BEHAVIOR SAMPLING

of Theme Park Ride Operators

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Theme parks have a high degree of public exposure and depend greatly on their public image and reputation as a safe environment. During this study, ride operator behaviors were observed to identify trends in at-risk behaviors that can lead to accidents. Eighty samples were collected in eight parks. Each 30-minute sample targeted attention-, communication- and procedure-related behaviors. Sampling results showed at-risk behaviors in procedures at 16 percent, communication at 15 percent and attention-related at 8 percent. Procedural at-risk behaviors associated with proper dispatch sequence, unloading assistance, standing or working in safe zones and measuring children's height were observed most often. Best-demonstrated practices observed in the sampled parks were documented and are offered as measures to improve systems and eliminate or reduce "forced" at-risk behaviors.

Who hasn't taken their family to an amusement park and wondered, "Is it safe?" In recent years, the media, amusement industry and public have given much attention to accidents and fatalities in amusement and theme parks.

Root-causal factors for amusement and theme park incidents (which often result in injury) are dynamic and multifaceted. Significant elements of these incidents are embedded in existing safety cultures and human behavior. Recognizing this, the desire to improve safety culture and eliminate hazards has challenged many organizations to seek more proactive methods of identifying, understanding and correcting system flaws.

This requires a balanced approach which gives proper emphasis to causal factors that derive from design management, operations management and task performance (Manuele). Ultimately, it requires a blend of system safety and behavioral safety techniques. The behavioral component focuses systematically on an organization's safety values and employee behaviors,

FIGURE 1 Behavior Sampling Data Collection Sheet

Job/Area: _____ Date/time: _____/_____ No. of Workers: _____

ATTENTION LEVELS	SAFE	AT-RISK
Alert and aware of operations		
Focused on task		
Actively listening		
Visual scanning of dock/ride		
Responsive to instructions/guests		
TOTAL		
COMMUNICATION	**SAFE**	**AT-RISK**
Verbal instructions given		
Visual/eye contact made		
Physical "all clear" hand signal		
Verifying physical signals		
Clear PA instructions		
TOTAL		
PROCEDURAL	**SAFE**	**AT-RISK**
Checking children's heights		
Loading/securing guests' lapbars		
Proper dispatch sequence		
Unloading assistance		
Crossing track procedure		
Standing in safe zones		
TOTAL		

while the systems component focuses on existing management systems. This combination allows an entity to improve management systems by identifying key at-risk behaviors that are primarily or partially caused by system flaws or weaknesses, management protocols, administrative practices and corporate culture.

According to Manuele, "An organization's culture consists of its values, beliefs, legends and rituals, all of which is translated into a system of expected (management, supervisor and employee) behavior" (Manuele). At the heart of corporate initiatives such as safety, quality and empowerment, is the belief that people are motivated by core values contained within those initiatives (Hurst). By creating a safety culture that does not accept employee at-risk behaviors, an organization can improve productivity, quality and employee morale, and reduce incidents and their costs (Lyon 33+).

At-risk behavior is considered a leading indicator of workplace accidents (Daniels 18); it is best measured by observation. Such behavior sampling is a method of identifying root-causal factors that can lead to incidents; it is a repeatable method of observing employee behaviors in the workplace to document and measure both safe and at-risk behaviors. Data collected are used to identify primary risk factors, accident precursors and system weakness so that cultural and system improvement can be made.

This study focused on theme park ride operator behaviors and involved observation of operators working on three ride types: large attractions (e.g., roller coasters), mid-sized attractions (e.g., flat rides, small coasters and float rides) and children's rides.

Sampling data collection sheets categorized critical employee behaviors into three categories: attention level, communications and procedural practices. Checklist criteria were based on several sources, including input from ride operations management; established company policies and procedures; training materials and information provided to operators; and incident/accident data collected by theme parks.

STATEMENT OF THE PROBLEM

The purpose of this study is to evaluate employee safe and at-risk behaviors in ride operations at select theme parks. Specifically, the study seeks to answer the following questions:

1) What percentage of at-risk behaviors are occurring at larger roller coaster rides, mid-sized attractions and smaller-sized children's rides?

2) What types of at-risk behaviors are occurring with respect to operator attention levels, communication and company procedures?

3) What causal factors, such as environmental, administrative and cultural, contribute to observed at-risk behaviors?

4) What corrective measures or changes should be considered to eliminate or reduce these at-risk behaviors?

Hypotheses

It was hypothesized that ride operators engage in at-risk behaviors which contribute to mishaps that lead to guest and employee accidents and injuries. It is believed that several physical conditions, such as dispatch station design and ride operation control panel design and/or layout, contribute to or cause "forced" at-risk behaviors critical to safe operation.

Furthermore, it is believed that a relationship exists between the types of at-risk behaviors that occur and the three categories of behavior identified in the sampling checklist: communication problems, operator distraction and in-attentiveness, and procedural breakdown—three areas covered extensively in ride operator orientation and training.

STUDY SIGNIFICANCE

Successful theme park operations, like many other entertainment-oriented industries, recognize the importance of their public image. Guest safety and health are critical and help shape each park's reputation.

Guest injury resulting from ride accidents is a leading liability facing theme park operations (Barratt 32+). According to Consumer Product Safety Commission, some 10,400 ride-related injuries

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were treated in hospital emergency rooms in 1999 (CPSC). Employee at-risk behavior is often a contributing factor in guest-involved incidents. For example, improper loading and securing of guests before dispatch of rides have contributed to guest injuries and deaths.

Age-related factors—such as inexperience, immaturity and lack of discipline—often lead to higher levels of at-risk behavior as well. Therefore, administrative measures such as orientation, training and supervision are key elements of the effort to train operators to behave safely. Worker observations are needed to determine actual behaviors.

FIGURE 2 Safe Behaviors Observed by Category

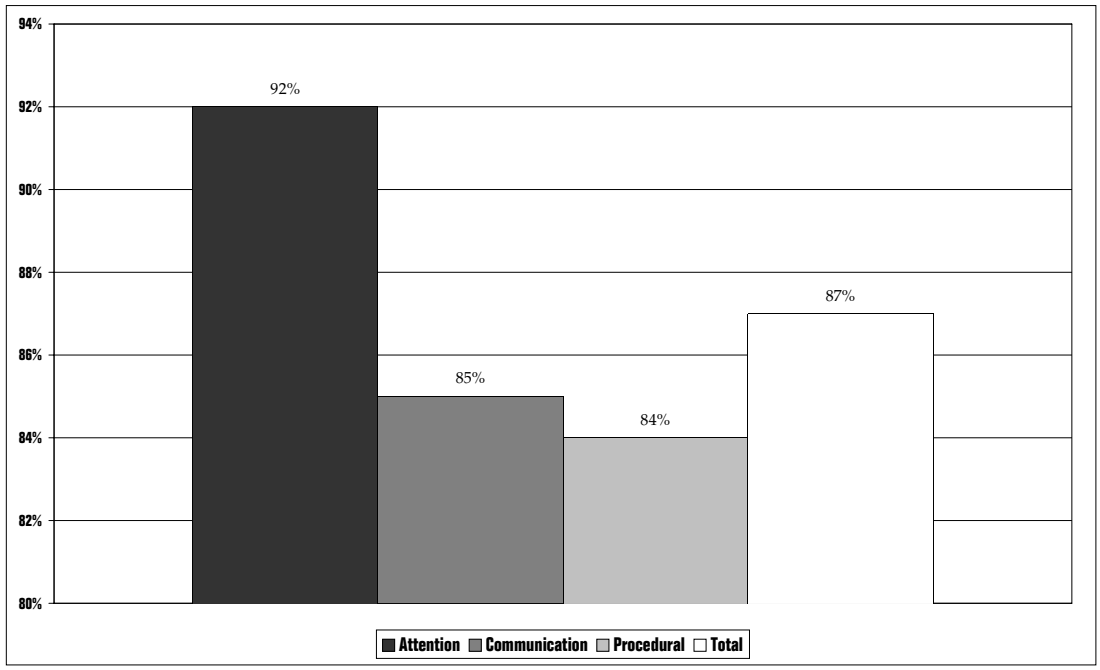
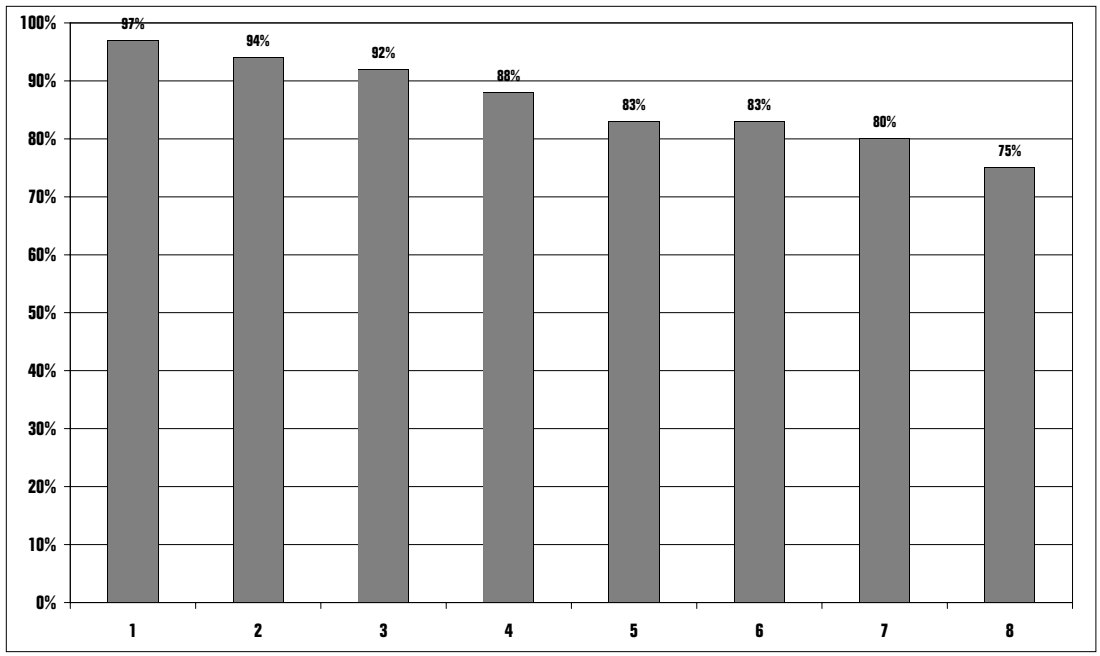


FIGURE 3 Safe Behaviors Observed by Park



ASSUMPTIONS

This study assumed that the behavior sampling methodology used during onsite observations was consistently and evenly applied throughout the participating operations. It also assumes that rides selected were representative of ride operations within each of the sampled parks.

Most samples were taken during the first shift of operations (9:30 am to 4:00 pm). It was assumed that first-shift operations and ride operator behaviors were representative of the second shift (4:00 pm to 9:30 pm).

It was also assumed that no significant differences exist between weekdays and weekends. These assumptions are based on the knowledge and experience of the park's risk manager and ride operations management, as well as the author's experience observing behavior and previous work experience as a ride operations supervisor at a theme park.

In addition, the study assumed that onsite observation and sampling methods were unobtrusive, with little or no affect on overall employee behaviors. Furthermore, it was assumed that 30-minute sampling sessions were adequate in duration and representative of ride operator behavior that occurred throughout the shift.

The study also assumed that the number of samples taken (10 rides per park) was adequate in number, distribution and volume, and representative of the remaining park ride operations.

LIMITATIONS

As noted, this study was designed to identify critical behaviors that lead to potential incidents. Therefore, it focused only on the "observation" element of the behavior-based safety process. Sampling was limited to three categories of ride operations in eight theme parks.

TABLE 1
Safe Behaviors Observed by Category at Each Park

A total of 80 ride operations were sampled within eight selected theme parks. Through this process, 1,310 ride operator behaviors were documented. Sampling data indicated the highest percentage of safe behaviors observed was attention-level-related safe behaviors for all parks and ride categories.

Park	HIGH	LOW	SPREAD
1	98%	95%	3%
2	95%	91%	4%
3	98%	85%	13%
4	95%	83%	12%
5	87%	79%	8%
6	93%	76%	17%
7	88%	75%	13%
8	88%	70%	18%

TABLE 2
At-Risk Behaviors Observed on Large Rides
All Parks

Park	ATTENTION	COMMUNICATION	PROCEDURAL
1	0%	10%	15%
2	14%	28%	33%
3	24%	21%	13%
4	11%	28%	23%
5	9%	10%	8%
6	12%	27%	24%
7	0%	5%	4%
8	4%	4%	20%

The study did not identify operator age, experience level or time on the job, nor did it separate supervisor, ride manager or ride operator behaviors observed. Parks were forewarned about the study, which may have affected initial operator behaviors. However, in the author's opinion, "forced behaviors" resulting from management systems were unaffected and operators continued to perform (or display) behaviors they thought to be correct, leading to key indicators of system flaws and weaknesses.

OBSERVATION METHOD

Based on behavior-based safety principles, the observation method was designed to be repeatable and incorporated input from park management. The data collection sheet used listed critical safe behaviors specific to ride operations (Figure 1). For consistency, the author and the theme parks' corporate safety director performed all samplings.

Prior to each observation session, the purpose of the exercise was explained to the ride operator(s). This allowed observers to document 1) critical behaviors considered correct or safe by operators; and 2) "forced" behaviors that were beyond operator control. Observers stayed in a non-obtrusive location.

As noted, each session lasted 30 minutes, with start and finish times recorded on the data collection sheet. During each sample, the number of ride dispatches observed was recorded to provide the number of cycles of the operation. The number of ride operators observed was also recorded.

SAMPLE SELECTION

To obtain a representative sample within the scope of the researcher's resources, eight major parks within the corporation were selected as were 10 attractions within each park. On average, each park has 35 rides. Park selection was based on the number, size and type of rides.

Ride selection at each park included three groups/categories of rides: 40 samples from large rides (roller coasters); eight samples from mid-sized rides (flat rides); and 32 samples from smaller-sized children's rides. By park, this totaled five samples of large coasters, one mid-sized ride and four children's rides.

The largest number of samples involved the large-ride group since these operations represented approximately 50 percent of the total attractions at each park. In addition, these rides typically represent the greatest risk potential for guest and employee incident and injury. In most cases, such rides also have larger crews, consisting of seven to 10 people. Observations at these rides focused on team-coordinated behaviors and crew interdependencies.

Mid-sized rides represented approximately 20 percent of parks' rides and had a lower accident experience. These attractions are usually operated by two to three employees, requiring some coordinated activities and some independent and/or single-operator behaviors. Most are simple operations with lower risk potential.

The third group sampled was rides designed for children age six and younger. Operated by one employee, such rides represented 30 percent of those sampled. Exposure on smaller-sized children's rides differs from adult rides. For example, children and their parents require assistance while boarding and disembarking the ride. Children also need help being secured in the ride. These operator behaviors are critical to ensuring guest safety.

Each park was contacted in advance by corporate risk management to schedule dates and times of visits to perform the behavior sampling.

MEASUREMENT INSTRUMENT

As noted, observations were recorded on a data collection sheet. This form lists specific operational behaviors and their definitions, providing a standard of safe behavior performance to increase observation consistency and reliability. Park management had identified these behaviors as critical to safe ride operation.

Specific critical behavior pinpoints were identified by analyzing ride operation procedures manuals; observing operator training; reviewing accident data analysis; and observing ride operation. The author then defined each behavior pinpoint with the parks' corporate safety director and key ride operations personnel (see pg. 39).

As noted, the checklist included three separate categories of behaviors: attention-related, communication and procedural. For each critical behavior pinpoint listed, the checklist featured columns for recording safe behavior and at-risk behavior, and a column for comments (Figure 1). The total number of specific safe behaviors and at-risk behaviors were totaled for each category and ride.

Critical behaviors associated with attention level focused on issues such as alertness, attentiveness, task focus, listening to instructions and visual scanning. At-risk behaviors related to attention level include fatigue, distraction, lack of interest in tasks and appearing detached from surroundings. The latter behaviors can increase risk as they may lead to omission of critical safe behaviors (e.g., checking lap belts or seat harnesses) as supported by research that indicates human errors and mistakes are more likely when alertness decreases (Klein 50).

The second category—communication—is critical in crew-based operations. Coordinated efforts are needed to safely perform tasks such as loading guests into trains or cars, securing lapbars or seat restraints, dispatching trains or cars, unloading guests and helping guests to exits.

For example, main control ride operators (MCOs), secondary control operators (SCOs) and loading/unloading operators must communicate with each other during dispatch procedures using verbal, visual and physical communication. Verbal communication behaviors include spoken instructions and directions to guests and other crewmembers, and the use of a public address (PA) system by the MCO or recorded message on the loading dock.

Visual communication and eye contact

are also critical. The MCO must make eye contact with the SCO, as well as with all other operators to ensure that conditions are ready before dispatch. Each ride operator follows visual eye contact and confirmation with a physical hand signal such as a "high sign" or "all-clear" hand signal. Each park's ride operations department has developed specific hand signals for dispatch; these are taught during operator orientation and training.

Procedural behaviors are defined in the ride operation manual and are covered during operator training. These behaviors include checking the height of children in line; physically testing each harness; making sure each guest is properly seated; following the proper sequence for dispatch; clearing all guests prior to dispatch; and following proper track crossing procedures.

DATA INTERPRETATION

Scores primarily indicate the percent of safe and at-risk behaviors observed at each ride within each park. Data were used to identify patterns as well as differences between parks and ride categories. In addition to the percent of safe behaviors vs. at-risk behaviors, the study identifies what at-risk behaviors were observed most often in the three categories. Percentages of at-risk behavior in each category are also shown. These data were used to identify indicators for potential ride incidents resulting from operator error, omission or other at-risk behavior.

In addition, data were used to link possible causal factors and root causes to these at-risk behaviors and to identify possible system flaws. These include:

1) administrative policies and practices such as training and education methods or content, supervision and leadership, and ride operation procedures;

2) environmental conditions such as ride dispatch control station arrangement, significant distractions, information overload or confusion, and masking of communication (noise);

3) cultural factors such as management's philosophy, values, organizational structure, communications and actions.

Through sampling, data collection and interpretation, "best demonstrated practices" were identified. These practices include engineering standards such as control panel design and layout on loading docks and flat rides; and operational procedures such as signal sequence, com-

Behavior Pinpoints

Pinpointing behaviors is the act of defining the desired critical safe behavior clearly and precisely so that consistency is maintained (all observers agree on the behavior observed). This study used the following targeted behavior pinpoints described in observable terms:

ALERT AND AWARE OF OPERATIONS/GUESTS - Operators (MCO, SCO, loaders and unloaders) watching and listening to other operators, guests, the ride in operation and paying attention to surroundings.

FOCUSED ON JOB/TASKS - Operators directing attention to their tasks without distraction or delay, and not distracting other operators.

ACTIVELY LISTENING - Operators listening for signals, instructions, verbal communication and ride operation sounds to determine correct actions.

VISUAL SCANNING OF DOCK/RIDE - Operators performing continuous visual scanning of their area of responsibility to make sure all areas are clear prior to dispatch or other actions each cycle.

RESPONSIVE TO INSTRUCTIONS AND GUESTS - Operators reacting quickly to MCO, SCO or other operator commands and assisting guests that need help loading, securing their seat restraint or unloading.

VERBAL INSTRUCTIONS TO GUESTS/OPERATORS - Operators providing consistent, clear and helpful instructions to other operators and guests.

VISUAL EYE CONTACT WITH GUESTS/OPERATORS - Operators making consistent eye contact (each cycle) with other operators, MCO, SCO and guests.

PHYSICAL ALL-CLEAR HAND SIGNALS - After all guests and operators are secured and clear, each operator making consistent, deliberate, all-clear hand signal (thumbs up) until the MCO and SCO complete the dispatch.

VERIFYING PHYSICAL HAND SIGNALS - MCO and SCO verifing by visually checking each operators physical hand signal and verifying that all systems are ready before dispatch.

CLEAR PUBLIC ADDRESS INSTRUCTIONS - Consistent, clearly audible PA instructions for guests during each cycle, and regular instructions or corrections/commands to other operators regarding dispatch, loading, securing, unloading, exiting or track crossing.

CHECKING CHILDREN'S HEIGHTS - Operator at waiting line checking and measuring all children that are close to the minimum height requirement for the ride and screening out children who are too small.

LOADING AND SECURING GUESTS LAPBARS - Operators actively assisting guests into car seats, providing instructions on securing seat restraint, and physically checking each lapbar/seat restraint, as well as making sure all empty seat lapbars are down before giving all-clear signal.

PROPER DISPATCH SEQUENCE - The dispatch all-clear physical signal must be given by each operator in the following sequence before dispatch can occur: first signals from loading and unloading operators in clear view of each other and the SCO and MCO; second signal from SCO in clear view of all operators; and final signal from MCO verifying all systems are go.

UNLOADING ASSISTANCE - Operators on the unloading side of the dock providing physical assistance, guidance and instructions.

CROSSING TRACK PROCEDURE - Any operator wishing to cross the track is required to gain the SCO's and MCO's attention by providing the physical arm signal for crossing and receive a verbal confirmation over the PA system from the MCO before crossing through the seat compartment of a stopped car. The MCO must also hold his/her hand up off of the dispatch controls.

ASSISTING GUESTS OFF DOCK TO EXIT - Operators on the unloading side of the dock prompting guests to move toward the exits in a safe, orderly manner. Operator also must make sure all guests are off the dock area before giving the all clear for dispatch.

STANDING IN SAFE ZONES - Operators on the dock standing or walking in areas designated as safe and standing away from yellow painted stripping along the track openings and dock during dispatch and ride cycles.

Best Demonstrated Practices

During the course of the observations, the study identified practices that were considered superior in design or application. These practices are called Best Demonstrated Practices. The following practices are grouped in categories related to attention, communication and procedure.

Attention

A. Adequate shade structures in waiting lines, loading dock platforms, lift platforms, control stations and other workstations to reduce operator fatigue, heat stress and sunburn.

Communication

A. Universal hand signal sequence procedure for all parks to eliminate inconsistencies and differences in application.

B. Position control panels facing each other so that the MCO and SCO are looking in each other's direction.

C. No hand signal until all guests have cleared the dock and exit gates have closed.

D. Verbal confirmation by the MCO over the PA system with hands raised off the control panel.

E. Head set microphones for MCO allowing "hands free" operation.

F. Drop out background music and sound effects when PA is used.

G. MCO use PA to confirm "all clear" signals of crew prior to dispatch.

H. Use recorded spiel in queue line to provide guest instructions prior to loading.

I. Whistles for employees in the children's rides to be used in emergency situations.

J. Convex mirrors positioned so that MCO and operators can see blind spots (primarily on flat rides).

Procedural

A. Child height markers in waiting lines and stalls for quick visual reference to rider height compliance.

B. Numbers painted on floor of loading stalls to increase efficiency and communication with guests.

C. Extend air gates down to within eight inches of floor to prevent smaller children from crawling underneath gates.

D. Provide air gates or turnstiles at exits to prevent guests from re-entering the unloading area.

E. Mark edges of track openings in docks as a "no standing zone" with highly visible warning striping (yellow and black) to provide visual warning of fall hazard and exposure to moving objects (reference OSHA 1910.144 and ANSI 535.1-1991).

F. Provide contrasting colors between lapbars and headrests of cars to help operators identify the position of lapbars.

G. Provide safe zones on docks (behind a removable chain or air gate) and require employees to occupy these zones during ride dispatch and return. Painted areas, locator spots and other methods can be used to identify where operators must stand during ride dispatch and return.

H. Crossing signal given before operator crosses rather than during crossing.

I. Elastic wristband key chains for children's ride operators allowing the key to stay with the operator rather than in the unattended control panel.

munication systems and track crossing (see list at left).

Although the primary purpose of this study was to identify critical behavior trends, ride operators also received immediate feedback regarding the sampling. It is extremely important to recognize and reward desired behaviors, and provide constructive guidance in avoiding at-risk behavior (Hunnewell 7).

DATA ANALYSIS

A total of 80 ride operations were sampled within eight selected theme parks in various states. Through this process, 1,310 ride operator behaviors were documented. Sampling data indicated the highest percentage of safe behaviors observed was attention-level-related safe behaviors—92 percent for all parks and ride categories. Communication-related safe behaviors were observed at 85 percent, with procedural-related behaviors scoring 84 percent safe (Figure 2).

Results of sampling at each park ranged from a high score of 97 percent safe behaviors (Park 1) to a low score of 75 percent safe behavior (Park 8). Figure 3 lists individual park scores.

Behavior category breakout findings show differences in attention level, communication and procedure-related behaviors within each park. Table 1 shows the percentages of each category in each park. The percentage spread between categories within each park ranged from three percent (Park 1) to 18 percent (Park 8). The mean high score for all parks was 92.8 percent and combined mean low score was 81.8 percent. The mean spread difference in the eight parks was 11 percent.

Large Ride Sampling Results

Sampling results for large rides indicated that among the three categories, procedural-related at-risk behaviors were the most prevalent. As shown in Table 2, such behaviors were observed at 17.5 percent. Communication-related at-risk behaviors were observed at 16.6 percent and attention-level at-risk behaviors were observed at 9.2 percent.

The breakout of specific at-risk behaviors (Table 3) indicates the highest observed procedural at-risk behavior was related to incorrect or out-of-sequence dispatching ("proper dispatching sequence"), which accounted for 27 percent. Problems related to this procedure included:

- inconsistent dispatch signal se-

"Forced" at-risk behavior can be reduced by identifying system flaws and root causes that create them.

quence (e.g., MCO/SCO signals before other crew members signal);

•MCO not verifying each crew member's physical "all clear" hand signal before dispatching;

•dispatching train/car before dock is clear of guests;

•dispatching train/car before loaders/unloaders are clear of train/car and in safe zone.

The second-most-prevalent procedural at-risk behavior was related to lack of or inadequate "unloading assistance" provided to guests on the dock (17 percent). In most cases, unloaders did not:

•provide guidance and/or instructions to guests in disembarking and exiting;

•check each row to ensure all guests and their belongings are removed;

•assume proper position when the train/car arrived to greet guests and provide assistance.

The third-most-frequent procedural at-risk behavior observed was associated with employees "standing (or walking) in safe zones" (15 percent). Examples included:

•unloaders standing near track opening in the yellow paint area ("no standing" zones) during dispatching and when trains enter the station;

•crew members standing near track opening at ends of dock.

"Measuring children's heights in line" placed fourth at 14 percent. This included:

•not enforcing height restrictions;

•inconsistent measurement;

•not measuring or missing small children in the line.

Other at-risk behaviors observed in this category included:

•not physically checking all harnesses (seat restraints) before dispatch;

•allowing the trains/cars to be dispatched with lapbars or harnesses in the "up" position on empty seats;

•allowing guests to ride when lapbar cannot be secured completely;

•MCO not correcting crewmembers on inconsistent or lack of signals;

•improper track crossing procedures;

•supervisors not practicing/enforcing proper track-crossing procedures;

•MCO not removing hands from control panel when employees cross track;

•operators not using the "track crossing" hand signal before crossing;

•operators crossing between train cars rather through cars.

Table 4 lists communication-related at-risk behaviors observed on large rides. The most-frequent such behavior (30 percent) was associated with MCOs and SCOs not "verifying (other operators') physical hand signals" before dispatch. Lack/inconsistent use of "physical all-clear hand signals" between operators accounted for 27 percent of at-risk behaviors in this category. Another 27 percent of these behaviors were related to unclear PA instructions or poor audio quality of PA systems, and inconsistent/lack of verbal commands and instructions to guests from the MCO.

Other communication-related at-risk behaviors involved inconsistent "visual/eye contact with guests/operators" and dispatch without eye contact between MCO and SCO or other operators (nine percent); and no "verbal instructions for guests/operators" (seven percent).

Table 5 identifies attention-level-related at-risk behaviors involving large rides. Topping this list were distractions and fatigue affecting operator alertness and awareness (44 percent). Some MCOs and SCOs were observed in full sun exposure, which contributed to fatigue, heat stress and sunburn.

At-risk behaviors involving "response to instructions" were measured at 26 percent. Lack of response or slow response to MCO or other crewmember instructions was observed in several cases as well. Other at-risk behaviors involved "active listening" (paying attention to surroundings/guests) at 17 percent and "focused on job/task" (lack of interest in duties, coworkers) at 13 percent.

Smaller-Sized Children's Ride Sampling Results

The second largest sample was taken from smaller-sized children's rides. In this category, communication at-risk behaviors were measured at nine percent, while procedural at-risk behaviors were at eight percent and attention-level behaviors were at five percent.

At-risk behaviors involving communication included lack of verbal communication with guests and children; lack of visual scanning of the ride and children during operations; and inconsistent PA use. The highest at-risk behavior percentage related to communication was 60 percent at Park 2.

At-risk procedural behaviors observed on smaller-sized children's rides included:

•not "securing or deactivating ride control panels" during loading or unloading;

TABLE 3
Procedural At-Risk Behaviors Observed on Large Rides
All Parks

Proper dispatch sequence	27%
Unloading assistance	17%
Standing or working in safe zones	15%
Measuring children's heights	14%
Proper track crossing	5%
Loading and securing	5%
Correcting at-risk behaviors	5%
Other	12%

TABLE 4
Communication At-Risk Behaviors Observed on Large Rides
All Parks

Verifying physical signals	30%
Physical all-clear hand signals	27%
Clear PA instructions	27%
Visual/eye contact	9%
Verbal instructions	7%

TABLE 5
Attention At-Risk Behaviors Observed on Large Rides
All Parks

Alert and aware	44%
Responsive to instructions	26%
Active listening	17%
Focused on job/task	13%

•operating ride without properly latched seat restraints or doors;

•operator not watching ride during operation;

•operator not alert to surroundings;

•operator stepping through hazard areas during loading and unloading.

Mid-Sized Ride Sampling Results

The smallest sample involved mid-sized rides due to the relatively small number of such rides per park and their lower incident rate experience. Procedural at-risk behaviors were observed at 19 percent, primarily involving improper unloading. Communication at-risk behaviors were observed at 11.4 percent and attention-level-related at-risk behaviors at 5.6 percent.

SUMMARY

The hypotheses of this study appear to be supported by the sampling observations: 1) ride operator at-risk behaviors occur, creating conditions that may lead to accidents; and 2) many of these at-risk behaviors are related to communication, attention and procedural functions.

Procedure-related behaviors were observed with the highest percentage of performance discrepancy or at-risk behaviors on large rides. This finding indicates a possible need for more-effective employee training, improved supervision and leadership, and further evaluation of management systems. Behaviors related to highly critical procedures—such as proper dispatching sequence, loading and securing seat restraints represent a higher degree of risk for guest injuries.

During the study, observers noted that employee behaviors often were different during the first 10 minutes and the last 20 minutes of each observation sample. This may be because operators became accustomed to the presence of observers and reverted back to behavior considered normal and acceptable for the remainder of the observation period.

Since parks were forewarned about the study, the author concludes that most employee behaviors observed (management, supervisor and operator)—including at-risk behaviors—were considered normal and acceptable by operators and park management. In other words, employees thought they were performing their duties as instructed. Some behaviors were "forced" by existing physical or administrative systems, which are outside of the employee's control. Examples of such conditions or systems include control panel design, layout and orientation or position; loading dock blind spots; and physical limitations.

Observations of behaviors at smaller-sized children's rides revealed both safe and at-risk behavior extremes. Critical at-risk behaviors included leaving controls active and unattended during loading and unloading of riders, and not fully securing and checking lapbelts and doors. To reduce or eliminate some of these problems, control panels should be redesigned and procedures changed.

"Forced" at-risk behavior can be reduced by identifying system flaws and root causes that create them. Targeting root causes allows the treatment to be applied to the source rather than the symptom. The behavior sampling technique can be an effective means of discovering flaws in systems that need to be fixed or improved. ■

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