

# Planning and Organizing for Emergency Snow Clearance and Traffic Routing

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Heavy snowfalls during the winter of 1964-65 virtually immobilized Indianapolis for several days. Street traffic almost did not exist. This, of course, was nothing less than a disaster for traffic movement is as necessary to the life of a city as the circulation of blood is to the life of the body. It determines the economic health of a city because good highway transportation is essential to a strong competitive position for attracting new or expanded industry and the jobs that they bring.

Within the year the Bureau of Traffic Engineering would be called upon to lay plans to combat a repeat of such an experience. That very snow creates serious concern within the government circles in Indianapolis and recognition that we were ill-prepared to cope with major snowfalls or general icing on our streets.

## *Plan Development*

How does one go about setting up such a plan? What is the problem? What is the goal? The goal is to recreate summer with a snow plow—a difficult task at best—but it had to be tried; traffic must move more or less like it does in the summer.

How has the job been approached in the past? What has been the strategy? The answer was to clear the downtown streets—clear all important streets in the city.

The next question that came to mind was what resources do we have available—how much equipment and what kinds, how many men, how about garages, stockpiles, etc.? These questions were answered by inventorying the several departments of city government.

Fortunately, Indianapolis was well along in the conduct of the Indianapolis Regional Development and Transportation Study. Therefore, much of the data concerning pavement widths, centerline distances and traffic volumes had been compiled and were available in a punched-card format. A logical early step in any investigation, is an

assessment of the current state of the art—this meant a quick review of the literature on snow and ice control had to be made.

It's not the mechanics of the job that are difficult, it's the people who get in the way. There is no inherent difficulty in moving snow off the street. It is a relatively simple operation which can be mastered quickly, given the men and the equipment. But with a heavy snowfall, just at the time that the streets are clogged with traffic, problems begin—people are in the way. Furthermore, the procedure of snow clearing is little different today from what it has been for many years. Only the importance of it has changed. Apparently then, the big trick in snow removal is to know what is to be done, appoint someone to do it, then insist that the job be done.

It was decided that the best way to improvise a city-wide snow clearing effort was to assign specific, compact, equal areas of pavement to a small snow clearing team, and then to hold them responsible for getting the job done. But this raised several questions: (1) How much total pavement area are we proposing to clear? (2) Into how many districts should this area be divided? (3) How can we establish suitable boundaries for such districts? (4) How can we assure that the districts will comprise equal work loads?

From the inventory of available equipment, it was decided that 22 districts would be about the right number to establish and yet hold some equipment in reserve for replacement of break-downs, or for supplemental purposes.

In view of the many computations and correlations that would be necessary, it appeared impractical to attempt to do this job manually, so it was decided to feed the data into a digital computer.

Specifically, street name, pavement width, street segment length and segment terminae, corresponding to each width, were used as computer input. The computer supplied output for 22 districts in the form of street names and pavement areas on a block by block basis, and total pavement area in each district. The 22 output tabulations were plotted on a map, with a colored pencil, for visual inspection of compactness and to permit modification of the district boundaries to avoid inclusion of barriers such as unbridged streams and railroads, that might not permit rational routing of equipment.

At this point, the size of the entire snow clearing job and the amount of work to expect from each team was known. There remained the problem of specifying the street or street portions each team was to do, sequentially, to assure that first things were done first. This selection was based on traffic volumes carried by the several streets, street continuity, the relative isolation of neighborhoods

within the city, and the location of major traffic generators such as shopping areas, employment areas, and major concentrations of dwelling units.

With these points in mind, streets for priority clearing were selected, i.e., the streets to be cleaned first, those second, etc. This was done city-wide without regard to district boundaries, but was tabulated and scheduled in order of priority with each district.

Tabulations and maps, for field use, were prepared for each route in each district. The tabulations listed, and the map depicted, the beginning point of the route, every turn along the route, the side of the street to be plowed and the end point of the route. In following the route as scheduled, the equipment would make one pass in each direction along the street; thereby, clearing one lane in each direction for the movement of traffic.

### *Organization for Control*

The old cry of "We gotta get organized!" was supremely fitting here for that was exactly what we had to do. From study of Milwaukee's snow clearing plan, it was learned that the key ingredient for successful operation is supervision and more supervision—close supervision—along with pinpointing of responsibility.

A supervisor was assigned to each district. Each district embraced about  $2\frac{3}{4}$  million square feet of pavement to be cleared. Prime equipment in a district was at least one snow plow and one salt spreader. For some critical districts, this equipment force was supplemented by rental equipment and operators. The district supervisor and his snow fighting equipment were provided with two-way radios so that they could remain in close contact among themselves as well as with headquarters. The district supervisor patrolled his routes to anticipate and minimize problems that his men would encounter in their work. Parked cars, abandoned cars and stalled traffic are examples of such difficulties where police aid was sought for traffic control and for tow-away service.

The supervisor also looked for icy spots, such as bridges, upgrades and intersections which warranted attention prior to the scheduled arrival of the full equipment team. In these cases, he was authorized to dispatch his salt spreader directly to deal with the ice. In addition, the supervisor toured the streets which had already been plowed to confirm that they were, in fact, open to traffic. Inadequate work was not acceptable, and required re-doing immediately. Drifting snow also required early repeat performances in order of priority.

District supervisors were advised that since no one could sit behind

a desk and lay plans or rules to cover every situation that might occur in the field, he alone must decide whether one pass in each direction along the route is adequate to open that route for traffic movement, or whether additional passes are required. His instructions were to not leave a route until he was satisfied that it was "open to traffic" consistent with the intent of the snow clearing plan.

Obviously, it is most important that the man designated as a district supervisor have qualifications such that he can understand what is to be accomplished and supervise men and equipment in the accomplishment effort. He must have the intelligence, judgment and initiative to make minor adjustments in the field to meet local conditions and yet adhere to the basic intent of the plan. The success of the whole effort depends upon the interest and ability of this man, for the best of equipment, materials and planning will be of little value unless properly used. The 22 district supervisors were selected from among key people in several city departments, including the street commissioner's forces, the staff of the Flood Control Board, the civil engineering, traffic engineering, public parks and sanitation departments.

The entire city-wide operation was coordinated by the radio-equipped Snow Clearing Headquarters which was staffed alternately by the street commissioner and the assistant traffic engineer, or by the assistant street commissioner and the city traffic engineer.

To assure prompt, effective response to emergencies such as major damage to equipment, personality clashes, requests for re-assignment of equipment or proposed major alterations in the plan, snow headquarters exercised control through five field representatives called coordinators. Each coordinator acted as the eyes, ears and voice of snow headquarters, and with full authority to make any on-the-spot decision consistent with the intent of the plan, and in the public interest. These coordinators were assigned four to five contiguous districts over which their word was law for snow clearing purposes.

Coordinators must be highly competent men, accustomed to accepting and exercising authority. Therefore, we selected them from among the mayor's staff of department heads.

All assignments of personnel and of responsibilities were made with the full support of the mayor. He had made it known, from the inception of the plan, that no one was exempt from service in this effort, and that he demanded full cooperation from all who might be selected for assignment.

### *Implementing the Plan*

The receiving and analyzing of storm warnings and the making of the decision as to the extent and timing of a snow or ice clearing

effort is perhaps the least tangible yet the most vital of all elements of a snow and ice control operation. Once the decision has been made to swing into action, our first step was to invoke a contract with rental equipment suppliers, before private enterprise or other levels of government engage them. Then we informed the press and the broadcasters that a storm is imminent, that a snow emergency has been declared by the mayor, and that certain full-time parking prohibitions, as provided by city ordinance, automatically go into effect.

Next we initiate the "grapevine" alerting procedure which is started by a telephone call from the street commissioner to the members of the snow headquarters staff. Then five calls are made from snow headquarters to the five garages involved in the effort. Two calls are made from each garage to the two coordinators who work out of the respective garages. The coordinators, in turn make either four or five calls to alert the district supervisors under their direction.

For each garage, a responsible person of authority is on call at all times. He is notified by the street commissioner's radio dispatcher who, by pre-arranged plan, calls the garage attendants, field service men, mechanics, stock men, and operators or helpers assigned to districts and working out of that garage.

Subsequent to being alerted, equipment operators report to their garages and pick up the plow or spreader to which they have been assigned. Then they proceed to a designated salt loading station, take on a load of salt, pick up a helper and proceed to a designated district and route to rendezvous with their district supervisor. The snow and ice control effort is then under way.

As each route was reported cleared for traffic, it was checked off of a tabulation and colored on a map in snow headquarters. By so doing, we were able to give a rather complete up to the hour picture of progress throughout the city.

Prior to the beginning of rush-hour traffic each coordinator makes a final inspection of all routes in his districts to assume that no major omissions have occurred, and that there will not be avoidable traffic congestion resulting from inadequate clearing of snow and ice. During this inspection, especial attention is devoted to icing on bridges, up-grades and major intersections, as well as to snow accumulations in curb lanes where vehicles were parked.

The framework for successful operation of a snow clearing effort begins with a plan. The formulation of a successful snow clearing plan in any city depends upon several things: money, competent employees, field supervision and equipment; above all, it depends upon an administration that will make effective policies and see them through.

For, efficient operation of the plan necessitates a cooperative integration of equipment and personnel from all of the concerned units and levels of government.

Someone has said that a snowflake is lighter than a traffic engineer's bank account; however, the mounting costs of removing these snowflakes is a source of alarm to many officials and taxpayers. The irony is that the real cost of a sharply stepped up and quick-triggered snow clearing plan is small, compared to the economic loss to merchants from stay-at-home shoppers, and to both employers and employees when the worker is snowed in. In fact, these costs are so great that a snow storm, or freezing rain, is in a very real sense an "emergency" if not an out-and-out "disaster."

Indianapolis insisted upon a more highly organized and controlled snow clearing program. Such a program was improvised to look good on paper—but the test of workability is—Did it work?

Apparently it did for it was reported that our citizens did a most unprecedented thing. They wrote over 100 letters commending the mayor and his staff for a job well done.

## ADDENDUM I

### SNOW CLEARING RULES AND REGULATIONS FOR DISTRICT SUPERVISORS

District supervisors will be in immediate charge of plowing and salting the streets which must be cleared of snow. All equipment and personnel assigned to their districts will work under their directions, and it will be their job to see that snow clearing is accomplished according to the intention of the plan. Any deviations from the schedules can be made by the equipment operators only with the district supervisor's approval.

There will be no deviations from the specific streets of the district, as shown on the lists and maps, except with the prior approval of the coordinator to whom the district supervisor reports.

Each district supervisor will be assigned to oversee the clearing routes in a specific district, and will be required to contact snow clearing headquarters in the City-County Building, giving his vehicle number and name when he starts out for his district; again when his equipment begins each route, giving truck numbers with names of operators and helpers; and again as his equipment finishes each route.

During clearing operations, he will report all progress, breakdowns, equipment changes, etc., every 1½ to 2 hours, to snow clear-

ing headquarters, until snow clearing is completed, at which time a final report must be made.

District supervisors will be supplied with maps, instructions, route lists, and progress report forms all of which must be returned to snow clearing headquarters when snow clearing is finished. In addition, the district maps and route lists for the equipment operators will be distributed by the district supervisors to the operators who must return them to the coordinator when finished.

When snow has fallen to a depth of two inches and continues to fall, or when icy conditions prevail, all district supervisors must contact snow clearing headquarters for instructions, if they have not previously been contacted through the snow clearing ALERT system.

District supervisors may separate the snow-plow salt-spreader team when necessary or advisable, but should have them working together again as soon as possible.

Any requests for snow plowing or salt spreading, other than what has been listed or mapped shall be referred to snow clearing headquarters.

Complete cooperation between equipment operators and district supervisors is demanded at all times. Contact your coordinator in the event of any difficulty or disagreement arising in the field.

Cars will be assigned to all district supervisors at their regular place of employment or at their assigned snow clearing stations. They must be signed out and in on the forms provided for that purpose in the respective snow clearing station garages.

Field exchanges of cars between first-shift and second-shift district supervisors must be signed by the man leaving duty and by the man coming on duty.

All boulevards or streets with center medians are to be plowed part to the curb and part to the center median. Plow one-way streets the same way as other streets, which means plow will be doing one side against traffic, unless the plow is equipped with a reversible blade.

It shall be up to the district supervisor to decide the number of passes necessary to clear a route adequately for the movement of traffic, before proceeding to clear the next route; however, in no case shall a route be considered clear until at least one lane in each direction is open on a two-way street, or until at least two lanes are open on a one-way street.

When you have completed your district, inform your coordinator immediately. He may find it necessary to assign you and your team to assist in some other district.

If you and your team should be assigned to help in another district—remember—the equipment must work down the list—not up!

## ADDENDUM II

### SNOW CLEARING RULES AND REGULATIONS FOR EQUIPMENT OPERATORS AND HELPERS

The streets which must be cleared of snow are grouped into several districts and routes. These have been listed and shown on maps. Each person assigned to the snow clearing operation will be provided with lists, maps and schedules, as necessary to clear the streets quickly and efficiently.

These lists and maps must be followed exactly as printed. No deviation from them will be tolerated without specific orders or permission from your immediate district supervisor.

If it becomes necessary to plow or salt the streets during your regular working hours, regardless of what department of government you are assigned to, you will be notified by your regular foreman to pull in for snow clearing.

Operators of dump trucks, garbage trucks and trash trucks will dump their loads at the nearest dumping place or stock pile, return to their regular place of employment, gas the truck, and immediately report to their regular supervisors for further orders.

Helpers will return immediately to their regular place of employment and report to their regular supervisors for further orders.

When orders have been received, operators and helpers will proceed immediately to the garages or stock piles according to instructions. If an employee does not have personal transportation, it is the duty of his regular supervisor to help him reach his assigned snow station promptly.

If a snowfall of two inches or more should occur, or if icy conditions should occur after regular working hours or on Saturdays, Sundays, and holidays, you must contact the snow clearing station to which you have been assigned.

That station will have a man in charge who will check your calling time and also give you any instructions necessary for your assignment.

Operators and helpers must report for snow clearing adequately dressed with proper protective clothing, since it may be necessary during any snow clearing operation to work outside the truck cab for extended periods of time during extremely severe weather. This includes heavy socks and underwear, overshoes, warm gloves or mittens, and caps with ear coverings as well as heavy trousers and coats.

After reporting to your snow station, the station supervisor may request that you assist with the work of mounting snow plows or salt spreaders, or perhaps loading trucks. It is your duty to assist with these tasks and with other tasks as assigned.

Operators and helpers who are assigned to plowing or salting will be given a schedule for a district and route by the supervisor in charge of your snow station. In addition, you will be told where to report for snow clearing duty, when you must be there, the name of your district supervisor, and the necessary equipment will be assigned to you.

It is the duty of every operator and helper to check before leaving the snow station to see that the vehicle has adequate gasoline, oil, battery water, radiator water and antifreeze. Check to see that the tires are properly inflated, that a spare tire is available, that the fan belt is tight and in good condition, that headlights and taillights and windshield wipers are working property, and that all non-essential equipment has been removed from the truck.

Equipment failures must be avoided since you may have the only plow or the only salt spreader in your district.

Operators, when plowing or salting, should add gasoline whenever their equipment is in the vicinity of any of our service garages, to avoid the possibility of running out of gasoline later on while performing their assigned work.

It is the duty of every helper to assist the operator in every way possible, in order that their assigned work may be accomplished efficiently and as carefully and quickly as possible without damage to equipment.

This includes the following items:

- (a) Careful operation of the plow blade or salt spreader at all times.
- (b) Checking frequently to see that the equipment does not overheat and cause an engine to be damaged.
- (c) Maintaining a constant watch of the road ahead for parked cars, raised manhole covers and other obstructions.
- (d) Frequent checking of the salt supply to avoid running out unnecessarily.
- (e) Checking frequently for proper snow clearing, correct placement of the snow as it leaves the plow blade, and correct scattering of the salt as it leaves the spreader.
- (f) Advising the operator of the route to be followed, as shown on the map and lists, or as ordered by your district supervisor.

- (g) Assisting the operator in making necessary adjustments or repairs to the plow blade, or salt spreader, and supporting mechanism.
- (h) Lending all possible assistance to the operator whenever the truck becomes immovable because of heavy snow conditions.
- (i) Remaining fully awake and alert at all times.

Upon completion of your assigned plowing or salting schedule, return your copy to your district supervisor who will assign you further duty, or tell you where to report for possible further assignment.

Snow plowing, salting, is part of your job. Your own illness or serious illness in your immediate family will be the only excuse for failure to turn out for this duty. In event of illness, your regular place of employment must be notified of that fact without delay. You may be required to present a medical certificate confirming and describing your illness.

Cooperation is demanded at all times between all persons involved in the snow clearing operation.

Any arguments or disagreements should be reported to the foreman or supervisor on your regular job for settlement.

Any requests from the public to push or tow a private vehicle, to plow or to salt any place not on your schedule must be courteously refused, and inform this party that his request must be made to snow clearing headquarters:

ME. 3-3623    ME. 3-2624    ME. 3-3721.

There will be no lunch periods before four hours of snow clearing service.

This snow clearing duty involves the public more than any other activity at that time, and complete cooperation between all persons and departments is again stressed.

Failure to observe these rules and instructions will be cause for disciplinary action.

This duty is one of the most essential of your activities, so go out and show the public we can do the job in a workmanlike manner.