

[Introductory music playing] [Voiceover] Presenting Electricity at Work, a story of heat, light, and power by means of electrical energy. Featuring Dr. Donald P. Brown of the Agricultural Engineering Department of the Michigan State University Campus. And now, here's Don. [Donald P. Brown] Welcome once again to our program, ladies and gentlemen. Today we're going to talk about crop dryers and some of the various types of buildings that you can use them in and some of the advantages of using the crop dryer. Speaking of advantages let's go over and run down some of these various things that people have found to be advantageous in using a crop dryer. Many farmers of course tell us that crop dryers will help them get their crops in and to maintain a safe moisture content that is for storage. Now of course we all think of that as being the one big reason for using crop dryers, however there are some other reasons and I particularly wanted to mention those to you. For instance, some farmers have told us but by combining their grain a little bit early they can get cleaner grain because it cleans up a little bit better the kernels are still a little heavy and they don't lose so much grain by blowing over and don't get so much chaff in their grain. Another thing that fellows have told us is that by using a combine and by being able to put in high moisture grain as we might think of it, it will lengthen their combining day in other words they can start a little earlier in the morning while there's still something to do on the plant, they can work a little later in the evening after it starts to get moist. So it lengthens their day and by the same token it helps to lengthen their combining season because they can start a little earlier in the season than they would be able to if they didn't have some type of a forced air crop drying system. So those are some of the points that we tend to overlook if we don't have them pointed out to us. Let's go over now and take a look at some of the the different amounts of moisture that it is necessary to remove from various types of crops and of course you all know that you can dry practically any type of crop on a dryer once you're set up for it and once you're designed for it. The thing that I want to point out is the terrific amount of moisture that it is necessary to remove from crops, grains and beans in our case here today, in case we happen to harvest those a little bit on the wet side. I have chosen 20% moisture for the harvesting of these crops and I want to show you how much moisture it is necessary to remove from them if we do harvest them at 20%. For instance on wheat, wheat of course doesn't keep well until it's down to around 14% moisture. If we harvested wheat at 20% moisture it would be necessary to remove around 4 and 2 tenths pounds of water from every bushel of wheat or the amount of water that we have in this gallon jug. Moving over now to ear corn, ear corn will keep well at around 18% moisture content. We harvested ear corn at 20%, it would be necessary to remove around a pound and a half of water or the amount of water that I have in this jug from a bushel of ear corn in order to get it down to safe storage content. So multiply that by the hundreds and hundreds of bushels that some people do store and you can see what a terrific amount of moisture that we do have to remove from that. Just a word about navy beans, here again navy beans will keep it around 18% moisture. If we harvested these beans at 20% moisture it would be necessary to remove around 1 and 7 tenths pounds of moisture from every bushel of beans in order to get them down to a safe moisture storage content or about the the amount of water that I have here in this jug. So for beans and ear corn you can see it's very closely, very closely together in that we do need to remove the same amount practically from the two different crops. The difference there being in the weight per bushel of the two crops, you notice they both keep the same moisture content, around 18%, and if we're harvesting in the 20, we would need to take out around four pound and a half to a pound and seven tenths of moisture. Now, how are we going to do it? Well, of course, here's where our plans come into play, because it is necessary, especially on large volumes, to force air through our crops. Many of our earlier

farmers constructed their bins so that they got enough natural circulation of air through the corn and through the grain in order to keep it dry, in order to dry it out, I should say. To the advent of the combine helped a lot in this moisture problem. In other words, we got the combine to get the grain in out of the field, and then we created a problem for ourselves of safe keeping of the grain. The thing I want to point out on the fans is that normally we have two different types of fans that are used for crop drying. The one that we have right here is the propeller type fan, and you get this name from the very fact that it does look like a propeller. The propeller type fan and the centrifugal fan, and I just have the parts of one here to show you essentially how they differ. Now this this centrifugal fan you'll notice revolves, well this one would revolve in this manner, throwing the air out the periphery of the fan, whereas on the propeller type fan the air comes right through the fan you might say, and is discharged out in this direction. Well those two fans are used on crop doors. I think that perhaps we're safe in saying that the propeller type fan is used much more extensively than the centrifugal type fan. One thing that I do want to point out to you and stress upon you is that if you're buying a fan to use as a crop drying fan, be sure that you buy one that's designed to operate against pressure. We've had many farmers relate some sad experiences to us, telling us how they've noticed where the old fans were for sale, say building ventilating fans or something like that were for sale. They thought they were getting a good buy on something that would make them a good crop -drying fan. However, to their sad experience, when they got them home and installed them in their building, they found that they wouldn't deliver the air against the pressure. They weren't getting the required amount of air through their drain or through their hay. So make sure that you buy a fan that's designed to operate against the pressure. The best recommendation I can give you there is to make sure that you consult a reliable dealer and let him go over his fan performance curves with you. He has the curves, the data on all of these fans that will show you just how much air they'll deliver at a certain pressure and that is very important and for goodness sakes take time to grow it with him and make sure that you're getting a fan designed to do the job. Now a word about the different types of buildings that can be used for grain storage. There we aren't too specific as to the type of building there are certain fundamentals of course that we do need to keep in mind as you'll see here a little later on practically any type of building can be adapted for grain storage. If you're building a new building of course there's some things that you might want to incorporate into that that would make it a little easier for you so far as handling the grain and so far as being able to do a good job of drying. If for instance you have rectangular bins, such as the one that we illustrate with our model, you might want to set up such as this one. This being the main air duct located on the outside of the bin so so that we don't take up good storage space. Then for our air distribution system, on the inside of the bin, we might go to something like this. Blowing the air down the main duct that's located on the outside of the bin, and then discharging it through these laterals that are placed about every two feet apart, and are blocked up off the floor, so that the air comes out through the laterals, comes out around the edges of them, and then comes up through the grain, whether it's corn or small grains, sweet or oats or beans that we have piled on it. Notice these are spaced all the way down through here. One thing that I particularly want to point out to you is that they don't come all the way out to the edge of the building. In other words I think we can see it right here, you notice they stop back away from the building wall so that we do have a space there in which the grain fills down in here and helps to to create a barrier there so that the air doesn't come out and scoot right up the building wall. You'll notice also that this first lateral here isn't right up against the wall, we have a space there that the air tends to get in there or the grain tends to spill down in there and to keep the

air from scooting right up the side of the building. Now perhaps you have a round building that you'd like to install a grain dryer in and if we can borrow a piece of our drying set up from this building we'll place it over in this one and with our lateral ducts I think we're all set up there and ready to go. Many grain bins of course are round to begin with. As the one that we have shown here we've cut away the side of it using this as our central distribution system down through here. Of course our fan would be located in the end of it up here. Then we discharge the air out the sides, as you can see on these laterals and we have the same thing on the other side, these two stop back a certain distance from the wall that's usually about two feet back from the edge of the wall here all the way around so that we don't get the air scooting right up the side of the wall and there's less pressure there to work against we can go out there easier if we once let it get out there. And of course, too, on a system like this, this end down here opposite the fan would be closed up so that the air doesn't come down there and scoot right up. Another thing that has been found to be quite satisfactory by many of our farmers, especially for drying air corn or some of them use it for drying bags of grain, is to use their A-frame type of drying system, the same system that they use for drying hay. And their A-frame, as you may remember, looks something like this. Actually it looks like an A if we turn it around here you might get a little more resemblance of an A. That is built so that we blow the air down through here, the openings through the sides allow the air to come out through there and filter up through the hay or through the grain. As I mentioned a while ago many farmers use this system for ear corn, they pile the ear corn right in on top of it and have had very good results. A lot of them use it for bags of grain, say for wheat or something like that, they leave them in the bag and stack the bags right up and down the sides of the A-frame. One thing that we should remember there is that if we're piling, for instance, wheat on top of this system, we're likely to build up a greater pressure than our hay drying system was designed for. We're assuming now that we're using a hay drying system for drying grain. Let's keep in mind that as we build up the pressure on our fan, that it will deliver less air. So let's keep in mind that we may be cutting down our air supply that we were normally getting from our fan when we were drying hay. However, we're usually on the safe side there because grain usually requires less air per bushel or per drying volume than does hay because we have to remove usually a lot less moisture from the grain. Now for some other types of buildings that can be adapted for grain storage, let's start off with perhaps the simplest one, the old shed type corn crib with which I'm sure most of you are familiar. We'll let this be our ground line and if you remember most of those cribs were built, they were rather long and narrow and had slatted sides on them depending there of course on air circulation to remove the moisture from the grain so that was down to safe storage. And then of course this side back here was slatted also (I won't put all of them in). One thing that we have seen used quite successfully on a building of that type is that instead of putting this central air duct down through the center of the building, it comes over to the side here and have not taken up good storage room. I built another little duct down along the side. Place the fan in the end of that. And then of course it's necessary to come in here and seal this building off so that the air can't escape. We seal it down there and of course we seal the duct itself and make a good tight floor in the duct and come out here at least part way in the bin or in the crib. So what we're doing there is blowing the air out through here and letting it come up through the grain and accomplish the drying process. And, of course, it'll come up through here. Now, one thing that we do need to keep in mind is, of course, that we don't get this grain much deeper than we have this distance across here, or we won't get a good air distribution. Another type of system, another type of building that quite often we like to convert to a forced air drying system is the old drive-

through pipe, and I think we can show that one and show you what some farmers have done with a building of that type. This being our ground line, we'll put our two cribs, usually, and we're built with crib on each side. You may remember, we'll run this one on up to the roof here, perhaps tied across here. Normally, they would drive the wagons down through here and unload onto each side. But with a forced air drying system, it's quite often possible to do this. These two were slatted on the sides, of course, I won't bother to put those in. Come in here with a central main duct right down through what used to be the driveway, place the fan in there, blow the air down through it, and then we can fill the whole thing up with corn up along here. Now, this is all illustrated in the bulletin that I'm going to offer to you just a little later on. Now, perhaps, if you're building a new building, there's some features that you might want to keep in mind. And let's sketch those right here very hurriedly in the time that we have left. You might want to put an A-frame right down the center of it. And if you're building a new one, you can do this very easily. Put a gutter down the side here so that you can put a drag chain in there for unloading. You may want to put some openings in the roof for filling with an elevator. I know there are a lot of points that we haven't covered here, and I'd like to suggest to you that if you do have more questions, you stop in and see your county agent and ask him for a copy of a bulletin on drying grain with forced air. That's a good bulletin. It has a lot of pointers in it, and if he doesn't have one, I'm sure that he can get one for you. That's about all that we have time for today, so we'll see you next week. [marching band style outro music] [Voiceover] This has been Electricity at Work. Today's program was presented by the School of Agriculture and arranged by the Department of Agricultural Engineering and the Michigan Committee on Rural Electrification. We had with us today Dr. Donald P. Brown of the Department of Agricultural Engineering. Today's topic was crop dryers. Electricity at Work is directed by Les Harcus.