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NO SIMPLE SOLUTIONS

By ALAN S. BOYD

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A year ago, we at Illinois Central Gulf experienced the worst tragedy in the history of our railroad—the commuter accident in Chicago in which 45 passengers lost their lives. Some of you may recall what a pall the accident cast over last year's National Safety Congress.

At ICG it did much more damage. It left us in a state of shock and personal trauma. It made us mindful of the fact that no system, however perfect, is really fail-safe.

Scores of investigating teams—the National Transportation Safety Board, the Federal Railroad Administration, state and local authorities, and our own experts—examined and re-examined signals, braking systems, track conditions, rules interpretations and terminology, car design and construction, sight distances, and other factors which might have had some bearing on the tragedy. We are thankful for the assistance. We learned much. We have incorporated into our operation the recommendations made after these intensive investigations.

However, now that the dust is beginning to settle, it is apparent to us that we know too little about the human elements of calamity.

Time and time again, we have asked this question: With a service which was virtually accident-free since inception, why should we suddenly have such a monumental failure? Why would two experienced crews on separate trains seem to ignore the most basic operating practices? Violate the most basic rules?

Was job monotony a factor? Did our people fully know what was expected of them? Did they have the needed skills for their particular responsibilities? Had these people experienced any disruptive influences in their personal lives? On the job?

It occurs to me that we run the risk of potential accident recurrence, however fail-safe we design and redesign our systems and

operations, so long as we do not focus constantly upon the human dimensions involved in operations.

In saying this, let me assure you that I do not foresee a slide rule to measure behavioral patterns. Nor do I think that we have the time to become behavioral psychologists or sociologists. What I am saying is that, until such time as our society and medical researchers become more adept at monitoring behavioral patterns, there is no substitute for the line supervisor being close to his people—close enough to detect personality changes, behavioral quirks, or deteriorating job performance.

The questions I have propounded are not new. Long ago, I discovered there are no simple solutions to complex problems. In fact, I'm somewhat suspicious of simple solutions. With that confession out of the way, let me tell you what we are doing, or at least striving to do, on Illinois Central Gulf.

We are working hard to get everybody into our safety act. My staff and I recently have been meeting with the leadership of each of the brotherhoods that represent employees on Illinois Central Gulf. There have been some interesting exchanges. Nothing earth-shaking, but we feel we are more sensitive to the perception our employee representatives have of us. We have taken another look at such matters as lodging complaints, claim handling, the number of investigations we hold, pay shortages, and other employee irritants to which we in management perhaps have not paid sufficient attention or handled with sufficient dispatch. We have corrected some. We are working on others. But more importantly, we have cleared normal established channels of communication. We feel we are trying for a revitalized climate of trust and openness. Each of us needs a less distorted image of the other.

An aspect of this new spirit is soon to be

announced: our joint labor-management employee assistance program. Total union involvement has been present since the outset. Our program will be administered by a committee of union and management officers. The philosophy behind the program is the idea that an enlightened approach to the problems created by addiction of any kind will encourage employees and their families to seek assistance. The *objective* of the program, briefly stated, is to assist employees who may develop alcoholism or drug problems to help themselves before the condition destroys job capability, and to do this without disturbing normal disciplinary and grievance procedures.

Let me hasten to add that we at ICG owe a great debt to the missionary efforts of the program on the Burlington-Northern System, the programs in existence on the Seaboard Coast Line, the Duluth, Missabe, and Iron Range, the Canadian National, and to the recently inaugurated programs on the Milwaukee Road and the Union Pacific. A national awakening to the impact addiction has on job performance and the lives of people seems to be in the making.

At ICG we are proud of our missionary work in hearing protection. We have had three years' experience with this program. This program has been responsible in correcting some non-work related hearing defects—an additional bonus. All our shopcraft general chairmen were instrumental in getting the program established in our major shops, helping allay the fears of some who believed that we had discovered a diabolical way to disqualify employees.

Virtually every division and shop on ICG has placed greater emphasis on getting local chairmen and rank and file employees involved in local division and shop safety programs. It is short sighted policy to do otherwise. Protective agreements and merger conditions on railroads virtually insure employees "cradle to grave" seniority. It just makes good economic sense to explore every avenue available to improve the work climate. Knowing and practicing sound human relations is the best guarantee of creating and maintaining a safe and productive work atmosphere.

ICG is not alone in trying to revitalize employee confidence. Similar efforts are underway on other railroads. Several railroads, including ICG, have taken employee attitude surveys and are doing something about what employees perceive to be the problem in these organizations. Yet another road is holding a series of employee family nights throughout their system in an effort to get closer to their people. These are significant breakthroughs in union-management relationships. Ten or even five years ago, such cooperative programs would not have had much of a chance.

Our industry is in a period of rapid change. We need to explore new directions. I can think of no group as important in helping us find our way to higher ground, particularly in the area of people problems, than safety people.

You have a virtual passport on your own properties to circumvent, bypass, and leapfrog procedures, methods, and traditional reporting relationships to get to the root cause of particular problems. I am not proposing or sanctioning organizational anarchy. Your freedom must be used judiciously. You must possess the innate ability to know when and how to use it. I would liken this view of a safety man in an organization to the role of the middle linebacker on a professional football team. Whereas the guards, tackles, and defensive ends have specific assignments, middle linebackers like Nitscke and Butkus can anticipate, diagnose, and respond immediately to situations. The role of safety people at Illinois Central Gulf is a little like that. Our safety people are often the catalyst for change.

Some examples?

We have had a joint OSHA-FRA inspection at our Paducah Shop. Violations were found—some trivial, but violations nonetheless. Like other roads, we are contesting jurisdiction. Nevertheless, being realistic, we are trying to meet the OSHA requirements systemwide in our mechanical facilities. Our safety middle linebackers, anticipating the future, got together with our mechanical department brass. Today we have our own OSHA inspection team. The team consists of one safety officer and a top mechanical de-

partment line officer. When our linebackers run into line supervisory opposition, with the old bromides: "We don't have the time, men, or money to shape this place up the way it should be," our middle linebackers' standard answer is something in the nature of, "We may be poor, but do we have to be dirty?"

With the line officer along, backed up by the chief mechanical officer, it's amazing how clean our poor mechanical department shop installations have become. The full impact of OSHA will not come to us with the impact of the FRA-OSHA Paducah visit.

Our safety man middle linebacker analogy is apropos concerning the adoption of our hearing protection program. Here our middle linebacker safety crew was perceptive enough at the outset not to blitz our budget people without protecting their flanks. Accordingly, they enlisted the service of two outside linebackers to blitz with them. They chose their teammates well—the chief medical officer and the general claim agent. A medical-claim-safety crew made a potent triumvirate. The chief medical officer added his medical muscle and analysis, the claims' man predicted that future hearing loss claims might well rival back injury claims in future settlements. The program was funded.

But enough about ICG.

I understand that the Association of American Railroads Safety Steering Committee was recently exposed to FRA's think tank at the Transportation Systems Center at Cambridge, Massachusetts. I was pleased to hear that. There is work underway there which is

getting to the crux of what I referred to previously as our people challenge.

The FRA study, analyzing the impact of operational safety on such factors as job knowledge, job skills, training, equipment design, workload, work environment, and physical fitness, is very important. Every bit as important, I might add, as the track standards and equipment standards which have caused so much controversy in railroad circles. Such people standards are every bit as important. I am pleased that a dialogue between the safety specialists and Cambridge has developed.

We cannot escape the reality of the real world. We must be continually aware of our individual and collective responsibilities to the safety of railroad men.

These are tough days for the railroads. The financial condition of the Eastern roads is a matter of great concern to all of us. However, I am optimistic. The future will bring our industry many challenges, but I predict we'll be equal to them. I detect a new appreciation and awareness of the vital role railroads play in the national transportation network.

From my vantage point, I see forces of government, labor, and management moving inexorably toward one another. Once these forces become mutually supportive, supported by an American public aware perhaps that the industry needs more than band-aid solutions from government, I predict we'll be on our way to a new and more useful role in the economy.

NEW DIRECTIONS IN MANAGEMENT TRAINING

By DON K. MILLER

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We at Southern Pacific have had departmental reorganizations tied to the continuing upgrading of managerial skills and to a new yard concept with resulting new training needs, many of these with strong safety emphasis.

I'd like to mention quickly five such programs and then spend more time on at least three of them.

The Mechanical Department was reorganized late last year, necessitating an extensive training program for its officers. The reorganization had the effect of giving the mechanical officers transportation duties jointly with their present ones. Sixty mechanical officers have so far been indoctrinated in transportation department duties; e.g., a trainmaster's duties.

In like manner, Transportation Department officers were trained in mechanical department duties, as each department assumes certain responsibilities of both.

Over two hundred Southern Pacific first- and mid-level managers have participated in our "Results-Oriented Management Workshop." This 32-hour workshop has as its course units: Nature of Management, Planning, Organizing, Controlling, Standards and Appraisals, Communications, Motivation, and Decision Making.

Just recently, a "Review of Technical and Supervisory Skills for Yardmasters" program was developed covering basic supervision, cost control, computer systems and their uses, planning, yard safety, train blocking, agreements, and communications.

An extensive training program was begun this year in safety procedures, which is given to managers and officers of the three major segments of the Operating Department; namely, Transportation, Mechanical, and Engineering. I'll come back to this later in

more detail.

A real challenge in new training concepts came with the creation of our brand new West Colton Yard. Time does not permit us to discuss in detail all the training efforts that are planned at this facility, but there are a few things we would like to talk about. Number one is our management team.

Here is perhaps the most valuable ingredient of all, for the management team and the men who work with them are the vital force that provides system motivation and direction. Without them, our sophisticated yard could not, of itself, produce to the level for which it was designed.

Our management team, like the rest of the facility, has been put together with the total need in mind. All terminal disciplines will be represented in the staff, including mechanical, clerical, operating and administrative. Each officer will, in addition to his own specialty, be required to learn and share responsibility for the total operations.

The entire terminal staff has been carefully selected to provide a balanced mix of experience, practicality, and management potential.

While the management team has been receiving training over the past several months, they have also acted as consultants in the construction of the yard. The management team consists of a terminal superintendent, senior assistant terminal superintendent, and five assistant terminal superintendents—three with expertise in operations, one in mechanical functions, and one in administration.

Like the data system, the management team is not designed for West Colton Yard alone. It is designed to provide a terminal management system and talent pool which will be expanded to other terminals and assist

in providing a unified approach to better terminal operations not only on our lines, but eventually on other rail lines across the nation.

Over a year ago, we appointed a district training officer at West Colton to establish various programs. He, along with six terminal officers who will receive an instructor preparation course, will utilize two separate buildings to conduct classes. These classrooms are air-conditioned and equipped with special educational furniture to facilitate the learning process. Graphics and flip charts have been prepared describing the course, along with training manuals which contain details of each course. Each classroom is equipped with the necessary instructor tools such as chalk boards, overhead slide and movie projectors, and other teaching aids.

The following employees who work at this yard will receive formal training on how to operate the new system before they are on the job. For example, clerical forces will be given a total of 45 hours of classroom instruction in the data system and procedures. Yardmasters will receive 40 hours of formal training. Herders will receive 24 hours of classroom instruction, and carmen will receive eight hours.

Engine foremen and switchmen will receive their training on the job, supplemented with video-tape instruction programs.

The procedures that we have developed for training employees at our West Colton Yard are conventional methods of instruction, such as video-tape, classroom instruction, flip charts, slide-sound programs, simulated training with actual equipment, and on-the-job training. But what is new to railroad people and significant for a smooth operation is the course content.

West Colton was planned from the beginning to be the most advanced installation of its kind in the world today. New concepts were introduced for mechanical functions, clerical functions, signal, engineering, and management philosophies. We began preparing ourselves for training procedures at West Colton well over a year ago. However, before discussing this training activity, I think it is appropriate to give a better idea of

the design and operations of the West Colton Yard.

Southern Pacific management, after extensive planning and research, selected the site at West Colton, California, for construction of a car classification yard.

The first and most important consideration in making this decision was its strategic location. It's considered strategic for several reasons: It provides easy access to the entire Los Angeles basin. It's also on our line to Arizona, Texas, and the Mississippi River gateways of St. Louis, Memphis, and New Orleans. The new Palmdale-Colton cutoff provides a direct access route to central and northern California and the Pacific Northwest.

Construction of the West Colton Yard is an example of the emphasis being placed on terminals and their operation today. In the past, more emphasis was placed on train operations and less thought was given to the terminals. Terminal operations for the most part grew for reasons of expediency, rather than by plan and logic. Not so at Colton. Colton Yard was planned and designed to overcome the many deterrents to terminal efficiency.

Extensive research has been carried on to determine what the actual work load at Colton would be. This level of predicted activity, plus the growth potential, was a key factor in the planning and building of West Colton.

Let's take a look at the physical aspects of West Colton. It's a "tandem yard." The receiving, classification, and departure yards lie in a line. It's over six miles long and occupies approximately 560 acres.

To the south of the classification yard are the car and diesel service facilities. The area to the east of the receiving yard contains the yard control facilities and switching section. Through here pass all cars going to the classification or service areas. Trains will enter the Colton area from three directions: north, east, and west. The yard has been designed and constructed to permit trains to be yarded at the same time cresting is in progress.

The receiving yard contains nine 10,000-foot tracks. There is expansion room for two more tracks. Crossover tracks in the middle of the yard make it possible to yard two short

trains or one long train in each track.

All receiving tracks are equipped with power-operated switches, electric blue flags, movement indicators, and arrival sensors. These devices are all operated and monitored from the control room, top floor of the Administration Building, located at the east of the receiving yard and near the crest.

Arrival sensors automatically feed the arrival time of trains or yard cuts into the data system. Tote Boards give authority for movement into or out of each end of the receiving yard. They flash the number of the track the inbound or outbound train is on and are controlled by the switch tender in the control tower.

The movement indicators give authority for movement from a track. When activated, they emit a flashing white light. They are used in the receiving and departure areas. The electric blue flags and power switches are interlocked and provide maximum protection for personnel and equipment in the area.

Receiving yard tracks are on 20-foot centers. The area between tracks is paved, and allows sufficient room for automotive and mechanical equipment access.

As trains arrive, they receive a thorough inbound inspection. Mechanical forces are mobile and radio-equipped. Their work is coordinated by the lead carman in the control tower.

Cars can be classified into outbound trains, without the delay of going to the car-service area.

From the receiving yard, cars are normally moved along track 903 toward the crest. It has a descending grade from the receiving yard to the cresting area. Along this track is a series of approach retarders. If a "break-in-two" should occur while descending this grade, the retarders will prevent the cars from increasing in speed as they approach the crest.

Next, the car is weighed by the weigh-in-motion scale. Overweight cars, or those having a significant weight differential in an individual wheel set, will be detected. The computer then sends out a message and routes the car to a designated track where it can be checked.

A pin puller display indicates, by a system of lights, the next five cuts: one white light for one car, two white lights for two cars, red for stop.

After cars pass over the crest, they go through a system of computer-controlled retarders and switches on their way to the classification yard. The grade profile of six percent off the crest is designed to keep the "slowroller" moving through the switching area at approximately thirteen miles per hour. Tangent point retarders located at the entrance to each classification track govern the coupling speed of each car. Each group retarder has its own rollability-measuring section. The ability to move cars at a high speed through this retarder and switching system, with constant monitoring of their speed and rolling characteristics, permits a cresting rate of six to eight cars per minute.

The term "key" refers to a design that provides a combined classification/departure yard. The center four tracks of each key extend eastward to form the departure yard. Each classification track is equipped with a tangent point retarder at the west end, and a skate retarder at the east end. The skate retarders open when the track is locked at the west end, and close when it is unlocked. This prevents cars from rolling out of a track during cresting and permits pulling cars without the usual "squeal." The key allows up to two engines to pull from each key into the departure track, without interfering or being interfered with by other engines.

All key departure tracks are on 17 foot centers and are equipped with power switches, electric blue flags, movement indicators, and departure sensors. They are controlled from the trim tower located here in the receiving area.

Departure yard mechanical forces will also be mobilized and radio-equipped. They are coordinated with operating by the lead carman in the trim tower.

An air test panel is a unique innovation in the departure area, and it is located at the lead carman position in the trim tower. It's only necessary for crews on the ground to couple air hoses and check piston travel. From the panel, the lead carman charges train lines and makes leakage and air tests.

Upgrading and caboose tracks are equipped with electric blue flags operated from consoles in the individual areas. Caboose can be cresting directly into upgrading tracks. As the cars enter this area, retarders will stop them west of the servicing area. A trackmobile will be used to move them onto and off the caboose service pad.

The last major area of the yard is the diesel service area. Road units after being removed from the inbound train are lined to Track 905. This track is signaled and has power switches for this movement. Sanding towers, overhead sanders, and cranes are some of the sophisticated equipment available at this facility.

The roundhouse foreman oversees all activity from the roundhouse tower. He is linked to TOPS and Colton's terminal control computer and is provided with all necessary inspection and service information to help him accomplish his job.

Although physical layout is very important to terminal efficiency, it is really one-third of the package. The second necessity is an effective, real-time, terminal data system. Without correct car record information, available on request or automatically at the time and place needed and in the proper form, the benefits of the ability to move cars quickly are largely lost. Without this kind of data, the ability to effectively plan ahead does not exist. Stated simply, the traditional yard office, data system and procedures, operating procedures, and planning concepts just would not satisfy our requirements in the physical environment of West Colton.

Computer functions associated with control of retarders and switches used in cresting cars are nothing more than a process control system. The use of car, crew, and power records for information and planning is strictly a management system. The previous terminal standard has been to house both systems in the same computer, with a twin unit provided as standby and for off-line processing.

In our West Colton system, the process control functions reside in their own computer system that we call the CCC—crest control computer. This system performs no management function and does not even keep inventory of the classification yard. It's con-

lined only to switching, retardation, and diagnostics through its own system. The computers are located at West Colton in the administration building. One computer is always on line, and one always in hot-standby. Necessary switch lists and other information are fed to the CCC by the management system from San Francisco via a high-speed microwave data link. In turn, the CCC passes to the management system inventory data as cars are switched, and the computer system of the other end of the high-speed microwave data link is the complete management system that we call the TCC—terminal control computer. This is a large computer located at San Francisco in the TOPS computer center. The TCC "talks" both to the CCC and to TOPS computers.

The following four basic elements are included in the TCC system:

1. TOPS feeds advance train consists and diversions into the TCC.
2. A complete up-to-the-minute freight car inventory of the West Colton responsibility area, including locomotives and cabooses. All cars spotted on industrial tracks belonging to the West Colton district are included in the inventory.
3. A complete physical description of the trackage, track numbers, and capacities in feet.
4. Decision logic and rules for basic operating procedures.

These four basic elements in a single coordinated system makes possible a total approach to a controlled terminal environment. Although the computer is located at San Francisco, it will seem, as if it is on site to the people at West Colton. For access to this system, they will have at their disposal some 33 cathode ray tube message displays, 13 computer-associated printers, and nine teletypes. Information is available instantly at all key points, and outputs can be tailored by the requestor to fit his needs.

Inventory is automatically moved by the TCC system as cars move through the yard. All changes in car status—for example, reporting a car as in need of service or changes in track inventory requiring a report to TOPS—will be automatically received and inventory information will be updated by the TCC.

Permanent, accurate displays of the inventory of the receiving yard, classification, and departure yard, and line-up of inbound trains are located at critical control points. These displays are automatically updated as conditions change.

Because we will have accurate information on trains due to arrive and on track inventory, plus certain decision rules, we will be able to perform in-depth planning with the TCC system.

Basically, the system will constantly scan advance incoming consists and terminal inventory and advise, on real-time, of the available traffic for all outbound schedules. If traffic builds up early, the planner may advance the call time of a train. Otherwise, the system will order the train on scheduled time and issue cresting sequence instructions to the crest yardmaster based on decision rules following car scheduling criteria. It will also assign cars to blocks, assign those blocks to trains, and issue make-up instructions to the trim yardmaster. If outside events change and affect the plan, the system may be updated at that time, and the plan rerun from that point. The planning system also takes into account availability of locomotive power and crews.

These highlights are some, but not all, of the functions of our TCC system. Many other capabilities will be available and are in the developmental stage for future use. It is important to point out that both the CCC and the TCC were not designed as just one-yard systems. They can and will be installed at other Southern Pacific yards.

This is a thumbnail sketch of what is being encompassed in the West Colton Design. But in the final analysis, the finest plant and the finest tools are of no value unless their use is intelligently directed by people. We have tried to identify those human elements that will contribute to the best use of terminal plant and tools and, as was done with the physical and data systems, incorporate them into the West Colton Yard design.

We feel that environment and training are the two most important considerations from the standpoint of human elements. From the buildings to the toepaths, much thought and many added dollars have been designed into

this element. All offices, including the yard offices and towers, are carpeted. All offices have been made as soundproof as possible and are attractively decorated and furnished. There is ample employee parking and the exterior landscaping is very pleasant. Safety in the operation of this facility is of the utmost importance. Toepaths are excellent. Most of the switches are power operated, and hand brake use will be kept to a minimum. All skate retarders will be open when pulling cars, thus eliminating a source of noise. Other retarders will be fitted with ductile iron shoes to minimize noise.

Traditionally, the yardmaster has to call dispatchers and clerical forces to gather information concerning the operation to perform his duties in the tower. Under our new system, the yardmaster will have a continual display of updated information on a television tube about conditions in the yard and detailed information about arriving trains and the traffic each car contains. Therefore, we have to teach yardmasters how to read and update certain information, such as what tracks trains will be yarded on.

The herder will no longer be on the ground and ride trains into the yard. At West Colton, he will be located in the tower and perform his duties through the use of a console and television display which will give him the information about arriving trains. He will make track alignments on the console and align trains into tracks to record arrival time and to authorize movement of trains on tracks by pressing pushbuttons and will light indicator lights on the tracks themselves.

The switchman or pinpuller on the crest will receive a light display of the number of cars to make in a cut, and also a stop indication when he comes to a car that is a "Do Not Hump" car.

The engine foreman will also be taught how to operate a console where he will monitor the car going over the crest to make sure that the correct car is being recorded into the data system. He also monitors warning devices when something is wrong. He no longer has to do any controlling of cars whatsoever. All the control of the cars is taken over by the computer and radar devices. The engine foreman will be taught how to read instruc-

tion messages that will be transmitted over a teletype or television tube.

Clerical forces will be given extensive training in the complete data system of crest control computer and terminal control computer operation. Traditionally, entry into a data system is made by IBM card. At West Colton, the data entry will be made by keyboard through a CRT, or cathode ray tube, display system.

The carmen will no longer physically place blue flags on cars or tracks. Blue flags will be controlled by the lead carman, who will be located in the tower. After the herder has properly lined switches and derails to protect track from entry and permission is received from the yardmaster, the lead carman will activate a blue light through a pushbutton on his console.

Briefly, then, these are the people we have to train and some of the things we must teach them to operate our new system. We do not have time to fully describe each course and every procedure. However, I would like to demonstrate how the engine foreman calls his list up to be displayed on his CRT.

There are six steps in the procedure: (1) He reports the first car to be crested and the instruction number to the train clerk; (2) Being in hump approach mode, he would press the hump radio mode pushbutton which activates the engine radio to receive the hump mode; (3) He presses the list key which tells the computer that the succeeding key to be pressed represents the number of the list; (4) the engine foreman presses the digits or numbers of the instruction; (5) He presses the enter key, which enters the information into the computer for processing; (6) he presses the hump button on the keyboard. The list is now displayed on his CRT and a green signal in the engine cab and wayside signal to begin humping.

In years past, an experienced rail could give a new employee a few hours of on-the-job instruction that might keep him going for the rest of his career. I think you will agree that our West Colton operation is a good example of the technological changes taking place in our industry and the crucial need for employee training programs.

These are the new directions in manage-

ment training as implemented for the needs of a new yard concept which requires new training needs, a new yard concept costing \$39 million. This yard is the most technologically advanced rail terminal and will handle more trains and freight cars safer and faster than any other rail terminal in the world. This is possible, in part, by the use of advanced computerized control systems and a unique new terminal design which requires the training of management people in new individual management skills and available source of management information through computer output. Once trained as to individual skills, training in management teams was then necessary.

As I mentioned briefly earlier, three safety awareness projects have been established this year; one for each of the three major segments of the Operating Department: Transportation, Mechanical, and Engineering.

These projects were initiated incident to the reorganization of the Mechanical Department. Here we have a safety training program for management—"How to Make Safety Checks, etc." Safety and other officers concentrate their observation efforts on specific areas each month, giving out citations for unsafe practices when observed. These citations are educational in nature. A dual purpose is served in not only pointing out to the violator that an unsafe event has happened, but also it commits the officer to recognize them and take action.

For example, during June 1973, one month of this project: Transportation Department—check proper securing of engines at tie-up points; Mechanical Department—check condition and use of yard birds and car jacks; Maintenance of Way—check condition and operation of track equipment.

In addition to the Safety Awareness Project, we have what we call a "Tailgate Safety Program," 52 safety subjects, one for each week in the year. All officers and safety personnel concentrate on a specific safety subject each week, such as safe operation of work equipment, warning devices and posted signs, personal protective equipment.

This new terminal covers 560 acres, is 5.7 miles long, has 99 tracks totaling 96 miles, and has capacity for 7,100 freight cars and

standing capacity of 98 locomotives. Safety was the first consideration from the initial planning of the yard. Consider the communication system: 420 channel capacity microwave system, seven base radio stations, nine teletypes, 60 yard talk-back speakers, 35 miles of underground ducts carrying communications, electrical, and signal cable, 14 miles of aerial cable.

Signal, interlocking, retarder, and electronic systems consist of 14 miles of compressed air lines, 26 miles of aerial cables, 229 miles of multiple conductor underground cable, 207 electronic wheel detectors, 75 electronic train sensors, 68 radar units, one electronic coupled-in-motion freight car scale, one dragging equipment indicator, 57 power operated safety derrails, three hot box detectors, three high-wide load detectors.

The lighting of the yard has a total output of 31 million candlepower.

Closely related to safety is the environmental protection, consisting of 7.3 miles of in-

dustrial waste lines, three waste separator ponds, two waste evaporation ponds, in addition to cooperating in the enlargement and improvement of city and county waste systems as well. In addition, landscaping, sound barriers, and special yard equipment have been installed to help protect the surrounding environment from sight and sound penetration.

These are the new directions in management training on Southern Pacific. I have stressed the training situation at our new West Colton Yard, for we have had new training needs in operating, transportation, mechanical, and engineering departments.

Use of electronics, computers, television, teletype, and cathode ray tube message displays has made possible the removal of men from some hazardous areas, and continuing safety training is stressed at management and line levels.

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