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RESOURCES--MONEY, EQUIPMENT, MANPOWER

My presentation this afternoon relates to my personal experiences in the war on snow and ice control and, by the way, I don't think you can control it.

I was promoted to the highway executive staff on December 15, 1977. Since it was December 15th, I had nothing to do but prepare for the winter. In that staff position, one of my responsibilities was statewide maintenance, which included snow and ice control. Remember the Mayor of Chicago, Jane Burn, who lost her job because of poor snow and ice control that year? Boy, I remember Jane really well--because they started calling me Jane! That winter we ran out of salt. The river froze so we couldn't get barges up from Louisiana. We experienced one of the worst blizzards in history! Some bridges over roadways were packed with snow drifts. We were plagued with ice pack--which even got chuck holes in it. Wheel tracked black ice--boy, that causes a lot of wrecks in a major city. And, spring claims for property damage due to salt runoff from open-pile storage. That was followed by directives from the Board of Health to immediately, if not sooner, cease and desist and correct the environmental problems. Well, I learned a lesson in a hurry.

Have you heard the story about the 911 operator who received a call from a little boy? She asked him if she could talk to his mother. "She's busy," he said. The operator asked to speak to his father.

"He's busy too."

"Could I send the police?"

"They're already here," the little boy said.

The operator continued, "How about the fire-rescue squad?"

"They're already here too."

"Well, what are they all doing?"

"They're looking for me," answered the little boy.

How does that fit in the war on snow and ice? We are always looking for the storm so we will know when to start the attack, what to do, and how to do it. They are looking for me. I have several transparencies to show which provide a broad overview of InDOT's war planning process which leads to budget costs for human resources, equipment, and materials.

In InDOT (that is what we call Indiana DOT), we have six districts. We have an "Ivory Tower"--I don't know what you call it in Kentucky. The Ivory Tower is what I used to call our central office, so I just kept it up. There are 37 subdistricts, 117 units, and we handle 23,203 lane miles of state highway system. We don't handle the local highway systems. There are 4,650 lanes on the interstate.

TRANSPARENCY NO. 1

THE WAR ON SNOW AND ICE CONTROL

1. Policies
2. Human Resources
3. Equipment
4. Materials
5. Budget
6. Reports
7. Other

The title of my talk is "The War on Snow and Ice Control" (I picked that name out of a brochure, I didn't create it). Transparency No. 1 lists major topics that must be addressed before a cubic meter of snow is plowed. We have to have a policy and the guys from the Ivory Tower set the tone; they define our objective. What level of service do we want to provide to the motoring public? Who is going to assign responsibilities and require an operating procedure to be developed? Human resources. They carry out the plan and they have to be skilled and multi-disciplined, with the ability to work long hours in poor conditions.

Have you ever been out in a snowstorm? Every year I make it a point to get in a truck and ride around with some maintenance workers to scare the hell out of me. The truck jerks around a lot so the drivers have to be skilled and have the ability to work long hours, of course. And, they have to respond within 30-45 minutes of call out any time day or night. That is a big task.

What about equipment? The equipment keeps the army mobile. Insure a proper fleet size, type, and replacement cycle; specify proper size, design, and repair schedules. This must all be in your plan. Materials serve as the ammunition to fight, and you must have materials prior to the battle. I learned that in '77-'78. Also, you must store the materials properly; I learned that too. And, it should be readily available in the combinations you need based on the various storms--and there are no two alike.

What about budget? Provide the dollars to match the plan and they must be available when you need them and in the amounts related to the plan. Reports are used to track the battle--they measure success and monitor progress. And, readiness for the next battle. As soon as the first battle is over, you don't sit down, you have to get ready again in a hurry. I threw these other items in there because later on you will see that there are other things that need to be covered besides the major topics that I have outlined.

TRANSPARENCY NO. 2

1. Policies

- *Department Goals and Objectives
- *Levels of Service
- *Responsibilities
- *Preparation
- *Operations
- *Evaluation
- *Post Winter Activities

Policies. This transparency lists the major policy issues to be addressed in writing.

Department goals and objectives. InDOT's plan is to, whenever possible, keep the roads passable during the storm and remove the snow and ice from the roadway surface. That is pretty simple.

Levels of service. How clean do you want the highway and how soon? We used to have three levels of service and we called them 1, 2, and 3, of course. We quit doing that because people hated it when they lived on a third-class road. We quit using those nomenclatures. Right now there are two levels of service that are continually being demanded by the public. Our highest level of service is a two-hour route (plus or minus 15 minutes) which is a plowing route, it is not a spreading route. For plowing routes, we provide a circuit that is two hours, plus or minus 15 minutes. The second level of service is three hours, plus or minus 15 minutes. And our class two, or our second level, is anything that is 5,000 ADT or lower. Of course, you have emergency situations like the route to the hospital, or similar situations, that you must give particular care.

Responsibilities. Who does what, and when do they do it? Write it down. The central office in our case develops policy and randomly monitors policy. Districts apply and monitor the policy. Our subdistricts do the field work. We wrote that down so everyone would know their responsibility.

Preparation. Readiness is a year-round process. Ordering materials, equipment parts, and supplies--you had better be thinking about that way before now. Inspection, calibration, and repair of equipment--how are you going to handle repair when a piece of equipment breaks down? Who is going to be responsible, where are you going to take it, and how are you going to pay for it? A routing plan--if I have a two-hour (plus or minus 15 minutes) circuit, what does the route look like and what happens if the guy who is supposed to run that route doesn't show up?

Training needs are extremely important because we have considerable turnover--we have about a 10-percent turnover in our state each year.

Operations. What are the guidelines for performance. How do I mobilize to start the war? What do I do after the war is over? What about material types, application rates, and timing of application. And payroll, regular time or overtime? What are you going to do on regular time and what are you going to do on overtime? We make a difference between the two, and we write it down.

Evaluation. How are we doing? Plan for reporting results and recommending actions. What about post-winter activities and beginning for next season? We begin for the next season in April of each year, as soon as the last storm is over. We give ourselves two weeks to make sure it is. After the basketball tournaments are over, it seems like the weather settles down. Then we evaluate the season's performance, inspect equipment and facilities, determine changes, and develop schedules. I brought a schedule from our Crawfordsville district that shows what we are going to do, who is going to do it, and when we are going to do it.

TRANSPARENCY NO. 3

2. HUMAN RESOURCES

- *Maintenance Workers
- *Winter Transfers
- *Training
- *CDL Licenses
- *Drug Testing
- *Call Out Procedures

Human resources. In the summer, we get up to approximately 2,200 maintenance workers--supervisors, mechanics, equipment operators, truck drivers, stock room clerks, and radio operators. We assign a primary operator to each piece of equipment. That is their truck, and if there is something wrong with that truck I am going to go talk to that person. It is their truck.

We don't have enough maintenance workers to run multiple shifts in the winter. We try to obtain two drivers per identified plowing route, especially in the urban areas. In the rural areas, we try to get one and a half drivers per plowing route. They will have 16 hours on and eight hours off. In the winter, we transfer people from our construction, traffic, and testing departments to maintenance or we have them doing feature inventories or something like that for the maintenance management systems, and they are on standby. When we need them we can call them out.

Training. We only hire licensed truck drivers. We show a video of our snow and ice operations. We have the drivers, particularly the new drivers or those on a new route, put the blade on the truck in the fall and drive the route. They have to look for manholes and mailboxes, turn around where they are supposed to turn around, look at the shoulders, see where headwalls or other objects are close to the road that may cause vehicle damage. Then, when the snow comes, we put an experienced driver with a newer driver because we think the best training is on-the-job training and we do quite a bit of that. Any new driver needs a CDL license because that is a requirement. Also, beginning January 1, 1995, we will have to perform random drug testing. That is the law.

Call out procedures. How do you mobilize? It covers who, what, where, when, and how. A written plan is required. We hadn't developed a written plan for a couple years, and last year I was going to go out and inspect the trucks. I said I wanted to see a written plan, and you would be surprised how much scrambling there was to get it up to date. I am sure glad I did that. The responsibility for that in our state is the subdistrict manager.

Who are the first-line drivers assigned to and who are the second-line drivers assigned to? If we have an impending storm, we get all heads up, if we expect a storm to come in by a certain time. Our managers must have pagers. We want all the subdistricts or unit sites around to all have pagers so that we can get in touch with them and they won't be tied down to their houses.

TRANSPARENCY NO. 4

3. EQUIPMENT

- *Plowing and Spreading Routes (CASPER)
- *Fleet Size and Type
- *Purchase and Delivery
- *Condition/Inspection
- *Parts and Repairs
- *Calibration/Controls
- *Hot Starts
- *Clean Up
- *Rental/Contracting

Equipment. We decide on the number of trucks we use based on plowing routes because we do a lot of plowing. But, we also have some spreading routes because probably in half the storms, all we have to do is spread materials. We have a program that we developed with Purdue University called CASPER--Computer Aided System for Planning Efficient Routes. CASPER can "think" of millions of combinations for plowing a route that we can't think of and it can do it in the blink of an eye. We just enter the parameters. A guy in our northeastern district who had worked in maintenance for 20 years did the route plans. Currently, he is the district director. I told him I want him to start looking at the CASPER system to see if he could improve his routes. He said that no way can it improve his routes. Well, we were able to cut seven routes out of his district. Now he goes around telling everyone to use CASPER!

CASPER gives us more uniformity also. One of the worst thing that can happen to a driver is to be driving along on bare pavement and all of a sudden hit ice for the next two miles--bad news! We get more calls about non-uniform driving surfaces than anything.

We found out that a route in our state is worth about \$140,000. That is a lot of money, isn't it. Right now, we are trying to develop a prototype software system--what the information service guys call a bulletproof system. We are going to use a lot of strip-type things in mowing and painting, and it has a lot of promise. We currently have 980 plowing routes statewide. We have 1,080 truck--single axle, tandem axle, do alls, and hopper mounts. The reason for the hopper mounts is that we require about 20 percent more snow trucks in the winter than we need for our summer operation. Until we can get a satisfactory cost-benefit ratio out of contracting, we put together the cheapest truck that we can find to plow snow. We have 117 two-and-a-half yard loaders and 20 graders--that is our snow and ice control fleet.

Purchase and delivery. We have an MCMS system that we use to track repair on a vehicle and control the parts we stock. We base any

new purchases on condition and repair. The central office does that. We involve the field in developing the specifications and delivery by at least November 1.

Condition inspection. Mid-April to the first of May, after the winter, we get ready for next year. By mid-October, we install on the trucks all of the blades and the hoppers and the spinners and anything that goes on a snow truck. We put them together, line them up, and we troop the line. We fire up the trucks, check the oil, all of the things that we think needs to be done. In the 1978 snowstorm, we had 13-foot hoppers for 11- to 10-foot trucks, and we had plows that wouldn't fit the trucks. It was ridiculous. It costs us four hours to change a blade. Now we have standard quick hitches that take a very short time to install.

Parts and Repairs. Parts and repairs are based on inspection and cost. We have a central procurement process and now we are developing a catalog like a Sears Roebuck catalog. We are going to bid, select a part and they will deliver it in a short time.

Calibration controls. We put down 250 pounds of salt per lane mile. We get the material each year by November 1. We are now in the process of purchasing closed-loop spreader controls. Before, we calibrated the spreaders with a knob that told how fast the spinner went--when we run at 25 or 30 miles an hour, we run an eight setting, and when we go slower, we run a six setting. If we stopped, we had the controls set on something, who knows? So, we were using more salt than we needed to do. We had to clean up after each storm. Commercial locations are possible. Also, we have high-pressure washers in our own shops. We try to direct the runoff into a sewer or a holding tank.

Rental contracting. I don't know whether the word contract is right--we have on retainer several large front-end loaders because we discovered that the smaller loaders that we have are not suited for big drifts. We develop contracts with contractors and aggregate suppliers or people who have large loaders. When there is a storm, the state of Indiana has them out opening the state roads when the counties are trying to do the same thing all at the same time. We put semi-trucks under contract to haul materials between our many storage sites. This year, come the August letting, we are going to try to contract snow and ice control again. We finally found somebody who is interested so we will see if we can contract some of that 20 percent surplus of trucks.

TRANSPARENCY NO. 5

- 4. MATERIALS
 - *Types/Amounts
 - *Purchase and Delivery
 - *Storage
 - *Environment

If there is one thing I have learned over the years, it is to get most of your materials before the winter and get those materials under the storm. If you do not get your materials under the storm, you have lost the cause already. We have increased the use of material prewetting--we can use fewer materials if we prewet the materials with calcium chloride.

Types and amounts. Currently, our policy is that if the temperature is over 20 degrees, we use pure salt. We started that policy because we were filling up our catch basins and our pipes and our gutters with sand, so we try to use pure salt. At 0 - 20 degrees, we use salt with calcium chloride, prewetted. When temperatures are below 0 degrees Fahrenheit, we use abrasives. We found out that crushed chips or cinders or slag works well.

Purchase and delivery. We use a 13-year average for our material purchases. We get 80 percent of our salt in storage by November 15, and 20 percent of our abrasives at the same time. The purchase order has a capability of getting 135 percent of the 13-year average, thank God.

Storage. We fill our liquid calcium chloride tanks by November 15. All of our salt products are under cover. Currently, we have 180 percent storage capability in dome buildings. Mixing and loading are done in contained areas. We have curbs around the front of our buildings. We clean up after every storm and push the salt back into the building. We put tarps over the doorways. Salt runoff is into tanks or sewers. And, we have a few retention ponds that are not working out too well.

I want to talk about the budget that is created by our policies. And, I am going to talk about FY93 and FY94--and you all know that FY93 was a mild winter, below normal, and FY94 was above normal. We used the maintenance management information system to report our costs. These are actual costs for snow and ice control:

	FY93	FY94
Human resources	\$1,930,000	\$4,530,000
Equipment	\$6,297,000	\$12,170,000
Materials	\$9,103,000	\$12,391,000
Totals	\$17,327,000	\$29,092,000

That money has to come from someplace. I know where it comes from--it comes from the road. Pick a dollar up and put it on snow and ice control, you just took a dollar off the roadway.

TRANSPARENCY NO. 6

5. REPORTING

- *Road and Equipment Status
- *Materials Status
- *Budget
- *Safety

TRANSPARENCY NO. 7

6. BUDGET (MMS)

- *Human Resources
- *Equipment
- *Materials

Reporting. I personally believe that what gets followed up gets done. If you don't follow it up eventually, it will just wane away. We have a road and equipment status report that is electronically reported. We do it each day, December through March. We have a road condition report that tells us about trucks out, trucks down, trucks available, and our repair plans for the equipment that is down. Materials status is an electronic report after each storm. It lists material used, materials in storage, materials remaining on the purchase order. Budget is a bi-weekly paper report listing approved dollars with current obligation for materials, equipment, and resources. It also lists regular time and overtime. We have a paper report on safety. It lists the number and types of accidents, and cost of accidents.

TRANSPARENCY NO. 8

7. OTHER

- *Weather Forecasting
- *Public Information
- *Police Coordination
- *Feedback
- *Awards

Weather and weather forecasting. This is extremely important and, as far as I am concerned, we don't have a satisfactory weather forecast-

ing process. We are in the throws of improving that system. We have a radar system now that is down-linked from a satellite, which is very good. The thing we don't know is the temperature of the pavement. Once the pavement freezes hard like it did last year, you know it is frozen, so it is not a big problem. But, during the freezing process and during the thawing process, that is a concern. We have some pavement sensors and we put out truck patrols. We work with the state police very, very closely because they are out there on the highways too. They have our phone number and call us. One of the things I learned in the maintenance subcommittee meeting last week is that there are infrared sensors that can be put on the patrol truck that will give pavement temperatures.

Public information. We try to tell the news media what is going on and they get the word out to all the people, especially at rush hour. And, of course, we respond to lots and lots of phone calls.

Police coordination. We try to meet with all the police prior to every winter. We stress the need for uniformity and that we want them to tell us when we are not uniform. We tell them what our policy is and we ask for their help.

We gather feedback, a summary of reactions, and send it to the district biweekly, and we coordinate between the districts from the central office as needed.

Awards. We have the best subdistrict equipment award during the fall inspection; we have the best truck award in the subdistrict. And, we have the best driver in a driver rodeo in some districts.

Snow and ice control is a year-round, year-round, year-round, year-round process. There are few processes that have more adverse effect on the state's economy than snow and ice control. In 1978, and to a lesser extent in 1982, Indiana's truck stops were on several occasions full of parked trucks due to our poor roadway conditions. Trucks were sometimes parked or stranded along the highway. Isn't it an eerie sight to go into a grocery store and see the shelves are bare? We do make a difference, which can be both positive and not so positive on the state's economy.

In closing, I have one story to read you. It is called actions speak louder than words. Every morning in Africa, a gazelle wakes up. It knows that it must run faster than the fastest lion or it will be killed. Every morning in Africa a lion wakes up. It knows that it must outrun the slowest gazelle or it will starve to death. It doesn't matter whether you are a lion or a gazelle when the sun comes up (or, in our case, when the snow flies) you better be running.