INDEX

Note: In addition to the definitions of items in this index on the quoted pages, many of them are also listed alphabetically and defined in Appendix III, on pages 575–582.

AC (ac) motors, power supply, 101–102, 108–111
Accelerated service, 50
Acceleration:
  control on electric vehicles, 102–112
  forces, 91, 119–120, 122–123
  impact on travel time, 124–134
  interval, 121–122
  rates for rail vehicles, 337–341
  regime, 122
Adhesion, 115–119
Adhesion weight, 115
Aerial structures (see also Rights-of-way), 362, 376–378
Aerial tramway, 490–491, 494
Agglomeration, human, 55
AGT, see Automated guided transit
Air cushion vehicle, see Hovercraft
Air springs, 316
Articulated vehicles (see also by individual modes):
  buses, description, 213, 218, 221–223
  light rail, description, 316, 325–328
  light rail, development of, 325
  rapid transit, description, 348
Automated guided transit (AGT) (includes APM and PRT), 70–71, 456–469
Automated people movers (APM), see Automated guided transit
Automatic train operation (ATO), 415–420, 550
Automatic train protection (ATP), 410, 413–415
Automatic train supervision (ATS), 420–422
Automobiles:
  first, 26
  impact on transit use, 22
  modified uses of 501–504. See also Carpools, Car rentals, and Car sharing
Axle loading, rail vehicles, 345

Basic operating units (rail transit), 344–350
  married pair (MP), 312, 315, 347, 349
  multiple unit (MU), 312
  single unit (SU), 312, 346, 349
  three-car unit, 347, 349
Bidirectional vehicles, see Rail transit vehicles, classifications and types
Block signals, see Signal control of rail transit
Boats, see Ferryboats
Body (vehicle):
  bus, 210–225
  rail, 322–334
Brakes/braking, rail vehicle, 318–320
  dynamic, 107, 110
  Electric, see dynamic
  emergency, 318
  motor, see dynamic
  normal, 318
  rates, 337–341
  regenerative, 107, 110
Braking distance, 119–120
Braking regime, 122–124
Bus garages, 281–285
Bus gate, 243–245
Bus lanes, 244, 250
  compared with HOV lanes, 253
  contraflow (CBL), 244, 250
  exclusive (EBL), 244, 250
  regular (RBL), 244, 250
  warrants for introduction, 245
Bus rapid transit (BRT), 69, 256–273, 532
  Achievement record, 259–260
  compared with LRT, 538–544
Bus rapid transit (BRT) (continued)
components, 257
definition, 256–257
evolution, 256–260
misconceptions, 257–258, 543
operations, 265
vehicles, 260–262
Bus stations and terminals, 276–283
Bus stops, 273–276
Bus storage and maintenance facilities (garages and shops), see Bus garages
Bus system (mode), 67
characteristics, 203, 287
costs, 287
impacts, 287
role, present and future, 289
service quality, 287
Bus/trolleybus preferential treatments, 240–250
Bus transit system (BTS), def., 203
Bus/trolleybus vehicle:
articulated (AB), 213, 218, 221–223
articulated, turning clearances, 218–222
body, 210–225
characteristics, 204
diesel, 205
double-decker (DD), 223
double-decker compared with standard, 226
energy consumption, 142
exterior, 231
guided, 225
historical development, 25
hybrid, 208
interior, 234
minibus (MB), 213
motor, 97
optimal size, 210
performance, 229–231
propulsion types, 204–210
standard, 214
technical data of different models, 211
turning path and clearances, 218–222
Busway, 254

Capacity, def., 153
bus lines, 190
light rail lines, 190
linear vehicle, 159
productive, see Productive capacity
rapid transit, 76
regional rail, 76
scheduled line, 155
station, 155, 175
utilization coefficient (load factor), 155
utilized, 156
vehicle, 156
vehicle line, 154
way, 155, 160
Carpools, 503
Car rentals, 503
Car sharing, 506
Catamaran, 494
Catenary, see power supply
Chassis, bus, 231
Chopper control of electric motors, 102–111
City:
ancient, 1
form and structure, 3
growth, 7
locations, determination of, 1–2
supplies for, 3
Coasting travel regime, 122–124
Cog railway, 482
Common carrier, 45–46
Commuter railroads 33–35, 81. See also Regional rail
Commuter transit, 81
Consumption rate, 153
Contraflow bus lane, see Bus lanes, contraflow
Control, train, 408–422
Costs:
capital, bus, 287
capital, rail transit, 426–429
investment, see Costs, capital
operating, bus 288
operating, rail transit, 429–431
Cover-and-cut tunnel construction method, 378
Crew size (rail transit), 415–420
Cut-and-cover tunnel construction method, 378
DC (dc) motors, power supply, 102
Demand-responsive transit, 513–516
Dial-a-ride (or Dial-a-bus) (DAR), 513–516
Diesel (ICE) motor,
  characteristic performance diagram, 97–99
  comparison with electric motor, 114–116
Disabled, services for, 515
Double-decker, see Bus vehicle, double-decker
Dual-mode operation, 453–455
Dynamic braking, see Braking, dynamic
Efficiency (concept, coefficients), 152
Electric propulsion, 100
  characteristics, 100
  comparison with diesel, 114–116
  performance diagrams, 103–107
Elevated structures, see Aerial structures
Emergency braking, see Braking, emergency
Energy consumption:
  conceptual procedure for measuring, 143
  trade-off with travel time, 138–141
  of different modes, 137, 144
  reduction through optimal driving, 141
Escalators, 404–405
Exclusive bus lanes, see Bus lanes, exclusive
Family of rail transit modes, def., 297
  characteristics, 297–299
  definitions of individual modes, 300–308
Family of transit modes, def., 66
  definitions and comparisons, 45–52
  review of characteristics, 53
Far side (FS) transit stops, see Bus stops and Light rail transit stations and stops
Ferryboats, ferries, 497–499
Fleet (of transit vehicles), def., 53
Flywheel propulsion, 113–114
Following train (FT) in signal systems, 413–415
Following transit unit (FTU) in capacity analysis, 166, 178
Forced-stop signals, see Rail transit, signals
For-hire transport (see also Paratransit), def. 45–47
Freeways:
  bus operations on, 250
  HOV lanes on, see High-occupancy vehicle facilities
  median use by rail transit, 383
  preferential entry by buses, 253–254
Frequency of service, def., 153
Fringe parking, see Park-and-ride facilities
Funicular railways, funiculars, 485–490
Gap between successive TUs, 162
Garages, see Bus garages
Gauge, see Track, gauges
Generic classes of transit modes, 50, 529
Grade-separated right-of-way, see Right-of-way, categories and types
Group rapid transit (GRT), see Automated guided transit
Group transport, 48
Guided transit, def., 49, 52
  compared with steered vehicle transit, 61, 526
Guideways, 445
Handicapped, see Disabled, services for
High-occupancy vehicle (HOV) facilities, 253
High-performance modes, see Rapid transit and Semirapid transit
Hovercraft, 497
Hybrid bus, see Bus vehicle, hybrid
Hybrid-type bus services, 513–516
Hydrofoil, 495
Impacts (transit), def., 55
Inclines, see Funicular railways
Individual transport, 48
Industrial Revolution, 5
Inertial energy bus (IEB), see Flywheel propulsion
Intelligent Transportation Systems (ITS), 53
Intensity of service on networks of different modes, 195
Internal combustion engine (ICE), 97
Interurbans (Electric interurban railways), 35
Investment costs, see Costs, capital
Jerk, 121
Jitneys, 26, 508–513
Kiss-and-ride (K+R) facilities, 405–408
Kneeling bus, 233

Labor productivity, see Productivity of labor by transit mode
Land use, transit impacts on, see Impacts, transit and Light rail transit system impacts
Lanes, transit, see Bus lanes and Light rail transit rights-of-way
Leading train (LT) in signal systems, 413–415
Leading transit unit (LTU) in capacity analysis, 166, 178
Level-of-service (LOS), def., 54. See also Service quality
Light rail rapid transit (LRRT), 72
Light rail transit rights-of-way, 362
cross-sections, 367–370
in pedestrian malls, 367
signals with LRT actuation, 375
treatment at intersections, 369–376
Light rail transit stations and stops, 388–392
Light rail transit system (mode):
def. and characteristics, 69, 302, 534
compared with AGT/APM, 544
compared with rapid transit, 547
compared with BRT, 538–544
costs, see Costs, rail transit development, 534
impacts, 431–432, 437–439
passenger attraction, 540–543
role, present and future, 431
Light rail transit vehicles, see Rail transit, vehicles
Linear induction motor (LIM), 112
Line capacity, see Capacity, def.
Load factor, 155
Locomotive, def., 312
Low-capacity modes, see Paratransit
Low-floor vehicles,
buses, 233, 261
rail vehicles, 326–328

Malls, light rail transit, 367, 542
Many-to-many, many-to-one, and one-to-many services, 514
Married pair, see Basic operating unit
Mass transit, mass transportation, def., 45
Measures, units, and conversion factors, 565–571
Medium-capacity modes, 68. See also Bus system, Streetcars, and Trolleybuses
Metric conversion, see Measures, units, and conversion factors
Metro, see Rapid transit
Minibus, 213
Modes, transit:
definitions and classifications, 47–50
family, 66
generic classes, 50
optimal domains, 78–81
review of features, 52, 76
theory of evolution and conceptual definitions, 55–65
trends in use, 81
Monohull vessels, see Vessels, conventional
Monomotor truck, see Truck, rail vehicle, types by motor positions
Monorails, 469–472
Motorbuses, see Bus vehicle
Moving block, see Rail transit signals
Moving sidewalks, 477–481
Multimodal terminals, see Terminals, multimodal
Multiple unit (MU) train, see Basic operating units, rail transit
Near side (NS) transit stops, see Bus stops and Light rail transit stations and stops
New modes, see unconventional modes
Newton’s second law, 91
Normal braking, see Braking, normal

Omnibuses, horse-drawn, 9
One-to-many service, see Demand-responsive transit
Operating costs, see Costs, operating
Operating regimes, see Regimes of motion
Operations, transit, 53
Overhead wires, see Power supply

Pantograph, see Power collection by electric vehicles
Paratransit, def., 501
applications and role, 518
characteristics, 509, 516
classifications, 501–502
modified uses of private transportation, 503
public, 506
regulation, 511–513
semipublic, 504
Park-and-ride (P+R) facilities, 405–408
Pedestrians and pedestrian-assisting modes, 477
People mover systems, see Automated guided transit
and Automated people movers
Performance, transit system, 53–54, 195. See also
under individual modes, such as Bus system
(mode), performance
Personal rapid transit (PRT), 472–475. See also
Automated guided transit
Platforms, station, see Rail transit stations and stops,
platforms heights, and Rapid transit stations,
platforms
Point-to-point transportation, 481
Population:
growth, 6, 7
ancient cities, 3
shift among economic sectors, 6
urban vs. rural, 6
Power, motor:
Bus, ICE diagram, 98–100
electric, rating (continuous, hourly), def., 100
electric, typical diagram, 103–105, 110
ICE (indicated, brake, effective), 97
Power collection by electric vehicles (pantograph,
shoe, trolley pole), 101
Power supply (catenary, overhead wire, third rail),
101–102
Power-to-weight ratio of rail vehicle models, 346
Priority treatments, transit, see Bus/trolleybus
preferential treatments and Light rail transit
rights-of-way
Productive capacity, def., 54, 151
Productivity, 54, 151. See also Efficiency
Productivity of labor by different modes, 195
Productivity of transit line, 196
Propulsion (see also Traction, vehicle):
electric, 100
internal combustion engine, 97
Public transportation, urban, see Urban public
transportation
Quality of service, see Service quality
Rail rapid transit (RRT), def., 72, 304. See also
Rapid transit systems
automation, 415–422, 549–550
capacity, 191–193
city size justifying metro construction, 434–436
compared with light rail transit, 547
costs, investment, 426–429
costs, operating and maintenance, 429–431
definition, classification and characteristics, 72, 297
goals in building, 433
impacts on land use, urban form, 424, 434
modes, 297
performance, 421
present and future role, 431
service quality, 424
trends in developing RT systems, 436–438
Rail transit signals, 410, 413–415
Rail transit stations and stops:
at-grade, 388
at-grade transfer, 389, 406
controlled access 390–397. See also Rapid transit
stations
platform heights, 398
Rail transit vehicles:
classifications and types, 310–313
description and components, 310–344
goometry of turning, 316, 324, 326
model characteristics plotted on diagrams, 337–347
technical data, see under the same heading for
individual modes
trends in design, 343
uni- and bidirectional, 313
Rail, types of, 354–361
Railroads, railways:
commuter, see Commuter railroads
Interurban, see Interurbans
suburban, see Regional rail
Rapid transit rights-of-way:
alignment geometry, 362
clearance (cross sections), 355–357, 371, 377
definition, 51
elevated (aerials, embankments), 376–378
transfer, 401–402
Rapid transit rights-of-way (continued)
tunnels, types and construction methods, 378–383
types, 362–369
Rapid transit stations:
auto and feeder bus, design for, 405–408
integration with surroundings, 401–407
levels, 400
platforms, 393–398
requirements for design (passengers, operator,
community) 391–392
transfer, 389, 399–408
Rapid transit systems (modes), see also Rail rapid
transit
costs, see Costs, rail transit
environmental impacts, 433–434
modes, 545–553
performance, 421–424
Rapid transit vehicles. See also Rail transit vehicles
basic operating units and train consists, 344–350
body design, 322–334
technical data of different models, 336–347
Regimes of motion, 121
Regional rail (RGR), def., 33,
characteristics, 306
compared with commuter rail, 551
historical development, 33
technical data of different vehicle models, 336–347
trends in developing RGR systems, 551–553
vehicles, see Rail transit vehicles
Regional transit, def., 50, 550
Regular bus lane, see Bus lane, regular
Regular or all-day transit service, def., 73
Regular transit network compared with commuter, 81
Rental cars, see Car rentals
Reserved lanes, see Bus lanes and High-occupancy
vehicles lanes
Resistance to motion
air, 94
alignment (gradient and curvature), 95–96
basic, 93
curvature, gradient, see Resistance to motion,
alignment
vehicle, 93
Rheostatic control of electric vehicles, see Switched
resistor control
Ride-sharing, see Carpool and Vanpool
Right-of-way (ROW), transit, def., 47. See also under
different modes
categories and types, 47, 51
importance of separation, 522–524
interdependence of ROW categories with systems
technology, 528
modes classified by, 51–52
Rolling stock, def., 53
Route, transit, def., 53
Rubber-tired rapid transit:
characteristics and comparison with rail transit,
385–388
description, 384
development, 384
Safety, 53
regimes of travel, 165
Seat dimensions, 159, 234, 335
Sectors of economic activity, 6
Semirapid transit, 50
Service (transit), def.
classification and types, 50, 54
Service intensity, see Intensity of service on networks
of different modes
Service quality (SQ), def., 54
Shops, bus maintenance, see Bus garages
Short-haul transit, 477–480
Short-haul transportation, 481
Signal island, 366
Signal preemption, see Traffic signal control, actuated
Signals, rail transit, see Rail transit signals
Single unit (SU), see Rail transit vehicles,
classifications and types
Skidding/spinning of wheels, see Adhesion
Skip-stop service, 50
Specialized technologies, 477
Speed, maximum vehicle, see under “vehicle” for
individual modes
Standard bus, see Bus vehicle, standard
Standing time in stations, 121
Station, transit, see Rail transit stations and Rapid
transit stations
Steered vehicles, def., 49, 51
compared with guided, 61, 525–526
Stopping distance, vehicle, 120
Stopping shadow, see Train, stopping shadow
Stops, transit, see Bus stops and Light rail transit stations and stops
Streetcars (SCR), def., 67, 300. See also Light rail transit
compared with regular buses, 525
collection to buses, 23–24
electric, development of, 14
horse-drawn, 10
mode characteristics, 300
rebirth of streetcars, 301–302
vehicle, see Light rail transit vehicles
Street transit, def., 50
Subscription bus, see Paratransit
Suburban railroad, see Commuter railroads and Regional rail
Subway (rail rapid transit in tunnel), 378
Support, vehicle, 47
Supported and suspended vehicle technologies, 446
Surface transit, see Street transit
Switched resistor control (of electric vehicles), 102–105
Switches for:
AGT guideways, 445–451
rail systems, 362
rubber-tired rapid transit, 384, 449
Système International d’Unités (SI), see Measures, units, and conversion factors
Taxi, 506
Technology of transit modes, def., 47–50
Terminals:
definition, 53
multimodal, 53
Terrain-specialized transit modes, 477
Third rail, see Power supply
Thyristor chopper, see Chopper control
Track, rail:
components and structure, 354, 361
construction in pavement, 360
gauges, 359
plan, 362
switches, 362
Traction, vehicle; see also Propulsion
cable, 484–490
cog wheel, 482–484
comparison of electric with diesel (ICE), 114–116, 526–528, 534
theory of, 93
Ttractive effort, def., 91
Traffic signal control:
actuated by transit vehicles, 375
leading or lagging green, 375
phasing for transit vehicles, 373–374
preferential treatments for transit, 243–244, 373
Trailers, def.,
powered, 312
rail vehicle, 313
Train, def., 53, 61
automatic train operation (ATO), 410, 415
automatic train supervision (ATS), 420
multiple unit, 312
stopping shadow, 177
travel control (manual and automatic), 410
Tram-Train mode, 308, 553
Tramways, see Streetcars
Transit, def., 45
beginnings, 8
classifications and definitions, 45
Transit federation, 40
Transit modes, see Modes, transit
Transit, service, see Service, transit
Transit unit (TU), def., 53
Transloading points, 2
Transmission:
bus, ratio, 98
Transportation:
constraints on urban development, 3
impact on cities, 1–5
private, 45
urban public, see Urban public transportation
work, 151
Travel time:
as a function of station spacing, 128
equations and diagrams, 125–131
interstation vs. spacing, 128–130
sensitivity to parameters, 132
trade-off with energy consumption, 140
Trolley, trolley car, see Streetcars
Trolley, coach, see Trolleybus
Trolley pole, see Power collection by electric vehicles
Trolleybus:
    Articulated, 207, 218–222. See also Articulated vehicles, buses
    characteristics and applications, 288, 533
    compared to ICE bus, 534
    historic development, 29
    mode definition, 533
    preferential treatments, see Bus/trolleybus preferential treatments
    technical data of different models, 211
    vehicle, def., see Bus/trolleybus vehicle
Truck, rail vehicle:
    description, 315
    purposes of, 313
    types by motor positions, 319
    turnout, see Switches for rail systems

Unconventional modes, 444
Units of measures, see Measures, units and conversion factors
Urban development, form, see City, form and structure, growth
Urban passenger transport, def., 45
classification by passenger volume/performance, 66–80
classification by usage, 45
theory of modes, 55–66
Urban public transportation, def., 45
Urbanization, 6
Utilization, 155
Vanpools, 504
Vehicle, transit, see under respective transit modes
Vehicle capacity, see Capacity, vehicle
Vessels, conventional (monohull) 494; see also Catamaran and Hydrofoil
Walking, see Pedestrians and pedestrian-assisting modes
Walking distances to station entrances, 403
Water-borne (transit) systems, 494–499
Way, travel way, see Right-of-way, transit
Wheelchair access to transit, see Disabled, services for
Wheels:
    guiding and supporting, 47, 49, 449
    steel wheel vs. rubber-tire, 49, 61, 524
Work, transportation, see Transportation work
Yards and shops, rail transit, 408, 411–412