources, hearing protection equipment, and their effectiveness as well as the onsite measurement of sound levels.

Example illustrations from the protective equipment lectures include the penetration of chemical agents through protective clothing and the utilization of protective clothing in agriculture.

One of the diagrams or schematics used in the noise lectures is an illustration of the sources of agricultural noise. It shows the diminution of the effect of that noise, based on distance from a noise source.

The final category, then, discussed standardized protocols. In two lectures, it provided a

standardization process for observational walkthroughs, their planning and conduct, the identification of exposure agents during the course of that walk through, and information relating to the controls for such exposure, as well as the durations.

The last lecture was Field Observation and Coding, which dealt with a system of computer compatible coding systems, standardized work area definitions and task definitions, the encoding of exposure observations, and the conditions of such exposures.

In its final form, the CAST package consists of 24 hours of edited videotaped lecture in 20 separate videotapes. There are both student and instructor manuals which differ primarily in that the instructor's manuals contain very detailed outlines of every presentation, whereas student manuals are intended as an aid to notetaking and are therefore not as detailed. These outlines also include a justification and an explanation of the purpose of each of the lectures, contain bibliographic resource citations, and contain discussion questions and exercises intended to stimulate discussion.

I should mention that this course is intended to be utilized by a qualified instructor for the instruction of a class of students. Presentation of this material by an instructor and guidance in the study of this material, is imperative. It is not intended as a self-study course.

I have already mentioned the supplemental materials that are contained in this package. In addition, there are a number of NIOSH publications, including certified equipment lists, which are very applicable and can be

obtained. Finally, one product from the effort to generate this training course was a library of 35 millimeter slides. There are somewhat in excess of 800 of these. They provide, as you have seen, some excellent illustrations and instructional materials for hazard surveillance in agriculture. These are available only on a lending basis, simply because I do not have many of them.

In summary then, let me say that this package has been developed and disseminated to the six States that were engaged cooperatively in their development. We are in the process now of developing additional, although limited, quantities of this material as an aid to other agricultural surveillance programs. I have already promised a number of these packages to various individuals and programs. Those who are interested in these materials should contact me sometime during the course of this symposium, and I would more than happy to discuss it with you, or alternatively, simply contact me within the DSHEFS division of NIOSH, or through Tim Groza. Thank you. ■

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