Improving Operational Integrity at Sea through Teamwork

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Abstract

This paper reviews a project conducted by a marine transportation company to move the companies sea-going culture from one based on strict specialization and command and control leadership to a high-involvement team culture. The project spanned seven years and involved multiple methodologies aimed at altering the culture. Initially the project began with team development in the company's executive and management cultures ashore and then moved off-shore into the fleets where culture modifying activities were conducted at sea on ships during normal operations. This paper outlines the culture change project and focuses in particular on the phase of the project in which organization development and team coaching professionals from Decision Dynamics and from the company's own staff sailed thousands of miles in the company's fleet of crude oil tankers. Data are presented that show a steep decline in accidents and incidents aboard involving injuries and damage to equipment and to the environment during the course of the project. Additional data are presented showing a significant increase in teamwork aboard the vessels and concurrent changes in the decision-making style profiles of crewmembers.

This paper was written just before the end of the culture change project. Hence, the text describes a project in process.

Shortly after the conclusion of the project, the company, the British energy company, BP, acquired the Atlantic Richfield Company (ARCO). As a consequence of the acquisition, the fleet and marine operations were sold to a U.S. petroleum products company authorized to sail a U.S. flagged fleet in domestic trade.

Improving Operational Integrity through Teamwork

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This paper describes a long-term project to develop high reliability teams at ARCO Marine, Inc., a subsidiary of Atlantic Richfield Company (known as ARCO). ARCO is one of the United States' largest industrial organizations with over 17 billion USD in revenues per year and assets of 25 billion USD. ARCO is headquartered in Los Angeles, and ARCO Marine (AMI) is headquartered in Long Beach, California.

The project has several very unique qualities as noted in Table 1. Among these is the project's use of state-of-the-art assessment to tools to assess team members' decision-making styles and to track progress on team behavior. In addition, the project is unusual in its long-term nature. The project is now in its seventh year and it has survived despite numerous changes in senior management personnel during this period both at AMI and AMI's parent company, Atlantic Richfield. AMI president, Jerry Aspland, who later became President of California Maritime Academy, initiated the project but departed from ARCO in the project's fourth year. Hershal Kohut succeeded him as AMI president. Upon his appointment as AMI president, Kohut announced his commitment to continue the teams program. Kohut and his staff have themselves participated twice in the project's current TeamView phase for the development of their own team.

Table 1
Building High Reliability Teams
Project History

Unique Qualities

- Use of state-of-the-art assessment tools to measure team members' decision styles and to track progress on team behavior.
- Long-term commitment to change
  - Program persisted for seven years, despite several major changes in senior management personnel
    Program has been implemented for shore-staff as well as in the fleet
- Mix of shore-side training and real time, shipboard development activities.

AMI's high-reliability team development project is the prime means by which ARCO Marine intends to remain a maritime industry leader in the area of operational integrity in its fleet. As Table 2 indicates, by "operational integrity" the company means achieving and maintaining consistently low levels

(approaching zero) of cargo spills and accidents causing injuries to personnel, damage to equipment, and harm to the environment.

Table 2

Building High Reliability Teams

Key Goals & Objectives

Achieve highest level possible of operational integrity through superior teamwork with these objectives:

- Zero Accidents
- Zero spills
- Zero injuries

Building high reliability teams in a tanker fleet poses a number of hefty challenges, owing to the nature of the maritime industry's culture. Table 3 summarizes several aspects of the culture that tend to impede teamwork.

Chief among the challenges is the traditional organizational structure aboard merchant vessels throughout the world. The structure is essentially that of a quasi-military organization with very clear demarcations of duties and responsibilities based on rank and function. Traditionally, the master of the vessel possesses absolute authority on a ship at sea. According to an old adage, the ship's captain is "master of all that he surveys." Although, this authority is less absolute in today's merchant marine than in the past, there still exists a very strict hierarchy of authority aboard merchant vessels.

Table 3

Background

- Quasi-military organizational structure
- Heavy reliance on hierarchical and autocratic control
- Strong “code of silence” preventing upward flow of information and constructive resolution of conflicts
- Roles & responsibilities strictly determined by function and rank
- Minimal interaction and cooperation across shipboard departments lines
- History of accidents occurring despite awareness and fore-knowledge of crewmembers

Moreover, actual tasks and responsibilities are fixed worldwide on most vessels according to one's job title. For instance, the ship's Chief Mate is responsible throughout the industry for cargo operations. The Second Mate is responsible for navigation. In the engine room, the Third Assistant Engineer is responsible for electrical equipment; on a steam ship the Second Assistant Engineer is responsible for the boilers. Moreover, watch-standing hours are determined by one's position. The Third Mate, and the Third Assistant Engineer stand the "8 to 12" watches; the Second Mate and the Second Assistant Engineer stand the "12 to 4" watches, and so on.

As a reflection of this strict structure, individuals on a ship often are addressed by their job titles instead of their given names. A ship's master is addressed as "Captain," virtually without exception. The Chief Mate is called, "Mate." The Chief Engineer is called, "Chief," and the First Assistant Engineer is addressed as "First." Consequently, individuals tend to be seen first and foremost as role occupants.

In the midst of this, it is not surprising perhaps that there unofficially exists a "code of silence" aboard merchant vessels, whereby individuals are cautious about speaking "out of turn," or in any way "unnecessarily." As we heard one of the more senior boatswains remark, "I was always told that leaving your mouth open was a good way to catch flies."

Traditionally, there is minimal interaction between the deck and engine departments on the vessel. The deck department handles navigation and cargo operations, as well as routine maintenance on the decks and superstructure. The engine department manages and maintains the propulsion and power systems. On most vessels, there exists a rather uneasy relationship between the departments. They deal with different parts of the ship, have different kinds of training, use different sets of skills, and (even though the captain is the master of the vessel) they report through different channels to the shore-side management of the shipping company.

The unofficial "code of silence" in conjunction with the rigid organizational structure is particularly troublesome from the standpoint of safe and reliable operations. Silence at the wrong moments can mean disaster.

The history of the maritime industry is studded with accounts of accidents both minor and serious that have occurred within plain sight and with the apparent foreknowledge of crewmembers that something was seriously amiss. In many instances, the only person who seemed to be unaware of an impending accident was the captain, or the most senior person on duty, who for various reasons missed the telltale signs of approaching disaster. In this kind of setting, accidents can easily occur merely because people do not see it as part of their responsibility to comment or question unusual circumstances that arise and which can foretell trouble, unless those circumstances fall directly and clearly within the scope of one's specific job duties. Further, raising questions about issues that fall within the scope of authority of a senior person can be viewed as verging on insubordinate conduct.

Table 4 lays out the project's conceptual foundation linking teamwork to safety and reliability. As the table shows, a key assumption is that moving to a team-based culture eliminates the main obstacles to safety and reliability that are inherent in a rigidly fixed organizational structure.

More specifically, the logic assumes that teamwork eliminates structural and cultural barriers to the flow of communication among the crew. Inasmuch as tasks are less likely to be fixed according to rank

and position, there is less chance that anyone will ignore problems on the premise that "someone else will notice them." By and large, crewmembers will be expected to assist and cooperate with each other across lines of rank and function. Moreover, task assignments can be assigned more freely on the basis of actual competencies of individuals rather than on the fixed responsibilities of positions, thereby bringing about a better alignment of people and work.

ARCO Marine's high reliability teams project is very much a multi-faceted, on-going and evolving effort. Table 5 shows a chronology of major milestones covered over the course of the project.

These milestones cover a mix of activities from shore-side training for individuals, shipboard departments and entire crews of permanently assigned personnel on each vessel, to real-time training and process consultation at sea.

The current phase of the project, on which the balance of this paper focuses, is described in Table 6. That it is taking place solely on the ships under normal working conditions is a key element of this phase. The activities revolve around the use of assessments for gaining insights into

Table 4

Operational Concepts

Teamwork promotes safety & reliability through:

- Substitution of cooperation for excessive reliance on rank and fixed roles and responsibilities
- Unimpeded flow of information within team
  - Vigilance unrestricted by roles and responsibilities
  - Quick attention to unusual, high-risk situations
  - Knowledge of team members' strong & weak points
  - Better match between people & tasks
  - Real-time feedback & development within the team
  - Fewer "blind spots" in team's performance capabilities

Table 5

Project History

Summary of Key Milestones

Initial planning	Year 1
Assessments and feedback for all masters' and chief engineers' behavioral styles, motives, and values	Years 2-3
Measurement of masters' & chiefs' perceptions of their roles and their job demands	Years 2-3
Stabilization of personnel for key positions on each vessel	Year 3
Outward Bound team training for masters & chiefs	Year 3
Basic team-training (ashore) for intact officer teams from each vessel	Years 4-5
Bridge Team Simulator training 1994	Year 5
Engine Room team simulator training	Year 6
On-board assessments of decision styles plus 360-degree assessments on each vessel	Year 5-7

oneself and into one's shipmates and, additionally, for training in giving and receiving behavioral feedback between teammates. The assessments also provide measures for tracking progress in advancing teamwork in the fleet.

For the On-Board Assessment phase, two-person or three-person teams of facilitators sail two to three times on each vessel. Each facilitator team sails on a voyage ranging from 5 to 10 days, depending on the route of the voyage. In the On Board Assessment Process, as this phase of the project is known, crewmembers each complete a pair of standardized questionnaires designed to assess their styles of decision-making. In addition, a 360 rating was conducted in which each team-member completes a self-evaluation on a broad spectrum of team behaviors, and also completes evaluations of selected other team-mates on the same behaviors.

Table 6

On-Board Assessment Phase

Shipboard Style Training
plus 360 degree Feedback

- **Decision Styles Training**
  Crew Members learn about individual differences in decision-making styles, get personal feedback, and share styles profiles
- 360 Degree Feedback
  Crewmembers evaluate themselves and each other on 31 key team behaviors
  - Each person gets personal feedback
  - Crew gives and receives feedback on evaluations through a Team Feedback exchange
  - People learn about how they are perceived and about how their styles affect perceived strengths and weaknesses
  - Team Feedback Exchange
    - Ship's crew receives real-time coaching in giving and receiving behavioral feedback constructively.

After the assessments have been completed and processed on the facilitators' laptop computers, each team-member receives a written, personal feedback report during an interview with a facilitator. A "team feedback exchange" follows the individual interview sessions. During the exchange, all participating crewmembers meet together to solicit and give feedback about

Figure 7

Shipboard Decision Style Training

Styleview™ Decision-Making Style Model

their style assessments and their TeamView ratings received from other crew members. Note that the actual ratings that a crewmember receives are treated as confidential. During the team feedback exchange, crewmembers are encouraged to solicit (and give to each other) information about the behaviors that others see that might account for ratings on particular behaviors.

Table 7 shows Decision Dynamics' Styleview™ decision style model that forms the basis for the decision styles assessment used in this project. The decision style model describes four fundamentally different styles of decision-making that differ from each other in terms of two dimensions of decision-making: information use (information "satisficers" vs. information "maximizers") and decision focus ("uni-focus" decision modes vs. "multi-focus" modes). The model assumes no "good" styles or "bad" styles; a style is good or bad only in relation to the situation in which it is used. Crossing the two dimensions yields a four-fold style classification as shown in Table 7.

Decision Styles and Team Behavior

Each cell in the table shown in Table 7 describes the behavioral characteristics of a particular decision style. Decision styles basically are habits of thinking that shift with the ebb and flow of pressures that people face and which can change fundamentally over the course of time.

In using this model in the AMI project, the main point we make is that in any group or team, and in any one situation, people are likely to differ from one another, often quite markedly, in their particular approaches to decision-making and problem-solving. In terms of team performance, this has noteworthy benefits in that most teams face situations that themselves vary in the demands that are placed on people in terms of information processing and decision-making. In other words, different situations require different decision styles.

Being creatures of habits, most people cannot easily adapt their styles to the demands of all situations. So, some people will perform best in particular kinds of situations while other people will perform best in quite different circumstances. For instance, situations calling for rapid decision-making under time pressure favor the more "satisficing styles" of Decisive or Flexible shown in Table 7. Situations calling for consistency and persistent pursuit of a particular course of action favor the more "uni-focused styles" of Hierarchic or Decisive. Consequently, in a team of mixed styles, there

almost invariably is one or more persons whose styles or habits best fit the requirements of the situation at hand.

This is a reasonable proposition that most people can readily appreciate - at least intellectually. The more difficult part is to get people to emotionally appreciate the behavior of teammates whose styles differ from their own. The natural, human inclination seems to be to view the behavior of people whose styles differ from one's own styles as confusing at best and, more likely, as obstructive -- *even when those other styles fit the demands of the immediate situation better than one's own styles.*

To make matters even more challenging, most people do not see their own styles clearly. Most people see themselves in terms of the styles they are most inclined to use when they are aware of being evaluated or observed by others. We call these "self-aware" styles, roles styles, as described in Table 8. However, there are many circumstances under which people are unaware of, or unconcerned about, being observed or evaluated. In these circumstances, people tend to use styles that fall into a category of behavior that we call operating style. Not uncommonly, a person's role style profile differs from that person's operating style profile. By "profile," we mean the relative percentages of time that a person uses the different styles. People differ not so much in *whether* they use a specific style, but in how *much of the time* they use a particular style. Figure 1 defines the role style and operating style distinction in more detail.

Table 8

Two Faces of Decision-Making Styles

Roles Styles

Styles used when people are watching themselves – attempting to behave as they believe they should behave.

Operating Style (or "natural style")

Styles used when people are not watching themselves and not thinking about how they should behave – when they are focusing on a task or situation.

To help people see their own styles more clearly and, in particular, to see how their styles are viewed by their teammates, we use the 360-degree, multi-rater system mentioned previously. Essentially, this system provides a means for people to gain insights into how other people view the stronger and weaker points of their style-related behavior.

The particular 360-degree rater system that we are using at ARCO is *TeamView/360™* from Consulting Tools. This system was designed by Kenneth Brousseau and Michael Perrault specifically to evaluate behaviors that should correlate with decision style profiles. The system produces evaluations of 31

behaviors grouped into the seven major factors or clusters shown in Figure 1. The screen shown in the figure is an actual image of the interactive, computer-based, graphic display that team members see when they receive their TeamView feedback. On the screen, different lines plot the person's self-evaluation and the person's evaluation by teammates. In addition, the "Your Team's Average" line shows the mean evaluation of team-members by other team-members on a sample team. All scores are standardized using a cross-industry, primarily U.S., sample of over 850 persons.

For example, looking at the figure, we see the self-evaluation and the evaluation-by-others plots for Paul Brone (fictitious name, but real person) we see that Paul's own self-image agrees quite closely to Paul's image in the eyes of his teammates. We can also see that Paul gets his highest ratings on the left-most factors dealing with the more analytic and task-oriented behaviors and receives his lower ratings in the more interpersonal factors on the right. Predictably, Paul's primary (most frequently used) role style and operating style is the focused, analytic, Hierarchic style.

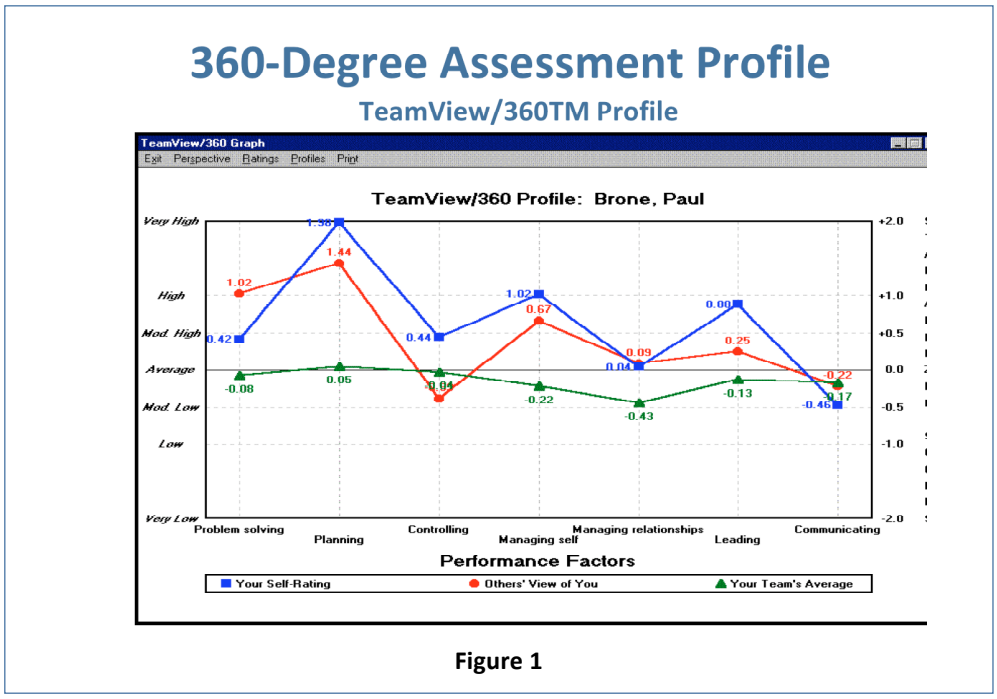


Figure 1

Progress and Outcomes

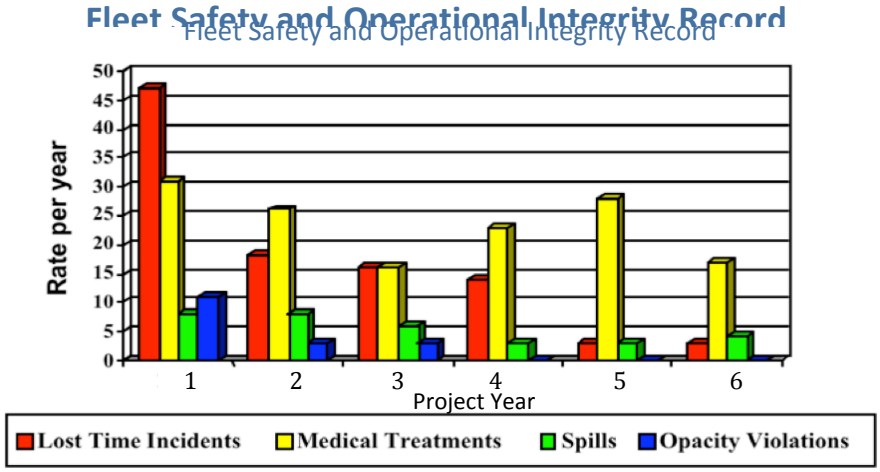
As mentioned earlier in this paper, the assessments used in the ARCO project serve dual purposes: providing insights into oneself and into ones' teammates; and providing metrics by which levels of teamwork in the fleet can be tracked. A mean shift from lower to higher TeamView scores over time would indicate that, at least in the eyes of personnel in the fleet, people are working more effectively as team-members. If the basic tenets on which the project is based - i.e., the operational concepts

shown in Figure 4 - are correct, then changes toward higher levels of safety and reliability should appear in other measures, too.

Gains in Safety and Operational Integrity

To evaluate progress, we started by examining progress on key indicators of operational integrity for evidence of improvement. Figure 2 shows data on several measures of safety and reliability in the ARCO fleet provided by Heidi Goebel, AMI Manager of Safety, Health and Environmental Protection. Goebel also is a certified TeamView facilitator and has sailed on a number of TeamView voyages as part of this project.

Figure 2



The data are presented as annual statistics from Year 1 through Year 6. The measures include lost-time incidents, medical treatments cases (for fleet injuries not resulting in lost time), cargo spills, and opacity violations (for smoke from vessel smokestacks). The data show declines over the 6-year period on every indicator. Lost-time incident rates stand out in particular as having declined sharply.

Figure 3

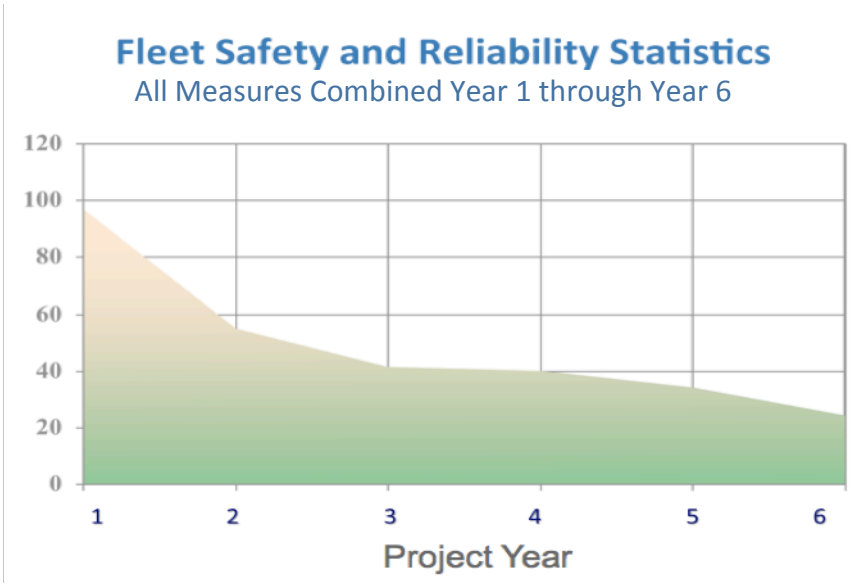


Figure 11 shows these same statistics summed into one overall safety and reliability index. Viewed in this way, the record shows an extraordinary

decline overall in accidents and incidents. Clearly, these data show very substantial progress toward achieving the company's key objective to maximize operational integrity.

Gains in teamwork

Having established that there have been major gains in operational integrity over the course of the ARCO Marine project, we now turn our attention to evidence indicating that levels of teamwork have increased in the fleet.

Unfortunately, we don't have direct measures of teamwork for the full period during which the project has been underway. The best available data are those generated by the TeamView/360 phase that began in early 1995. However, there are some less direct, more inferential data available that do cover the full span of the project, which we will discuss, also.

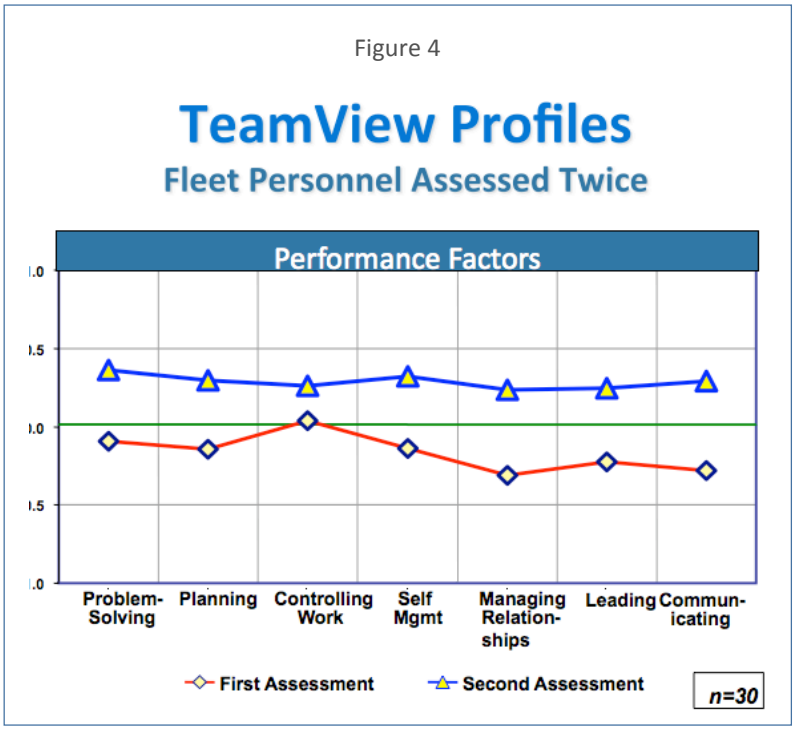
Over the course of the first two and one-half years of the On Board phase almost 160 fleet personnel participated in the assessment and team feedback process. Of these, 30 individuals were assessed twice on different occasions. If the improved operational integrity of the fleet in any way results from better teamwork in the fleet, then the TeamView profiles of persons participating in the TeamView process should show a clear shift toward higher TeamView ratings over time. In particular, individuals who have participated more than once in the process should receive improved evaluations from teammates, if the process is serving its purpose.

That is, if the TeamView process with its heavy emphasis on team feedback is working as intended, people should become more aware of their stronger and weaker points as teammates, *and* of the roots of those points in their personal styles. Armed with this awareness and knowledge, these people should be in a much stronger position to improve upon any behavioral factors that, as viewed by coworkers, are limiting their effectiveness as team players.

Figure 4 shows a graph of first and second TeamView assessments for the thirty fleet personnel who have been assessed twice in the TeamView program. In some cases, these individuals were evaluated both times by crewmembers on the same vessel; in other instances they were sailing on a different vessel with different personnel the second time they were evaluated.

The values plotted in the graph shown in the figure have been standardized using the scores of 160 fleet personnel as the normative base.

Figure 4



Looking at the plots we can see that, when first assessed, these 30 individuals received evaluations slightly lower than the fleet average, except on the Controlling Work factor (organizing and orchestrating events, monitoring and controlling performance, meeting deadlines and schedules, producing high quality work, maintaining high productivity, and meeting commitments). However, on the second time around, these same individuals now show scores that are quite noticeably above the fleet norm in every case. Statistical tests of differences between the first assessment scores and the second assessment scores indicate that the differences are all statistically significant. Clearly, in the eyes of their shipmates, these people have improved as team players. This, of course, is positive evidence of progress toward the company's objective of boosting teamwork throughout the fleet. And, these data fit consistently and as expected with the data showing sharply improved performance on measures of safety and reliability. Of course, the gains in operational integrity shown in Figures 2 and 3 cover the full period 1991 through 1996. So, they cannot be attributed all to the observed gains in teamwork shown in Figure 4 that cover only 1995 through early 1997. However, the likelihood is that levels of teamwork are improving throughout the fleet because of the TeamView process and the varied other elements of ARCO's team project.

Comparing the two plots for the first and second assessments, we can see that not only does the second assessment reflect higher evaluations by teammates overall, but also a more *balanced* evaluation across the seven major TeamView factors. The first assessment, in contrast, is not only lower but is less even. The highest evaluations on the first assessment were on the Controlling Work factor, and the lowest evaluations were on the Managing Relationships factor. This seems to say that

initially, and quite likely in the past, crewmembers made their greatest investment of effort in task accomplishment and correspondingly less in working effectively with shipmates. After their first encounter with the TeamView process, and the abundant feedback they received through that process about their styles and behaviors, these individuals improved most in the eyes of their shipmates on the relationship factor. Significantly, however, they were seen also as more effective than before on the Controlling Work factor. In other words, they apparently did not sacrifice their effectiveness in task performance in the interests of improving their relationships with teammates.

The Team Player: Not just another "nice guy?"

This last point seems very important. In putting so much emphasis on teamwork, fleet personnel could have concluded that relationships were now more important than task performance and that the chief priority was mainly to be seen as a "nice guy" (or "nice gal"). However, what we seem to be seeing in the ARCO Marine project is that being viewed as a good teammate encompasses effectiveness in task performance as well as managing effectively one's relationships with teammates. Being a team player does not mean doing less effectively in any category in order to do better in another; instead it means doing better across a full spectrum of behaviors.

Now, the question becomes this: what is it that the best team players do differently from those who are seen as least effective? If, as we have assumed, evaluations by one's teammates reflect how one's styles are perceived, how do those who are seen as the best teammates differ stylistically from those who are viewed as less effective as teammates? Stylistically, what is the formula for success in teamwork? What is the formula for failure?

With the extensive data on decision styles and 360-degreee team behavior ratings that we have collected in the fleet, these are questions on which we are now in a position to shed some light, and to which we now turn our full attention. To gain the clearest insights into these questions, we first identified the "best" and the "least best" team players in the fleet, as indicated by TeamView evaluations. For each person in the database we calculated a single team behavior index consisting of the arithmetic average of that person's scores on the total set of 31 TeamView behaviors. Then, based on this index we identified the "best" group as those in the top 20 percent of the fleet distribution on

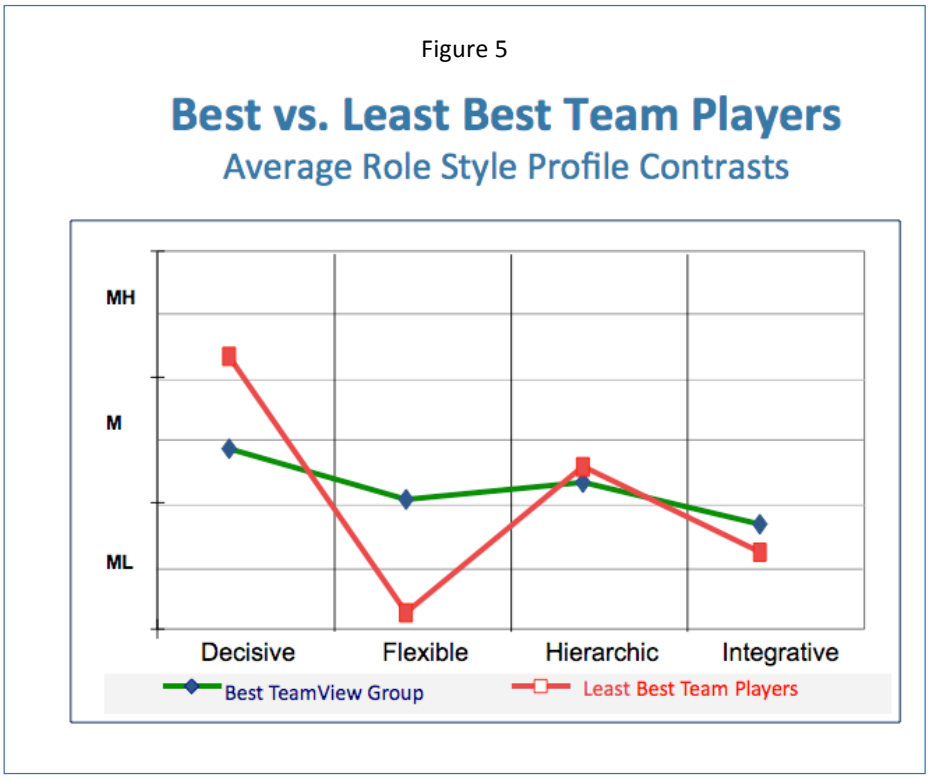
this index. Correspondingly, the "least best" group was identified as those in the lowest 20 percent on the TeamView summary index. The TeamView profiles for the two groups are shown in Figure 13.

Comparing the Best and the Least Best Team Players

To compare decision style profiles of the Best and the Least Best groups, we first calculated mean scores for each group separately on the four basic role styles. This comparison is shown in Figure 5. As can be seen the profiles differ noticeably. The satisficing, action-oriented and focused, Decisive role style is lower in the Best group than in the Least Best group, whereas the satisficing, action-oriented, but multi-focused, Flexible role style is higher in the Best group. Statistical tests show these differences to be quite stable. The two groups clearly do not differ on the maximizing, Hierarchic and Integrative styles.

As it turns out, however, the more interesting and important factor differentiating the two groups stylistically may have less to do with any one or two particular styles than it does the overall shape of the two profiles. Clearly, the profile of the Least Best group is more jagged than the Best group's profile; there are more highs and lows in the Least Best group's profile.

Figure 5



The implication of this difference is that the individuals in the Least Best group are *less style-adaptive* than are the individuals in the Best group. That is, compared to individuals in the Best group, those in the Least Best group have stronger style habits. They appear to be more attached to specific styles

and less comfortable with others. In contrast, the Best group seems less attached to, and less uncomfortable with, any particular style. This is apparent in the comparatively flat and moderate style profile of the Best group.

In our parlance, people with flat, moderate role style profiles have a "style-adaptive" profile. People with style-adaptive role styles are more likely to shift their styles from one situation to another. In particular, inasmuch as we are talking about role styles, they should be able to shift their styles when dealing with different people. Because they are less attached to any one style, compared to people with less adaptive profiles, they are likely to be more comfortable with people of varied styles and other characteristics. So to speak, their “diversity tolerance” is greater than that of people with profiles similar to the Least Best group.

Figure 6 shows the mean role and operating style profiles for the Best group, and Figure 16 shows the mean role and operating style profiles for the Least Best group. First, comparing the two charts, we see that the operating style profiles for the two groups appear to differ less than do their role style profiles. Still, the operating style profile of the Least Best group shows a slightly greater difference between the highest score (Integrative) and the lowest score (Decisive) than the Best profile shows between its highest score (Integrative) and its lowest score (Flexible).

Figure 6

Contrasting Best and Least Best Team Player Profiles

However, the difference between the two groups that catches the eye is the greater disparity between role and operating styles of the Least Best group than between the role and operating styles of the Best group. Comparatively, the Least Best group is a study in contrasts. The group's *highest* role style (Decisive) is the group's *lowest* operating style. Further, the group's highest operating style

(Integrative) is the specific style that *differs most* from the group's primary Decisive role style. That is, Decisive and Integrative styles differ both on information use and on solution focus. To the extent that these divergent role and operating styles are characteristic of individuals in the Least Best group, we would expect to see greatly different behavior when the individuals are in their primary role style mode than when they are in their primary operating style mode.

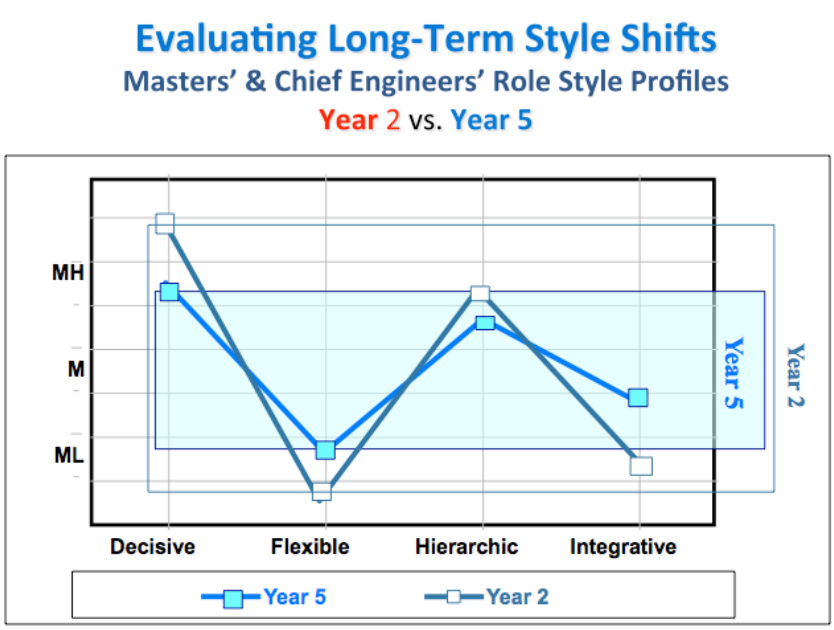
During the course of this project, when we have worked with people whose profiles follow the particular pattern in Figure 16 - strong, uni-focused role styles, contrasted with strong multi-focused operating styles - we have found behavioral descriptions from teammates to reflect some predictable themes. "You never know what to expect, one minute he is argumentative and intimidating and another minute he's the nicest guy," is a typical comment. Another is, "He seems really unapproachable and hard-nosed, but when you get to know him, you find he's really a big teddy bear." Or, "She takes these incredibly strong positions on things one day and then comes right back the next day and completely contradicts herself."

Longer-term style shifts in the fleet

So far, the analyses that we have presented regarding TeamView profiles and decision style profiles in the fleet cover just the past two and one-half years. What about the longer-term trends in teamwork and styles over the course of the project's nearly seven-year history? If adaptive style profiles are an essential key to teamwork, as our data seem so clearly to suggest, then we might ask, "Have style profiles in the fleet become any more adaptive over the past six years or so?"

Although, our data are not as complete as we would like for the full period, we do have some archival data on style profiles that can be brought to bear to shed some light on this question.

Figure 7



These data are summarized in Figure 7. The plots shown in the figure contrast the role style profiles of 32 masters and chief engineers whose styles were assessed shortly after the teams project began and then again roughly three and one-half years later. Looking at the plots, it is fairly easy to see that both plots are for the same people. However, the profiles, while following the same basic pattern, are not identical. On closer inspection, we can see that the 1992 profile is decidedly less adaptive than is the 1995 profile for the same people. As the distance indicators on the right of the plots show, the distance between the highest and lowest profiles in the 1995 is just slightly over one-half that of the distance between the highest and lowest styles in the 1992 profile. The 1995 profile clearly is a more adaptive profile, although not as much so as for the Best group shown in Figure 5. But, the trend is clearly toward style moderation and style adaptability.

General Implications for Team Behavior

We believe that our findings in the ARCO Marine team-development project have implications for teams working in other settings and in other industries. A subsequent and, as yet, unpublished analysis of a larger, cross-industry data-base containing data collected by Decision Dynamics Group on decision styles and TeamView evaluations revealed fundamentally the same findings as we have reported here. That is, people with style-adaptive profiles receive the best overall evaluations from their teammates. People who receive the lowest evaluations appear to have non-adaptive profiles and, in particular, have divergent role and operating styles combining primary uni-focused role styles with multi-focused operating styles.

These kinds of findings can help greatly to remove the mystery about what it takes to be viewed as a value-added team player. People who can appreciate style differences and adapt their own styles will be better able to handle the complexity of team-oriented work environments. Teams bring different kinds of people together. Individuals with style-adaptive profiles will be comfortable dealing with a diverse mix of styles and other personal qualities. They will not be inclined to deal with everyone in exactly the same way. Instead, they are more likely to be able to deal with individuals one-by-one in a mode that those other individuals are likely to understand and appreciate.

Beyond handling the interpersonal complexities of team environments, individuals capable of shifting their modes of decision-making should also be better suited for handling the greater task diversity that one is likely to encounter in team environments. That is, to the extent that tasks as less determined by job titles and fixed assignments, team environments expose people to a broader array of situations and task opportunities. Those individuals who can shift their styles are more likely to be able to shift appropriately their way of thinking and behaving as they move from one situation to another.

Importantly, our findings indicate that people can modify their style profiles toward greater behavioral adaptability as a result of long-term team training and team development activities. We think this is important because in some organizations we have heard the belief expressed that “people do not change.” “You are either a team player or you're not," is the point of view. Yet, our data seem to indicate convincingly that people can and do modify their styles. And, when their styles shift toward greater behavioral adaptability, coworkers view them as improved across a broad spectrum of behavior.

Perhaps, most importantly, we believe that the data we have reported about safety and reliability trends, together with data on decision styles and 360-degree evaluations, indicate clearly that a significant, long-term investment in team development can yield very worthwhile returns on investment for an organization. This should be particularly true in organizations where performance mishaps and breakdowns have major negative consequences. Crude oil shipping qualifies easily in this regard: a single oil spill can cause tremendous environmental damage, disruptions of lives, and can cost billions of dollars.

However, many other industries face similar risks. Nuclear power, chemical processing, refineries, and airlines are examples. Most of these industries involve continuous operations involving a relatively small number of people managing highly complex technologies. Fortunately, things do not go terribly wrong often. But, when they do - for instance, at Chernobyl and Bhopal - the consequences can be catastrophic. Our findings suggest that in these, and in many other less dramatic circumstances, a concerted, long-term effort to train and develop teams can yield dramatic changes with tremendous benefits.

About the Authors

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Kenneth R. Brousseau is cofounder and Managing Partner of Decision Dynamics LLC, a firm specializing in behavior profiling and human resource systems design. Dr. Brousseau received his Ph.D. in organizational behavior from Yale University. Prior to co-founding Decision Dynamics, he was a on the faculty in the Management and Organization department at the Graduate School of Business Administration, University of Southern California

Dr. Brousseau is the author of numerous articles on work system design, group performance, career development, and organizational design which have appeared in the *Journal of Applied Psychology*, *Harvard Business Review, Organizational Behavior and Human Performance*, the *Academy of Management Review*, the *Academy of Management Executive*, and the *Journal of Organizational Change Management*. He is the co-author of *The Dynamic Decision Maker* (Jossey Bass, 1993). Dr. Brousseau has consulted for a variety of public and private organizations, such as NASA, ARCO, Educational Testing Service, Federal Aviation Administration, Johnson & Johnson, Eli Lilly, Northern Telecom, United Parcel Service, The Aerospace Corporation, and Rockwell International. Dr. Brousseau's current interests focus on career management systems, and automation of behavior measurement systems.

John L. Sullivan

During this project, John Sullivan is Vice President of Engineering for ARCO Marine, Inc., a subsidiary of Atlantic Richfield Company. ARCO operates a fleet of 9 supertankers transporting crude oil and petroleum products primarily in the Pacific Ocean and the Gulf of Mexico. John holds a Bachelors degree in Engineering from the New York Maritime Academy and a Masters of Business Administration degree from California State University at Long Beach.

John has played many roles in the marine industry. In his early career, he sailed as an engineer in Mobil Oil Corporation's fleet. At ARCO he has served variously as Vice President of Engineering and as Vice President of Operations, and in both roles simultaneously. During the last eight years, John has played a leading role in ARCO Marine's effort to plan and to develop high involvement teams at sea and in its shore-side operations.

Recently John and his team have completed design and contracting for the first replacement tankers in the U.S. Alaskan North Slope oil trade. These new, "millennium class" vessels incorporate many innovative features intended to support and promote high performance teamwork at sea and superior operational integrity.