

# Questions for Layout Designers, Operators, Visitors, and Builders

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Many model railroaders find state-of-the-art layout design to be one of the most difficult or intimidating aspects of our hobby. Ways to design successful and satisfying layouts have not been thoroughly covered in magazine articles and books, despite the many track plans and photogenic layouts that have been featured.

The following questions can be useful for layout designers in several ways. You can answer the questions yourself, to clarify your own design goals, serve as a partial checklist of planning considerations, and determine where you want help. The questions can be discussed informally among friends and club members, to draw out their reflections, knowledge, and opinions. One of the most fruitful, rewarding, and informative applications of these questions is the panel discussion at conventions and organization meetings, where experienced designers and observant layout visitors can express their views.

Look over these questions, noting which ones interest you most and how you'd answer them. Write down original questions which are not included, especially those that might interest other hobbyists. Share your ideas with me and with others. Discuss your reactions to the concept of the forum discussion, as well as ways to improve their relevance and presentation.

## 1. The Scope of Layout Design

Some hobbyists think that layout design consists just of track planning. Others take a more comprehensive perspective about layout design that includes concepts, operation, scenery, equipment rosters, graphics, human factors, and other topics. What is your vision of future layout design? Is everything to be included or are some aspects of the hobby irrelevant for consideration during layout design? Which of the elements of layout design warrant the earliest attention?

## 2. Appealing Layouts

What descriptions of layout concepts and design features attract you to visit new layouts? What layout attributes influence your desires to return to layouts you've seen?

## 3. Memorable Layout Images

What are your most memorable "quintessential" images of layout scenes and operations you've seen? What are their implications for layout designers? What were examples of classy railroading or artistic composition? What favorite scenes of your own layout designs might others consider replicating?

#### 4. Ideas for Small Spaces

What scales, concepts, and design features appeal most to you for a small space layout? Why? How would these factors differ if your small layout was to be portable? short-lived? or last a lifetime?

What is the role of staging or "fiddle" trackage on small layouts?

What advice do you have for people who want to model in a large scale but have a small space?

#### 5. Design Mistakes

- (a) What mistakes and regrets have layout builders mentioned most often about their own layouts?
- (b) What "mistakes" do you see most often, even among recently designed layouts built by people who apparently attempted to avoid mistakes? (Be careful to consider people's own goals when determining "mistakes"; for example, insufficient or inaccessible staging trackage for desired traffic patterns.)
- (c) What are your own pet peeves about layout design? What features are unfortunately or inappropriately included on layouts? What desirable and feasible features often seem regrettably missing from layouts?
- (d) If you knew at the start of your last layout what you now know about satisfying layout design (assuming you had the same goals), what would you do differently? What, if any, mistakes did you make? What advice would you offer a fellow hobbyist who shares your layout goals?

#### 6. Layout Designers as Playwrights

Frank Ellison introduced the almost-trite analogy of model railroading as a form of theater--with the tracks as the stage, the buildings and scenery as the setting, the trains as the actors, and the operating schedule as the plot. Refining this idea, might the sophisticated layout designer of the future be akin to the playwright who now develops dramatic themes and messages, chooses appropriate characters/settings/actions, and melds them into a memorable script? Aren't the most satisfying and long-lived layouts the ones with the most credible or touching vignettes that generate such feelings as nostalgia, *deja vu*, excitement, or power?

If playwrights are analogous to layout designers, what distinguishes the writer of a grade school play from the one that wins the Tony award for best Broadway show--within the realm of our hobby? How do types of plays such as the burlesque, the soap opera, the docu-drama, and others have parallels among the contemporary approaches to layout design? Who are the most notable playwrights of our hobby and why? To what aspects of your own theatrical style do you credit the popularity of your layout design within the hobby?

7. Distilling The Essence Of Your Current Layout Vision

If you had limited space, time, money, and colleagues to build and operate a new layout with the same goals and scale as your current layout, what concepts and design features might you include on it and around it? Which section(s) of your existing layout might you be tempted to salvage and why?

8. Plausible Freelancing

How can designers of freelanced layouts develop plausible concepts and other layout elements that seem to fit together, creating a layout with a distinctive, yet realistic and appealing personality? What are the key trackage, schematic, and traffic features of prototype railroads that must be systematically addressed to determine the essential character of a believable freelanced railroad?

9. Novel Concepts for Prototype Freelancing

What are some of the exciting concepts for prototype freelancing by future layout designers? For example, what about modeling -- abandoned railroads like the O&W or the CM as though they never stopped operations? planned prototype railroads that were never built, like the South Penn? planned prototype mergers that never were achieved or backdated versions of railroads that actually merged (Conrail, circa 1925)? a progressive railroad that adopted John Kneiling's management and labor ideas?

10. Creating Moods and Atmosphere

What are the design approaches and features that help create effective moods and credible prototype atmosphere, especially for freelanced layouts and sites that require considerable selective compression? What designer judgements distinguish a mere collection of well-crafted models from carefully composed and operated vignettes that have an illusive quality of the real world?

How important is night-time lighting to achieve realistic operating sessions? How can practical problems of reading car lettering and numbers be overcome?

How have you experienced realistic background and loco sounds introduced into layouts? What are their design implications?

11. Importance of Naming and Vocabulary

One of the distinguishing attributes of credible layouts are the names of almost all railroad locations, industries, street crossings, scenic features, trains, etc. Even the use of prototypical labels like "eastbound main", "drill track", "secondary track", "subdivision or district", or "cutoff" seem to add realism.

How important in layout design is the assignment of names and the use of railroaders' vocabulary? What are the principles for selecting appropriate names and what are the sources of names that enhance a layout's character? At what stage of design do you recommend naming things? What

mistakes do even well-intentioned hobbyists make when naming things? (For example, naming key interchange and connecting railroads freelanced names instead of prototypical ones that reinforce the home road's locale, era, traffic, and corporate affiliations?) How can subtle humor be introduced when naming things so that it is not tiresome or hokey over the long run?

12. Trends in Prototype Modeling Applied to Layout Design

What do you foresee for the evolution of layouts based on prototype modeling over the next 10-15 years? What progress and innovations have emerged in the selection and portrayal of actual railroad schematics, scenes, and operations? What approaches do you recommend for extracting the essence of the prototype into modest layout spaces?

13. Sources of Prototype Information

What sources of information seem most worthwhile? Emphasize sources that seldom get appropriate publicity in the model press. (Consider possibilities such as the use of prototype track charts for selectively compressed curve and grade profiles, industry directories to determine the **mix** of shippers, engineering information to determining bridge choices and designs, and air photo/Sandborn/Valuation maps for scenery and industrial trackage ideas.)

What are some of the problems of prototype-based layout design and what solutions have you found to address them? What do you do when historical society publications and available books are inadequate? How can prototype modelers acquire copies of rare railroad documents? What advice do you have for hobbyists who are interested in prototypes of bygone eras or distant locations who cannot directly observe their favorite railroads' operations, rolling stock, and facilities?

14. Popular Bantam Weight Railroads and Modern Short Lines

What increased popularity do you anticipate for layouts patterned after the many less-well-known railroad lines that have modelgenic scenes, traffic, and rosters that could be fairly accurately portrayed? Distinguish among secondary trackage of major carriers, "bantam weight" railroads 100-500 miles long, and short lines. Cite examples of existing or planned layouts, describing something about their concepts and unique track plan arrangements, as well as any other features that might have broad audience appeal.

15. Coverage of Prototype-Based Layouts

How would you describe the layouts have you seen or heard about that actually reflected thoughtful and original research about prototypes and effectively conveyed these railroads' personalities to viewers and operators?

What can we do to persuade hobby magazines devoted to fine-scale railroad modeling to cover prototype-based model layouts, track plans, and discussions of how such plans are developed? How can we get railfan and historical societies to include modelgenic prototype trackage arrangements and describe common prototypical operations, their evolution, and variations among railroads and eras? Are there any prototype SIGs or historical societies beside the Frisco whose membership

publication for hobbyists has any coverage of layouts built by their members?

16. Traffic Planning and Layout Design

What trends in more realistic operation have track planning implications? How specific should particular preferred traffic be identified -- before track planning begins?

As operation becomes more sophisticated, special trackage to handle certain movements could become an added aspect of layout design. Layouts that simulate busy, bridge traffic railroads are growing in popularity, yet more layout owners want to run a train over the line just once (whereas in the past, the same train might recycle several times); this implies a need for more staging tracks and perhaps less need for continuous track connections. More hobbyists seem to like the appearance of longer trains, requiring longer sidings and yard tracks to handle them. Increasing numbers of operators want longer main line runs and resort to multideck benchwork, shallow (12-18" deep) benchwork, and "comeback again" (single helix) designs between towns. The ends of some big shippers' spurs have been hidden to generate multi-car blocks of traffic while not making the layout look too cluttered with track and cars. Other examples of how operation desires imply track elements include a scale track (for simulating tonnage considerations), a double-ended siding for efficiently icing hotshot reefer trains or spotting and picking up milk cars, double-tracking and extra helper pockets for busy mountain grades, and a wye to turn 1950's-era piggyback flats and other single-ended freight cars.

17. Future Staging Track Design

The importance of staging tracks to convey "beyond the benchwork" connections with unmodeled areas is slowly gaining broad acceptance, at least by designers of moderate and large size layouts. Whereas a plan of the 1970s might have had 3 hidden staging loop tracks and repeated train appearances in an operating session, modern plans might include a dozen or more stub-ended tracks and trains that make just one passage over a layout. Today's operation-oriented layout owners have begun to realize that you almost can't have too many staging tracks if you want to represent main line bridge or terminal traffic.

What lessons have you learned about staging track design?

What notably clever or poor staging track configurations have you seen? What are your views about including (hidden) connecting tracks or turnaround facilities, if possible, to facilitate the preparation of trains for subsequent operating sessions?

What neglected aspects of staging track management (such as hidden train identification, freight car routing reassignments and reblocking, or equipment-handling) remain to be considered by designers?

What is the importance of staging tracks for small layouts, even island-types, and how can they be included?

How can hobbyists add staging tracks to an existing layout?

What are the other frontiers of planning future staging trackage arrangements? Consider such approaches as "stagehand" fiddle yards where trains are made up and equipment added or removed during operating sessions, either by hand or loco switching; train-length traversers, turntables, and removable fiddle yards; staging track modules used just during operating sessions; vertical staging; and visible staging yard throats.

#### 18. Small Layout Design for Locomotive Lovers

Many hobbyists enjoy locomotive acquisition, detailing, decorating, and display. The July 1985 MR featured an imaginative small layout just consisting of a large division point engine terminal and hidden staging tracks to hold incoming and outgoing locos.

What are the appeals of this approach, for yourself and the hobby generally? How might you go about planning such a layout? How would you integrate the track planning elements with railroad concepts, operation and traffic planning, model photography, or other preferred aspects of the hobby?

#### 19. Design Implications of Realistic Way Freight Operations

Current layout designs are still heavily influenced by widespread notions that "realistic operation" focuses on way freight switching with its time-consuming maneuverings on complex "Timesaver" or puzzle-type industrial trackage. The resulting track plans have many long spurs, short switching leads and tail tracks, short runaround tracks, and other obstacles to challenge the train crews. Many diverse industries are crowded together, sometimes using structures that are much too small to be rail shippers. In addition, designers contrive to have sets of modeled industries that send most freight cars on unrealistically short intra-line moves, instead of routing such traffic to distant, unmodeled points.

How can way freight trackage and industries be chosen and modeled more credibly? What realistic track arrangements, clearance routings, and other features can be included for prototypical operating interest?

#### 20. Implications of More Emphasis on Other Operations

What are your views of way freight train operations in the context of the full array of interesting, modelgenic traffic? Highlight the track planning implications of more emphasis on other types of trains. What are the design implications for appropriate industry portrayal?

#### 21. Designing to Minimize Operating Stress

What new or improved steps can layout designers take to reduce or avoid undue stresses on future operators? Build on past advice such as adopting simple track schematics and alignments, minimal hidden track, wide aisles and walkaround benchwork, "sincere/linear" designs, simple carrier/computer/other control systems, and labeled names or numbers for many key layout places, scenic features, trackage, and trains.

## 22. Space for Off-Duty Operators

When and why is it important for designers to consider ways to accommodate off-duty operating crews? What facilities and space arrangements have worked out well or poorly? What suggestions do you offer someone with limited crew space in his or her layout boundaries? What approaches might be considered concerning the handling of occasional guests?

## 23. Layout Design To Reflect Railfan Perspectives

Many hobbyists appear to prefer the perspective of a railfan whose prime source of layout pleasure is trackside train-watching; for this group, acting as dispatcher, road engineer, or switch crew holds little appeal. Thirty years ago, John Armstrong suggested layouts for this group with track schematics for continuous operation and lots of space for scenery. Since then, train-watching has grown in popularity and sophistication, yet layouts of many train watchers almost never intentionally or successfully recreate favorite scenes or prototypical perspectives.

What further layout design advice would you offer to railfan hobbyists if they want to maximize their train-watching enjoyment? How might layout design reflect other railfan perspectives, e.g. tower operators, artists, loco restorers and photographers, or mileage freaks? How can they avoid getting bored with railfan theme layouts as the years pass?

## 24. Layout Design for Realistic Photography

In the future, more hobbyists might want to take appealing (and realistic) photo and video shots of their layouts, not just sunlit portable dioramas.

What aesthetic and practical advice do you have for designers who want to make their layouts as photogenic and photographable as possible, while considering the likely limitations of indoor photography, such as narrow aisles and benchwork, table edges, poor ventilation for lighting, low ceilings and other typical restraints? Do we need to learn more about object selection and composition, lighting angles and color rendering, forced perspective, and other matters, in order to design layouts that photograph superbly?

## 25. Track Alignment Aesthetics and Superelevated Curves

Until recently, designers seemed preoccupied with fitting in as much trackage as possible into a given space, ignoring the beauties of trackage with prototypical, often curvilinear alignments. There seems too relatively little balancing of space limitations with more attention to appropriate right-of-way aesthetics such as high numbered main line turnouts, cosmetic curves in yard and industrial areas, and superelevated curves. Designers of layouts with hand laid track rarely consider the use of turnouts with curved points and frogs that look graceful, instead of conventional Number 4/6/8 turnouts that have a much shorter curve arc in their lead rails.

What are your recommendations about space/aesthetic tradeoffs? How can layout designers create trackage configurations that really look prototypical? Share some impressions of exemplary layouts that sacrificed some siding or yard capacity or locational flexibility in order to capture the appearance

of real railroads. Describe situations when straight track is more aesthetically appropriate than curved track (e.g. when modeling Midwest railroads).

Discuss the visual importance of banked curves. What kinds of railroads and trackage were not superelevated? How much superelevation is needed to be noticeable on a layout? What track configurations should generally be avoided on modeled banked curves -- for example, crossings, crossovers, and diverging junction routes? Conversely, what images of superelevation would be neat to include, if appropriate -- a broad "S" curve, a multitrack main line, or a main line and concentric pass sidings. What design features can help achieve reliable modeled operation over them, even with long-wheelbase locos and cars on relatively sharp curves -- for example, smooth horizontal and vertical easements? What recommended construction techniques do you recommend for achieving superelevation?

26. The future of very large and very small scale layouts

What do you foresee or encourage for the development of future layouts in Z, N, 0, or larger scales?

27. Multi-deck Layout Design, Benchwork Heights, and Duckunders

Benchwork height has become a more critical design choice in recent years. As more layout operators seek realistic viewing perspectives for their train watching, recommended track height above the layout room floor has gradually increased from a popular level of 30-36" in the 1940s, to 42-46" during the 1970s, to 50-58" in the 1980's. However, more hobbyists want to take better advantage of the full volume of their layout room by stacking several decks of benchwork one above the other; such multi-deck layouts provide space for longer main lines, prototypical track configurations, and realistic scenery. In addition, layout designers are increasingly aiming for walkaround benchwork shapes that have no duckunders for train operators (or lots of underside clearance height if duckunder benchwork appears to be a necessary compromise to achieve other design goals).

What benchwork height do you recommend for single-deck layouts? How should a designer determine a suitable range of track elevations? How successful are layouts where operators sit on rolling chairs rather than stand? What design approaches permit high benchwork for realistic viewing, yet allow operators visual and physical access to track and rolling stock during switching maneuvers?

What are your opinions and forecasts about future multideck layout design? What issues should designers consider, such as minimum lower level benchwork height, good access, minimal hidden track, vertical separation distance between benchwork decks, multiyear phased construction sequences, maintenance, staggered crew standing locations, or adequate clearances for photography? What about three or more decks, upper-level staging tracks suspended over aisleways from ceilings, very low benchwork levels for scenic routes or added staging, complex benchwork with varying floor heights, or aisles covered by tracks or scenery that are visible from elsewhere within the layout room?

When might duckunder designs be considered for contemporary track plans -- for operators of yards

and branch lines? for local switching where crews will be work for a relatively long time during an operating session? when benchwork height and depth makes ducking under relatively easy? to provide short cuts for layout builders and operators, under serpentine peninsulas that wrap around a layout room? What ideas for moveable benchwork have you seen that can substitute for duckunders, are dimensionally stable, and easy to build?

## 28. Future Modular Design

What do you see as promising trends in modular designs? What are the pitfalls? Can you foresee a day when large modular layouts will be assembled for realistic (as contrasted to display) operation?

Consider the variations of modular layout design:

- (a) a set of stored benchwork elements a layout owner erects for home operation;
- (b) a large layout built in modules that the builder intends to assemble or salvage for a future permanent layout location;
- (c) large modular layout sections that are initially built at a convenient location or elevation, then relocated within a layout room as the railroad expanded horizontally or vertically;
- (d) NTRAK or other modules with interchangeable design features that can be assembled in an ad hoc arrangement for continuous display operation;
- (e) unique modules built by individuals or club members that are assembled to portray coherent prototypes' facilities and realistic operations for other experienced hobbyists; and
- (f) layouts that incorporate some modular elements plus permanent benchwork, so that modules might serve as outdoor photo props or be pooled with other hobbyists' modules for occasional composite operations.

## 29. Limits on Maximum Layout Size

Can a home or club layout be too big? How should a designer assess the practical or operating constraints that should limit layout size or complexity? What design steps can minimize future maintenance and operating problems? How important is a design that can be built and function well in several phases, in case the overall plan turns out too ambitious or costly?

## 30. Scenery and Structure Planning

How and when should designers consider scenery and structures in the early stages' of layout planning? What are the frontiers of future scenery design? For example, consider the artistic choice and selective compression of entire prototype scenic vignettes, generic terrain that typifies many locations within the U.S. or a region of the country, scenery that slopes down going away from the viewing aisle, more scenery depth or height that dominates railroad right-of-way, more shallow scenery that permits new benchwork configurations and longer mainlines, backdrops that extend

toward aisle ways to form view block partitions between adjacent scenes, removable/flexible aisle-edge scenery.

What are the frontiers of structure modeling? How should designers choose structures for a layout? Consider much more emphasis on prototypical, regional, common, and historically significant structures (rather than freelanced, fanciful buildings that do not reflect real world architecture, construction practices, and building sizes and shapes). What about interchangeable building bases (to permit locale or industry changes), foreground cutaway structures (that allow realistic, eye-level views of the railroad beyond open doors and windows), forced-perspective buildings, impressively large or tall buildings, or structures whose opposite sides represent different buildings when viewed from separated perspectives such as opposite sides of a peninsula?

### 31. Showing History and the Future

At any moment, a railroad and its towns, industries, landscapes, rolling stock, and other features include a mix of elements from the past and present, with some visible indications of plant, equipment, and other clues of the future. Track alignments, structures in various states of construction/ re-use/abandonment, and the types and sizes of vegetation are just some of the familiar clues that tell us what has happened and will happen.

Describe the ways that you have seen this concept convincingly modeled on layouts. Discuss the value and added credibility of a layout that includes prototypical traces of bygone days and offers viewers a sense of what's coming in the next few years. How would you recommend that designers portray the evolutionary nature of right-of-way appearance and other layout features? What particular aspects of layout design can express a railroad's history more clearly or with appealing vignettes? When fabricating a plausible history for a freelanced railroad, shouldn't the designer focus on those aspects for which clear evidence could still be shown on the layout, in its operations, or in layout room displays? (For example, the inclusion of an access road along a stretch of 1980's trackage or a large concrete coaling tower suited for the former heyday of steam.)

### 32. Layouts To Show More Than One Era

How might imaginative layout designers consider ways to build layouts so that rolling stock of more than one era can be shown in realistic settings? For example, two clubs have carefully chosen time-generic trackage, structures, and scenery for their timeless qualities that spanned several decades, so that simple roster changes could allow different eras' operating sessions. Other hobbyists have proposed layouts with some removable scenery and structures, to permit interchangeable elements to be substituted to sharpen a viewer's image of the owner's intended era at a particular time. At least one fellow is building two unconnected layouts of different eras, one located 24" above the other. Another's layout room has 5 separate layouts of different seasons and eras, separated by backdrop partitions and contrasting overhead lighting to visually separate one railroad's scenes from those of its adjacent neighbors.

What explains the growing interest in multi-era layout design? What advice do you have for people who'd like to consider this idea further? Have you seen any other noteworthy approaches to multi-era design?

33. Farsighted planning approaches

- (a) Many hobbyists seem interested in taking some time to consider, research, and plan a layout that will take many years to construct and which is intended to provide long-term visual and operating satisfaction. What are today's keys for designing layouts that are most likely to provide one or more decades of enjoyment, even within a hobby whose design ideas continue to evolve? How might someone go about the design process?
- (b) What design features have begun to receive attention from the model press and clinics that are likely to survive short term fads and become widely emulated over the next decades? Why? (Consider such features as large capacity staging yards, multi-deck layout benchwork, modules, "sincere"/linear/once-around designs, cosmetic curves.)
- (c) What track planning notions have barely begun to get publicity, yet have the potential for significantly added new visual or operating enjoyment to future layouts? (Consider visible stub-ended staging tracks, aesthetic and historical trackage and right-of-way, close-to-eye-level table heights, "shallow scenes" and "bulges/lobes", entryway duck-unders, specialized and secondary yards, serpentine peninsulas (shaped like "J" instead of "I"), "reverted" and other unconventional turnaround tracks, non-operating trackage, photogenic scenic composition, large buildings, longer sidings and yard tracks (for trains of 20-35 cars instead of typical 12-18 cars), 3-4 unit diesels (even on relatively short trains).
- (d) What current design features might or should fall out of favor over the next 20 years? (Consider long stretches of hidden track, switching areas on steep grades, unduly steep main line grades, stub ended large terminals, walk-around track plans where engineers can't follow their trains, space-consuming roundhouses, exaggerated/caricature scenery, short passing tracks, Number 6 main line turnouts on large layouts, low (40-46") track heights.)

34. Humanistic Concerns

What are some of the ways to ensure harmony with family members during periods of layout planning and research, as well as during subsequent construction and operating session activities? What ways have you found successful to integrate our hobby with the rest of our lives, to preserve and enhance our marriages, parenthood, and careers? Any ideas on how shy hobbyists or people in new locations can identify and become friends with hobbyists who have similar interests and complementary skills?

35. Recommended Design Procedures

What PROCESS or SEQUENCE OF ACTIVITIES do you recommend as a creative, yet pragmatic approach to permit imaginative concepts and thoughtful problem-solving to layout design, with a minimum investment of planning and research expense and time? Focus on the HOW of designing. What faster or new steps and techniques do you recommend to actually carry out such steps as identifying and prioritizing goals, compiling ideas for desired design elements (such as a helper terminal or a complex yard throat), exploring ways to array them, testing benchwork configurations for access and viewing, anticipating the shortcomings of track alignment and scenery ideas, avoiding

operation problems, and maximizing photo opportunities?

For example: emphasis on preferred/priority operating images and traffic; subsequent focus on preferred segments of a railroad such as an engine terminal or junction( rather than arbitrary and - premature sketches of benchwork shape or mainline route alignment); more use of schematics rather than track plans, as tools to analyze desired town sequences, operations, industrial locations, and other matters; scrapbooks/file systems/valences/bulletin boards to hold and display ideas during the seminal stages of site planning; extensive use of tracing paper, clear acetate sheets, and photocopies of layout room features; the use of small scale mockups of entire layouts to test benchwork and scenery ideas; and the use of full size drawings and 3-d models to test track alignments, preferred train lengths, complex terrain areas, and structures.

What approaches have been most helpful when you have designed layouts for other people, especially people you did not know well or who lived far away from you?

### 36. Multi-year planning and layout preparation

Many hobbyists eventually hope to build a moderate to large, permanent layout, perhaps after several interim home locations or raising young children. For people with a long time perspective on layout planning, how can they best make use of the intervening years? How can they identify their most fundamental layout goals and desired features, systematically acquire layout supplies and rolling stock, develop a practical idea file and retrieval system, or refine their skills to plan and build a layout? Which approaches minimize the risks of wasted efforts (if preferred scales, prototypes, eras, or other factors shift over time, or if standards in model building and control systems increase over the years)?

### 37. Improving Existing Layout Environments

What good ideas have you seen to increase the space available for a layout or to permit more flexible use of pre-existing space? Examples include the movement of utilities out of a layout room, the substitution of compact utilities and laundry facilities for bulky ones, the use of Sears' lolly columns to relocate an awkward load-bearing post or wall, and the use of closets or outdoor areas adjacent to layout walls.

### 38. Temporary Layout Spaces

Describe any temporary or portable design features that have been used to supplement fixed layout benchwork, for example, drop-leaf yards for extra staging tracks or modules that are attached to the layout just for operating sessions.

### 39. Ideal Layout Environment

If you could design the ideal environment for a layout, what physical features or geometries would you include? What are the most economical ways to provide a large floor space or room volume for a layout, such as a second floor for a garage, a basement extension under a porch or lawn, or a prefabricated structure for a backyard? Consider space not just for benchwork and aisles, but also

accommodations for able-bodied and handicapped visitors, off-duty crews, overnight guests, and convention crowds. Any neat ideas for workshop and restroom facilities, storage, safety, lighting (for construction, emergency egress, and day/night operating sessions), room air and spray-paint ventilation, temperature and floor comfort, fireproofing, sound-proofing, and theft security? Don't forget tall ceilings, plumbing pipes in corners, and windowless rooms.

40. Forecast of Future Layout Design

In a few words, what do you feel are the most important conceptual and track planning trends that could improve future layout design?