HIGH-LEVEL car's extreme height is 15 ft 6-1/2 in. above the rails. Center vestibule floor height is only 17-5/16 in.

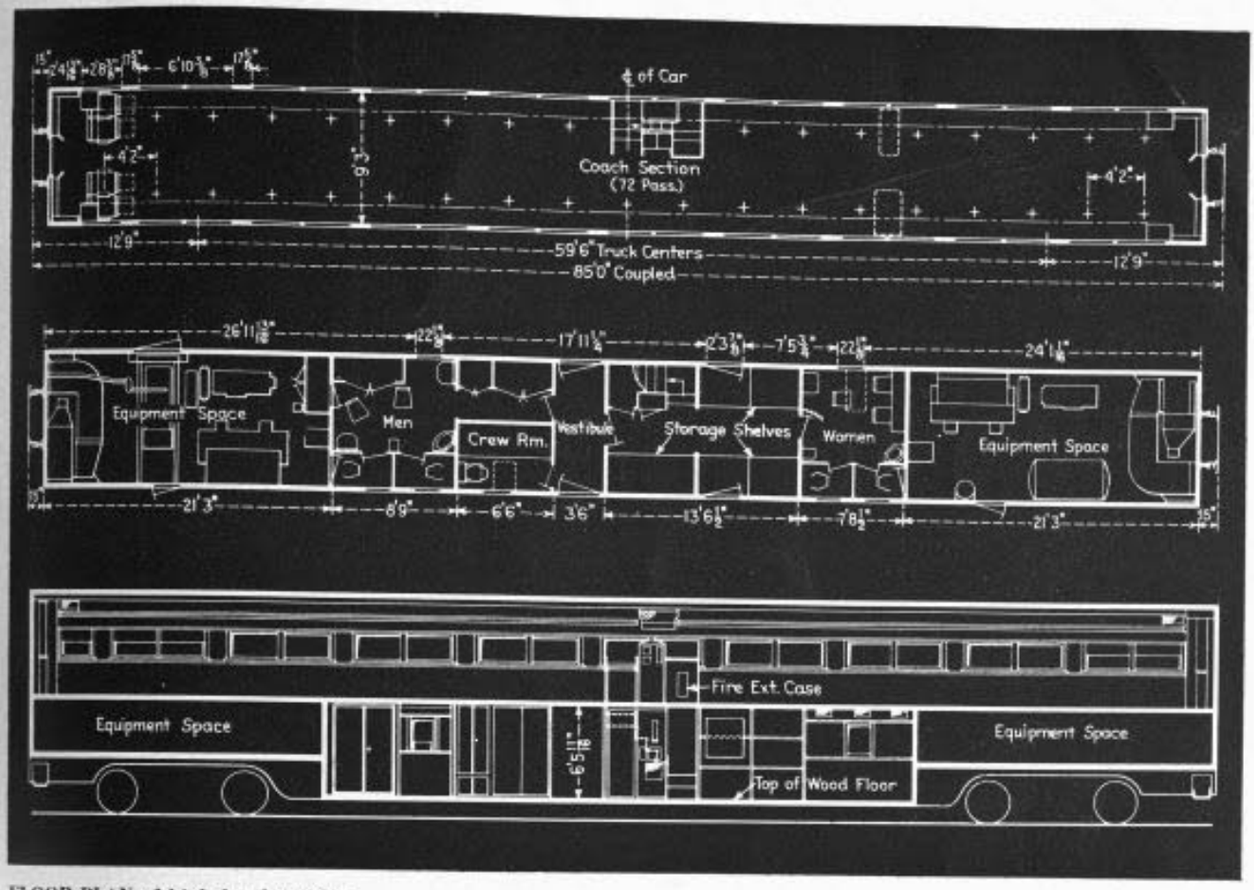
"El Capitan" Passengers Ride High

- *Santa Fe acquires 47 new high-level cars to reequip its 18-year-old Chicago-California all-coach streamliner—*
- *Result: high levels of comfort and luxury and greater seating capacity with reduced train length and weight*

INDIAN DESIGNS decorate all the cars. Pier panels and end bulkheads in this 72-passenger coach have such patterns.

LUGGAGE STORAGE shelves between vestibule and men's lounge is supplemented by parcel racks in upstairs coach section.

LADIES' LOUNGE is on lower level with vestibules, luggage storage spaces, men's washrooms, and crew accommodations.



FLOOR PLAN of high level coaches.

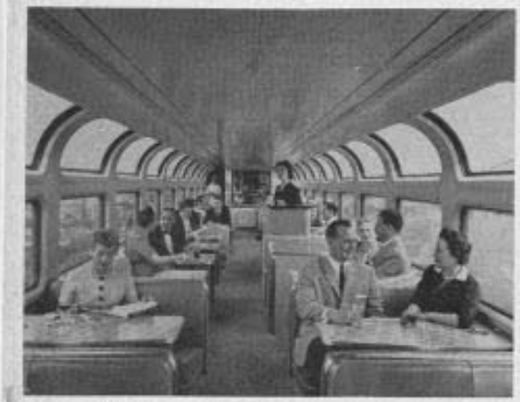
The Santa Fe is just putting into service the first complete trains of "high level" passenger cars. The five sets of equipment necessary to operate the daily all-coach "El Capitan" 39½-hour schedules between Chicago and Los Angeles are made up of these new Budd-built stainless steel cars, in which all passengers ride at dome car heights.

A floor 8 ft 3 in. above the rails extends the full length of the train. This arrangement requires special high level end doors and diaphragms and prevents assignments of most of these cars to trains of conventional equipment, but it does allow passengers to move from car to car with the same convenience as a standard train affords.

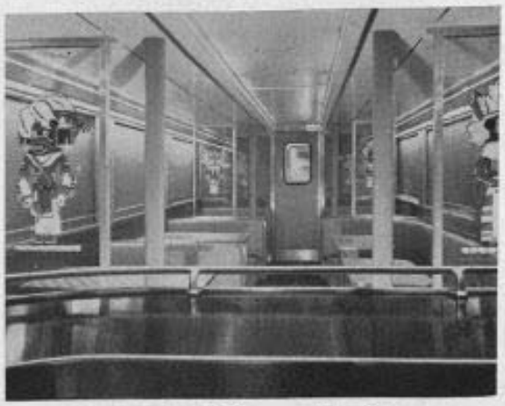
It means also that the new "El Capitans" can be two cars shorter and seat 146 more passengers than the former trains on this run, with almost no change in total train weight. Over two years ago Budd built the first two coaches of this type for the Santa Fe (Railway Age, September 13, 1954, p. 58). Their *(Continued on page 45)*

HIGH LEVEL COACHES — 35 Cars

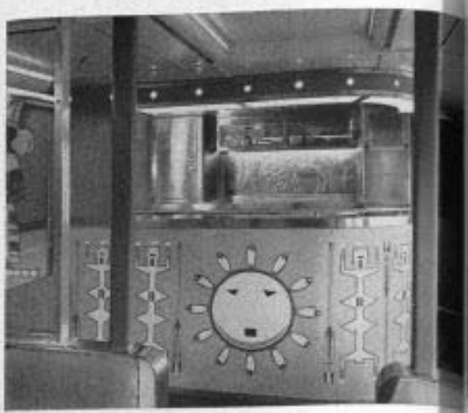
AREA	MATERIAL	COLORS
LOUNGES AND TOILETS		
Floors: Field	Rubber tile	Mottled green
Border	Rubber tile	Mottled gray
Walls and ceiling	Painted aluminum and panels	Light sandalwood
Doors: Men's lounge	Painted panels	Zuni turquoise
Women's lounge	Painted panels	Rust
Upholstery: Men's L.	Naugahyde	Chestnut brown
Women's L.	Elastic redo	Green
Vanity tops	Micarta	Green confetti
PASSAGES AND VESTIBULE		
Floor: Vestibule	Stainless steel	Diamondette, unpainted
Lounge and stair	Rubber tile	Mottled green and grey
Walls and ceiling	Stainless steel	Unpainted
Walls and ceiling (Men's L. Pass.)	Painted aluminum and panels	Sandalwood
Doors	Painted panels	Rust
Side doors	Stainless steel	Unpainted
COACH SECTION		
Floor	Carpet	Henna, cactus leaf
Wainscot	Laminated plastic	Zuni turquoise
Pier panels	Formica	Screen print on frost walnut
Frieze, ceiling, and parcel racks	Painted aluminum	Light sandalwood
Parcel rack nosing	Elastic redo	Green
End walls (over wainscot)	Painted aluminum, stainless grills	Rust
Wing partitions	Laminated plastic	Zuni turquoise
Upholstery	Mohair and plastic coated fabric	Turquoise



SKY LOUNGE'S bar and newsstand are at far end of car together with washrooms.



LOWER LOUNGE seats 26. Glass panels are etched with Southwestern images.



BAR in lower lounge area is placed against bulkhead separating this section from equipment space.

HIGHLY FAVORABLE passenger reaction to two test cars, along with increased economy—seven chair cars have greater seating capacity than eight conventional ones — were factors in. . . .

WHY THE SANTA FE WENT "HI-LEVEL"

"The theory behind the high level train is really the success we have had with high level dome-lounge cars."

This remark, from General Passenger Traffic Manager R. T. Anderson of the Santa Fe, does much to explain that road's decision to re-equip its streamlined chair car train, the "El Capitan," with "Hi-Level" equipment. The Santa Fe will place the new train in service the middle of this month, following an extended exhibition tour.

As explained in the accompanying article, the Santa Fe's train is a significant departure from the ultra-lightweight, low-slung trains which have attracted so much attention in recent months. But where the lightweights aim at the short distance travel market, the Santa Fe's "Hi-Levels" are designed for transcontinental travel—between Chicago and Los Angeles.

CUSTOMER APPEAL—The Santa Fe first stepped into the "Hi-Level" picture two years ago with the purchase of two test cars of this design. These cars were operated for several months to and from the West Coast. Passenger representatives rode the cars, checking their performance and compiling data on customer reaction.

Today, the Santa Fe has a bulging file as evidence that passengers found the original cars to their liking. As one man from Fort Madison, Iowa, put it, "This is the most comfortable chair car I've ever ridden." Another rider wrote the railroad that his trip in a "Hi-Level" car was the "smoothest and most comfortable ride I have ever had."

Surveys conducted among the passengers during each trip confirmed such reactions. On a typical run in September 1954, 73 of the 79 passengers said they liked the smooth-riding upper-level coaches. They cited such plus factors as less track noise, the high level view, smoother riding quality, the large rest rooms and the downstairs storage of baggage. A few asked for small racks at the seats for hats and small bags—a request which the Santa Fe is meeting.

One problem that did crop up during the test period was the handling of elderly or infirm persons who did not wish to go up and down stairs to the lower-level washrooms. This the railroad has solved by installing two washrooms in one end of the train's dome-lounge car. A special block of seats in the near end of the adjacent chair car will be reserved for these handicapped patrons.

REDUCED COSTS—Along with the obvious customer appeal of the "Hi-Level" cars is the fact that they promise to step ahead of conventional equipment in economy of operation and maintenance. For one thing, fewer cars will handle more people.

The double-level arrangement of the new cars eliminates vestibules and provides 28 more seats per car than present "El Capitan" equipment, Mr. Anderson points out. This means that seven chair cars will seat 496 passengers, compared with previous capacity of 350 in eight cars.

Other savings will be forthcoming in the diner. The upper-level dining car of the new train, with tables upstairs and the kitchen below, will have a seating capacity of 80. More patrons could be accommodated with snack-type meals in the lounge adjoining the diner. In this way, one "Hi-Level" diner will do the work of two conventional cars.

WEIGHT REDUCTION — The big "Hi-Level" car body is quite heavy, particularly as compared to the most recent low-slung lightweight prototype designs. On the other hand, a 10-car train (disregarding head-end cars) will have as much capacity as a 16-car train of standard equipment. On a weight per passenger basis, the "Hi-Level" design's 2,300 lb is about 250 lb less than that of the equipment being replaced.

BAR SERVICE ROOM in upper level of sky lounge is separated from the main lounge area by partition and mirror.

(Continued from page 43)

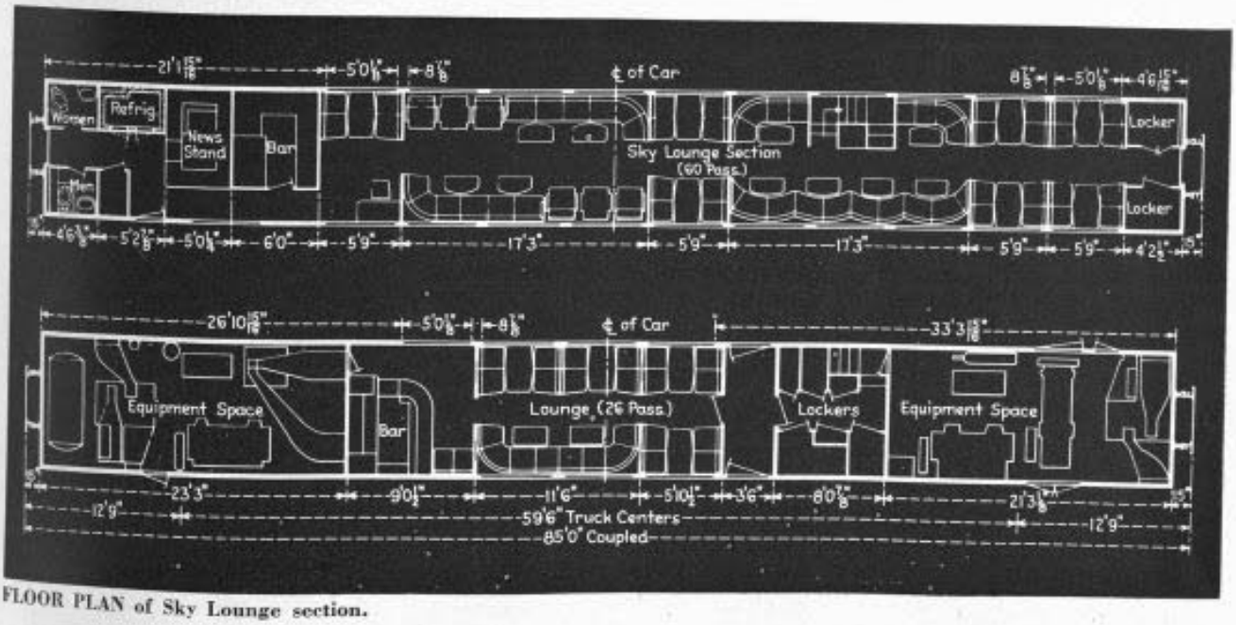
quiet and comfortable ride has been demonstrated in service, and confirmed by passenger surveys. Roadbed noises are farther away from the passenger-carrying sections of these cars. Shorter trains are possible because more "car" is packed into the AAR standard 85-ft length.

The new trains include the first high-level dining and high level lounge cars to be put in service.

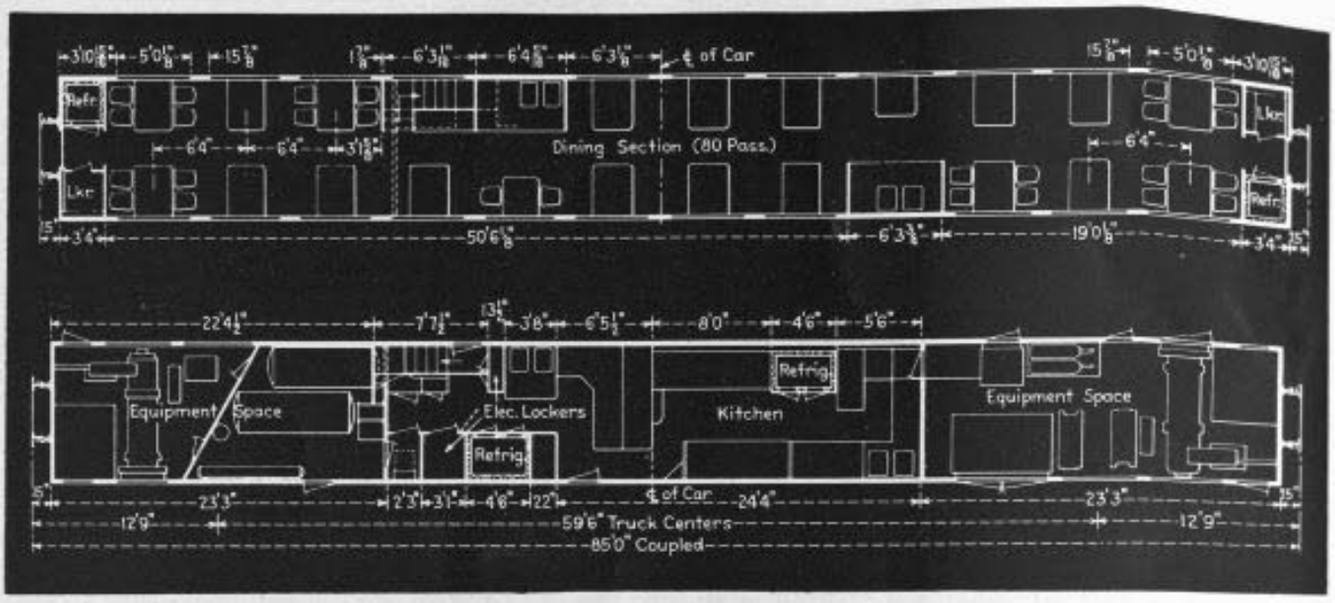
The structural design of these 47 Budd-built cars provides a depressed floor in the section between the trucks. This low-level area in the coaches is utilized for luggage storage, lounges, toilets, crew's sleeping room, and the entrance vestibule. This same space is the kitchen and

SKY LOUNGES — 6 Cars

AREA	MATERIALS	COLORS
END PASSAGES AND TOILETS		
Floor	Rubber tile	Mottled brown and white
Wainscot, end doors, newsstand, A-end walls	Stainless steel	Unpainted
B-end, toilet walls and ceilings	Painted panels	Rose beige
A-end ceiling	Painted panels	Orchid gray
Toilet doors	Painted panels	Mesa red
Newsstand counter	Formica	Black oak
SKY LOUNGE		
Floor	Carpet	Light charcoal, cactus leaf
Stairs	Carpet	Dark charcoal, cactus leaf
Wainscot, stairwell walls, low partitions	Laminated plastic	Zuni turquoise
Pier panels and end walls	Painted aluminum	Rose beige
A-end walls	Painted aluminum, Stainless grills	Zuni turquoise
Ceiling	Painted Aluminum	Orchid gray
Upholstery: chairs and 6-pr banquette seats	Naugahyde	Coral, turquoise piping
1pr banquette seats and settees	Redo	Beige, turquoise piping
Table and desk tops	Formica	Shell oak
LOWER VESTIBULE		
Floor	Stainless steel	Diamondette, unpainted
Walls, ceilings, doors	Stainless steel	Unpainted
LOWER LOUNGE		
Floor	Rubber tile	Light charcoal, cactus leaf
Wainscot	Painted Aluminum	Mesa red
Pier panels	Formica	Screen print on picwood
Ceiling, header	Painted panels	Pueblo beige
Wall at bar	Painted panel	Turquoise
Window sills, table tops, misc. surfaces	Formica	Shell oak
Bar top	Formica	Black
Bar and equipment	Stainless steel	Unpainted
Bar front	Carved linoleum	
Upholstery: Seat at bar	Naugahyde	Coral, tan piping
Card playing sections and settees	Naugahyde	Straw, coral piping



FLOOR PLAN of Sky Lounge section.



FLOOR PLAN of High Level Diners.

HIGH LEVEL DINERS — 6 Cars

AREA	MATERIAL	COLORS
END PASSAGES		
Floor	Rubber tile	Mottled brown and white
Walls and doors	Stainless steel	Unpainted
Ceiling	Painted aluminum	Light biege
DINING SECTION		
Floor	Carpet	Gray, cactus leaf
Wainscot, stairwell and partitions	Laminated plastic	Zuni turquoise
End walls	Laminated plastic with plastic designs	Zuni turquoise
Pier panels	Formica	Design on frost walnut
Frieze and ceiling	Painted aluminum	Light beige
Service areas	Stainless steel	Unpainted
Table tops	Formica	Charcoal skylark
Upholstery	Superneedlepoint and Naugahyde	Red coral
Window sills	Formica	Black oak
Roller curtains	Fabric	Frost walnut
Metal trim	Satin finish	Unpainted

pantry of the high level diners, and in the lounge cars is a secluded cocktail section. In every case, the design has produced an upper level which permits a great deal of imaginative arrangement, and a maximum of passenger comfort.

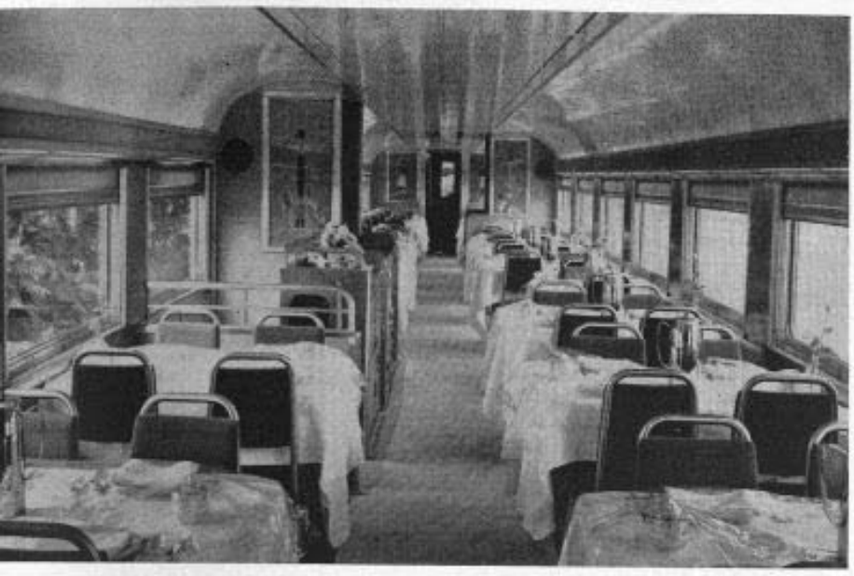
The upper levels of 25 of the coaches have space for 72 leg-rest reclining seats spaced on 50-in. centers. The other 10 coaches seat only 68 because they have a stairway to standard platform level from the aisle at one end. This was done so that conventional cars can be included in "El Capitan's" consist. The trains will regularly be made up with the diner and sky lounge in the center. The coaches with the aisle stairways will be used at the extreme ends of the assembled high level equipment. Regularly included will be three conventional head-end cars. Each high level car has a center stairway connecting its upper and lower floor levels.

Spaces between the high level floor and the trucks provide weatherproof areas for the air conditioning, electrical and air brake equipment, and water storage tanks. Each car has its own diesel-driven generating equipment. Coaches have a single 40-kw Caterpillar D-315 diesel alternator set. Load of the Angelo Colonna electric kitchen on the diners requires two 60-kw Caterpillar D318 units to supply sufficient 220-v, 3-phase a-c power.

Equipment spaces of all cars can be reached from the interior. This makes it possible to do repair work en route without delaying the train. All cars have 220-v, 3-phase train line and Pyle National receptacles and train line jumpers. Diner underfloor fuel tanks supplement the main fuel tanks which are an integral part of the end underframe assemblies of all cars.

End underframe units are of fabricated, arc-welded, low alloy, high-tensile steel. The remainder of the car structure and sheathing is stainless steel. Interior lining of the equipment spaces and some lower level partitions are carbon steel. Linings of the cars' side and end walls, and ceilings of the upper levels, are 0.081-in. aluminum backed with felt sound-deadening material. Wainscot and stairwell walls are Westinghouse laminated Micarta. Pier panels are Formica in most of the cars. Lower level ceilings, partitions and interior doors are plywood, faced on both sides with zinc coated steel. Entrance areas and some other sections are lined with stainless steel.

Air distribution to the upper levels of all cars is through special



DINER, seating 80 persons, carries out the train's Southwestern motif.

"SUBVEYOR" brings food from the kitchen in lower level to the dining room in upper level.

Pyle-National multivent ceiling panels which also incorporate side-slot air delivery. Lower levels are ventilated through bulkhead delivery systems with Triflex grills. Cooling for the 4,800 cfm of air delivered to the upper levels is by two 8-ton evaporator-blower units—one in each equipment section. This air returns through decorative Barber Colman grills in the end walls and through vertical ducts to plenums in the equipment sections. Here it is combined with fresh air drawn through Farr dynamic grills in the car sides. The mixture is filtered through Farr filters (2-in. on diners and 4-in. on other cars) before going to the Trane evaporator-blower units.

Diners and lounge cars have an additional 4-ton evaporator-blower mounted in one equipment section. This unit cools the kitchen of the diner and the lower lounge of the sky lounge cars with 1,200 cfm air delivery.

Refrigeration for these systems is provided in all cars by two electrically driven 10-ton Trane compressors. These unloading compressors automatically adjust through eight steps of capacity control. Coaches and lounge cars have two separate dry-type condensers, and the diners have a single split-type condenser. Both styles utilize water spray cooling only in event of head pressures over 225 psi. Equipment sections of the diners contain three additional small compressors for the food refrigeration equipment. Two such units accommodate the lounge-car requirements.

A modified Vapor unizone steam heating system is used in all cars. This includes fin-type radiation at the floors of both levels, and steam coils in each of the evaporator-blower units. There is provision for heating the equipment spaces to protect the water tanks and the diesel engines. These automatically controlled systems are supplemented by isolated manually controlled areas.

The reclining seats for the coaches were manufactured by Dwight Austin, and the majority of the loose chairs in the lounge and dining cars came from Coach & Car Equipment Co. Mohawk carpeting is used throughout the new trains, along with Goodyear rubber tile in certain areas. The double-width, double-glazed breather type windows supplied by Adams & Westlake are divided by a center mullion and are glazed with Pittsburgh polished Solex and safety plate glass.

The Pantasote roller curtains operate in Adlake aluminum curtain guides—a part of the window assembly. The lounge cars have no upper level window curtains. They do have Adlake curved double-glazed sash units set in the roof producing an effect like that obtained in dome cars. Because of the uniform height of all the cars in this train, there are no "windshields" in these sky lounges.

STAINLESS STEEL glitters in the kitchen area of the "El Capitan" diner.

Parcel racks in the coaches which include the reading lights, were supplied by Luminator as complete assemblies. Other coach illumination also was supplied by Luminator, while the diners and lounges have a combination of Luminator and Electric Service Manufacturing lighting units. In general, illumination is of the continuous fluorescent, indirect type.

Toilets are equipped with a combination of Crane, Colonna and Duner fixtures. Along with the kitchen equipment in the diners, the bar and newsstand in the sky lounge cars were built by Angelo Colonna. The diners have a dual electrically operated elevator system (known as "subveyors") to connect the upper-

(Continued on page 50)

"EL CAPITAN" . . .

(Continued from page 47)
level dining room with the lower-level kitchen. Water systems in all cars are equipped with Tested Appliance automatic chlorinators and Everpure filters.

All these cars are built along standard Budd lines with stainless flat, fluted and corrugated outer sheathing over stainless framing members. The LAHT end underframe units extend back to the depressed floor section. Their design permits a welded attachment to a 20-in. square vertical structural column which distributes longitudinal loads to the upper floor structure and to the shallow depressed section center sill. Portions of the load are transferred to the side sills through the body bolsters and through the structural partitions at the inner sides of each of the two vertical structural columns.

The entire car structure is designed as a modified girder with the roof and floor as the chord members and the sides as the shear carrying members. Standard floor levels have 4-in. deep transverse floor members and the depressed section has similar 3-in. sections. Ultralite thermal insulation in 3-in. thicknesses is used throughout most of the body of the
(Continued on page 52)

REGULAR CONSIST OF THE NEW "EL CAPITAN"

Locomotive
Storage Mail Car
Baggage Car
Dormitory Baggage Car
68-Passenger High Level Coach
72-Passenger High Level Coach
72-Passenger High Level Coach
80-Seat High Level Diner
86-Seat Sky Lounge
72-Passenger High Level Coach
72-Passenger High Level Coach
72-Passenger High Level Coach
68-Passenger High Level Coach
Capacity: 496 Passengers

Railroading

After Hours

Policy for Competition

J. E. Gilliland, traffic vice-president of the Frisco, explained to me the other day his company's policy for meeting truck competition. In substance, here is what he said:

"There is a lot of short-haul traffic for which the truck is economically best suited—and there is no point in the railroads competing for such business. When it comes to the longer hauls, however, we can offer alternative services that the trucks cannot match.

"For example, on these longer haul services, we can offer the shipper our piggyback service—which matches the service of the long-haul truck completely: the same service, the same minimum loads, the same rates. This piggyback service is profitable—but we also know that we can haul the same traffic in regular railroad service, using standard railroad equipment, with higher minima and

by James G. Lyne

Editor, Railway Age

the service, on the average, is not quite up to the standard (in speed, convenience, minima) of the piggyback service.

"Thus we are able to meet the shipper's demands whether his emphasis is on speed and convenience, or on economy. Our competitor, the truck, offers only the convenience and speed—the economy is beyond him, on the longer hauls.

"When the railroads are everywhere reflecting the great economy of all-rail service in their all-rail rates; and are, at the same time, matching the truck completely with

than the highway, and where the trucks will still be predominant. And they'll still compete with us on the long-haul traffic parallel to our rail lines for the traffic that demands superior service at premium rates—whenever our piggyback service isn't kept up to standard.

Healthy Competition

"But competition that is keen and on a sound business basis will be good for us, and good for our customers—and such competition need not frighten us; and it shouldn't scare the truckers either. We'll both prosper more than we are prospering now—if we concentrate on our 'inherent advantages,' with each of us making the most of the service qualities in which we excel.

"For railroads to reflect the economy of all-rail service in their competitive rates, they

"EL CAPITAN" . . .

(Continued from page 50)

car. The entire inside of the car shell was sprayed with Insulmat for acoustic insulation. The cars have Miner A4XB draft gear, Miner and Standard buffing equipment, and ASF Type E controlled slack couplers.

The General Steel trucks, both four- and six-wheel type, are of the single drop equalizer, outside swing hanger, all coil spring type with Houdaille vertical shock absorbers. They have Timken roller bearings, Canton Forge equalizers and swing hangers, ASF springs, Transportation Specialties side bearings, Gatke center plate liners, and Burkhart and Johns-Manville sound deadening pads. Budd disc brakes and Westinghouse Decelostat wheel slide control are used.

The cars have Westinghouse Air Brake's modified HSC brake equipment with the D22-AR control valve without straight air or electric train control. One truck on each car has a National Brake handbrake.

The Caterpillar D-315 40-kw, and D-318 60-kw, self-regulated diesel alternators used for the generating equipment are arranged so that they can be rolled out of the cars on track extensions. They have flexible fuel, water, steam and electrical lines so disconnecting can be done rapidly. An isochronous governor maintains engine speed within one per cent of the rated 1,800 rpm, on the 40-kw units. For parallel operation of the 60-kw engines, a governor setting of 3% is used. The engines are protected by automatic low oil and hot engine shutdowns, and the equipment areas are protected by automatically and manually operated carbon dioxide fire extinguishing systems. The electrical trainline system is arranged to cut loads approximately in half in event of the failure of the one engine on the coaches and lounges, and in the event of the failure of one of the two engines on the diners.

The 220-v, 60 cycle three phase a-c generated by the diesel alternators is used directly for the air conditioning and refrigeration equipment, and for the kitchen ranges and broilers. Single phase 220-v a-c is used to operate the exhaust fans in the electric lockers and wash rooms. General Electric transformers are used to deliver 110-v, single phase power for fluorescent and incandescent lighting, and for the dish washer and smaller kitchen appliances.

A 25-amp selenium rectifier produces 32-v d-c for charging Exide storage batteries in two battery boxes under the A-end of the car. The battery supplies emergency lighting, diesel starting, and control requirements.

The Okonite wiring is carried in Youngstown and Walker conduits. Both Pyle National and Crouse Hinds condulets were used. There are two 220-v, 3-phase Pyle National receptacles on each side of the car for terminal standby service. Control circuits are arranged to require both to be plugged in to supply this service.

Motorized circuit breakers furnished by Westinghouse Electric provide a simple control arrangement, interlocked to prevent more than one source of power being used at one time. Synchroscopes are used for paralleling the diner alternators.

SPECIFICATIONS OF THE NEW HIGH LEVEL CARS FOR "EL CAPITAN"

	Number of Cars	Weight (Lb)	Trucks and Journals	Air Cond. Capacity (Tons)	Diesel Alternators	Maximum Electrical Loads (kw) Lighting and Misc.	Air Cond. System	Kitchen Refrig.	Total	Fuel Capacity	Water Capacity (Gal)
72-Passenger Coach	25	162,210	4-wheel, 6½ x 12	16	One 40-kw	5.9	32.0	....	37.9	200	300
68-Passenger Coach	10	163,160	4-wheel, 6½ x 12	16	One 40-kw	5.9	32.0	....	37.9	200	300
Sky Lounge	6	176,100	4-wheel, 6½ x 12	20	One 60-kw	6.3	39.3	1.5	47.1	275	300
Diner	6	208,600	6-wheel, 6 x 11	20	Two 60-kw	5.7	31.0	48.3	85.0	550	800

(Continued from page 16)

MISSOURI PACIFIC. — C. L. Brown, trainsmaster, St. Louis Terminal division at St. Louis, appointed assistant superintendent, St. Louis Terminal division (east side of river) at Dupo, Ill. **G. T. Graham,** assistant trainmaster at Newport, Ark., succeeds Mr. Brown.

E. W. Hargrave, assistant general superintendent transportation, Houston, Tex., transferred to St. Louis, Mo., and his former position abolished. Position of superintendent transportation at Palestine, Tex., abolished. **J. C. McVey** appointed division trainmaster, Wichita Division, Wichita, Kan., succeeding **R. H. Gragg,** retired.

C. W. Brown, trainmaster, Little Rock Terminal, North Little Rock, Ark., appointed trainmaster, Chester, Cairo, and Cape Girardeau divisions and Sparta subdivision at Chester, Ill., succeeding **D. H. Martin,** transferred to the East and West, Benton and Mt. Vernon subdivisions at Chester. Mr. Brown's successor is **J. W. Dunlap,** assistant trainmaster, Omaha division, Atchison, Kan.

Carl A. Becker, general agent, Tulsa, Okla., transferred to Milwaukee, Wis., succeeding **Vincent C. Knorst,** deceased. Mr. Becker's successor is **Leland B. Bartlett,** general agent, Alexandria, La., who in turn has been replaced by **Robert J. Ball,** transferred from Atlanta, Ga. **Oliver W. Storck** replaces Mr. Ball.

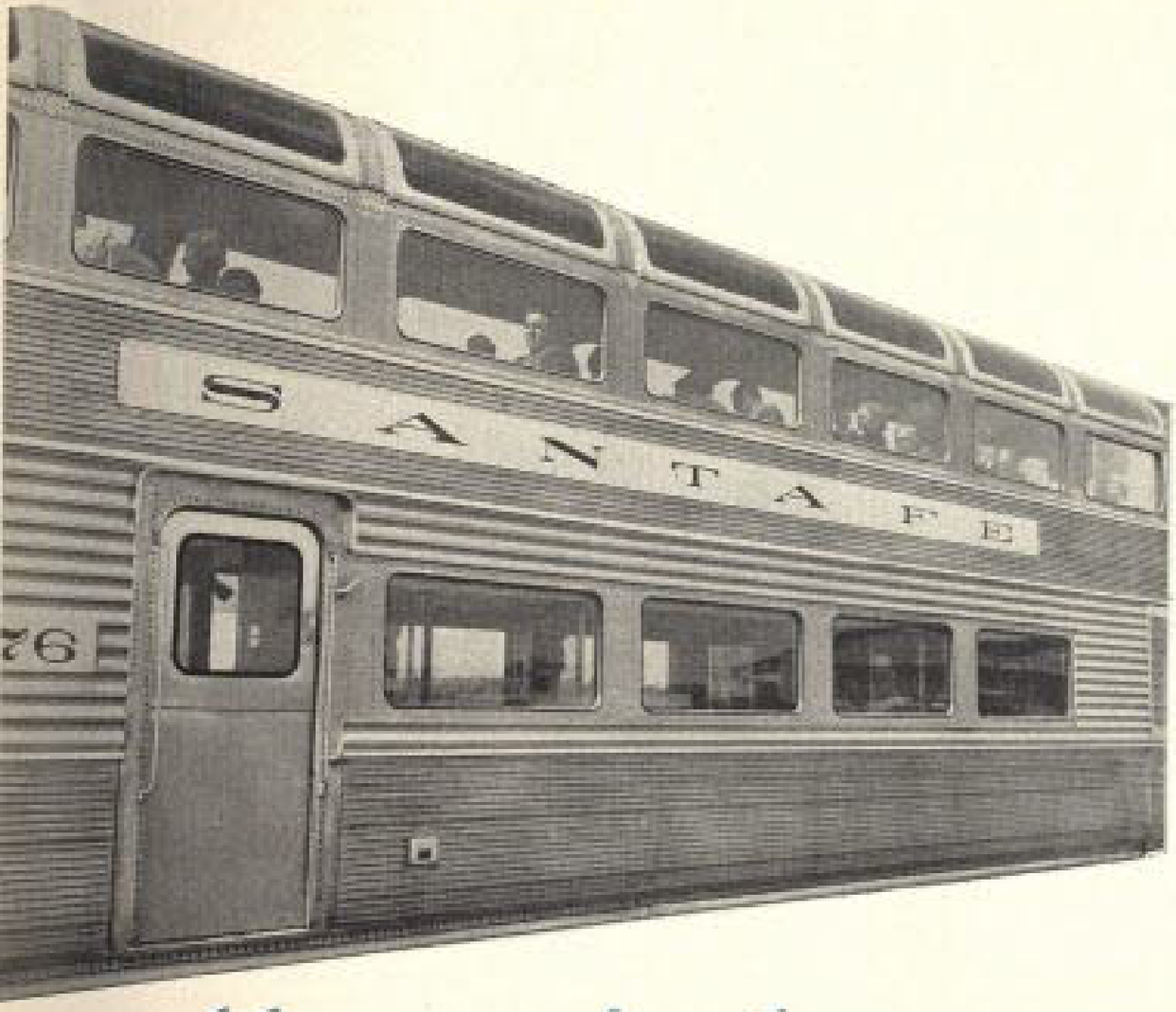
MONON.—Donald E. Cripe appointed freight traffic agent at Chicago.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—W. K. Wilson, assistant general freight agent—rates, appointed assistant general freight agent—commerce, succeeding **Luther Redmon,** commerce agent, resigned. Commerce agent position abolished. **S. L. Wilhoite** named assistant to general freight agent—rates.

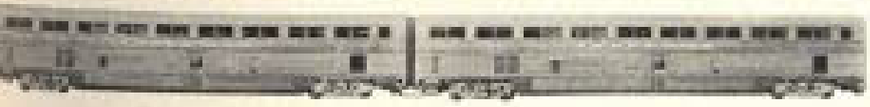
NEW YORK, ONTARIO & WESTERN. — Thomas L. Francis appointed general agent at Buffalo, N. Y.

NICKEL PLATE.—G. R. Bowman, general superintendent at Bellevue, Ohio, named general manager at Cleveland. **H. P. Thinnes,** assistant general superintendent, Bellevue, promoted to general superintendent there. **R. A. Gleason,** superintendent, Buffalo—Cleveland divisions, Conneaut, Ohio, named assistant general superintendent at Bellevue. **E. D. Walsh** appointed assistant superintendent, Muncie, Ind.; **M. J. Bickel** named

(Continued on page 56)



all-stainless



for high-performance, profitable operation

All-stainless construction and unique design, mean more passenger room and a lighter, higher-strength car. In fact, 10 of these new Budd-built cars do the work of 16 conventional ones.

Passengers are overwhelmingly in favor of the Hi-Level ride, and the beauty and safety of these new stainless trains.

They're another important step in modern rail transportation. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

9, 1956

Now "El Capitan" Rides High . . . p.42

RAILWAY AGE

WORKBOOK OF THE RAILWAYS

INDUSTRY'S ONLY WEEKLY NEWS MAGAZINE

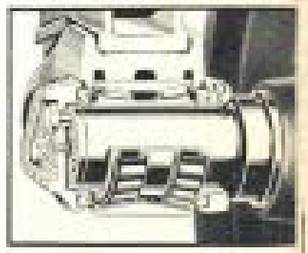
Santa Fe passengers ride high as new "Hi-Level" El Capitan rolls on TIMKEN® bearings

HE Santa Fe's revolutionary new ll-chair car train, the "Hi-Level" pitan, puts passengers on top of orld to "give the patron more for ed dollar" between Chicago and ngeles. New upper levels on chair e devoted entirely to seating space. eral" dining cars seat 80 diners have the kitchen below. Dome-unge cars seat 60 persons in a upper level lounge, include a newsstand, refreshment bar, rest rooms. *All* "Hi-Level" El Capitan cars provide a smoother starting, gliding ride, on Timken® tapered roller bearings.

Timken bearings helped make possible the modern streamliner by permitting sustained high speeds without hot boxes. And because they're geometrically designed, precision-made to give true rolling motion—practically eliminate friction—Timken bearings are now rolling the load on freight trains, too. "Roller Freight", cars on Timken bearings, can travel at sustained high speeds, like streamlined passenger trains. Already 53 railroads have started the big switch to "Roller Freight".

The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

Typical application of Timken bearings on freight car journals



MKEN TAPERED ROLLER BEARINGS ROLL THE LOAD