

JOB ANALYSIS SUMMARY
PHYSICAL DEMANDS AND
ENVIRONMENTAL CONDITIONS
FOR THE JOB OF
TRAINMAN/SWITCHMAN

Developed by a twelve member
Job Analysis Task Force
representing eight railroads
on May 12, 1977, and subsequently
reviewed and approved by the -
Project Steering Committee of the
Railroad Personnel Association

July 1, 1977

CONSULTING REPORT NO. 53

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OPINION

The attached document which defines the physical demands and the environmental conditions of the job of Trainman/Switchman was prepared under my direction and with my personal participation.

The job analysis system used was developed over many years by the U. S. Employment Service and is described in the publication, Handbook for Analyzing Jobs (1972), issued by the Manpower Administration of the U. S. Department of Labor. The system was modified in minor ways to make it compatible with the use of machine scored answer sheets.

The Job Analysis Task Force which developed the material met under my guidance at 400 West Madison Street, Chicago, Illinois, on May 12, 1977. It consisted of twelve individuals from eight railroads, each of whom was either a job incumbent or a supervisor who had previously performed the job. Members of the Task Force pursued the job analysis activity with enthusiasm and serious concern.

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In my opinion, the attached document is a fair and accurate statement of the physical demands and the job conditions of the job of Trainman/Switchman.

Respectfully submitted

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May 18, 1977

JOB ANALYSIS SUMMARY

Physical Demands and Environmental Conditions

JOB: TRAINMAN/SWITCHMAN

May 12, 1977

1. Standing, walking, and sitting

Standing: Remaining on one's feet in an upright position at a work station without moving about (includes minor foot movements in process of performing active work)

walking: Moving about on foot

sitting: Remaining in the normal seated position

The Task Force identified the following activities as representative of standing, walking, and sitting required by the job

Standing

- Stands while signaling
- Stands on car ladders and engines (EXHIBIT A)

walking

- walks on track ballast the full length of train and return to couple and uncouple cars and to connect air hoses
- walks to align switches

sitting

- * Rides engine or caboose
- waits for bills while sitting

Task Force Conclusion #1: The average Trainman/Switchman, during his first 2 to 3 years spends approximately 5% of his time standing, 75% walking, and 20% sitting

NOTE: Photographs of incumbents performing job tasks (EXHIBIT's) were supplied by members of the R.P.A. Project Steering Committee

NOTE: The next four factors (Lifting, Carrying, Pushing, and Pulling) utilize two kinds of estimates: (a) the number of pounds involved and (b) the overall amount of time involved. With respect to time, the following language is used:

- Occasional (up to one third of the time)
- Frequent (from one third to two thirds of the time)
- Constant (two thirds of the time or more)

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2. Lifting: Raising or lowering an object from one level to another (including upward pulling)

The Task Force identified the following activity as representative of lifting required by the job

- Changes knuckle (EXHIBIT B)

Task Force Conclusion #2: Occasional lifting of a maximum weight of 83 pounds is required.

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3. Carrying: Transporting an object, usually holding it in the hands or arms, or on the shoulders

The Task Force identified this activity as representative of carrying required by the job:

- Carries knuckles sometimes as fast as ½ mile (EXHIBIT C)

Task Force Conclusion #3: Occasional carrying of a maximum weight of 83 pounds is required by the job.

*Estimated to weight 75 pounds by the Task Force; true weight of an F Knuckle is 83 pounds.

4. Pushing: Exerting force upon an object so that the object moves away from the force (includes slapping, striking, kicking, and treadle actions)

The Task Force identified the following activities as representative of pushing required by the job:

- Adjusts draw bars
- Closes freight car doors (EXHIBIT D)

Task Force Conclusion #4: Occasional pushing of over 100 pounds is required by the job.

5. Pulling: Exerting force upon an object so that the object moves toward the force (includes jerking)

The Task Force identified these activities as representative of pulling required by the job:

- Removes broken draw bars from between the rails
- Sets or releases hand brake on cars (EXHIBIT E)
- Aligns switches (EXHIBIT F)

Task Force Conclusion #5: Frequent pulling of over 100 pounds is required.

6. Degree of Strength: The degree of strength required by a job is determined on the basis of the .5 factors which have been considered up until now. The degree of strength is expressed in terms of one of five categories.

Sedentary work: Lifting 10 pounds maximum and occasionally lifting and/or carrying such articles as dockers, ledgers, and small tools

Light work: Lifting 20 pounds maximum and/or carrying objects weighing up to 10 pounds

Medium work: Lifting 50 pounds maximum with frequent lifting and/or carrying of objects weighing up to 25 pounds

Heavy work: Lifting 100 pounds maximum with frequent lifting and/or carrying of objects up to 50 pounds

Very Heavy work: Lifting objects in excess of 100 pounds and/or carrying objects weighing 50 pounds or more

Task Force Conclusion #6: The degree of strength involved in the Trainman/Switchman job is: Heavy Work.

7. Climbing: Ascending or descending ladders, stairs, scaffolding, ramps, poles, and the like, using feet and legs and/or hands and arms

The Task Force identified the following activity as representative of climbing required by the job:

- Climbs ladders and steps on cars, engines, and cabooses (EXHIBIT G)

Task Force Conclusion #7: Climbing is present and important.

8. Balancing: Maintaining body equilibrium to prevent
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falling when walking, standing, crouching, or running
on narrow, slippery, or erratically moving surfaces;
or maintaining body equilibrium when performing
gymnastic feats

The Task Force identified the following activities as
representative of balancing required by the job:

- Climbs on and off moving equipment (EXHIBIT H)
- Stands on car ladder while passing or giving
signals
- Sets hand brake on moving car
- Maintains balance while moving about in or on
moving equipment

Task Force Conclusion # 8: Balancing is present and
important.

9. Stooping: Bending body downward and forward by bending
spine at waist

The Task Force identified the following activity as
representative of the stooping required by the job:

- Stoops to bleed and inspect air brakes

Task Force Conclusion # 9: Stooping is present and
important.

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10. Kneeling: Bending legs at knees to come to rest on
knee or knees

Task Force Conclusion #10: Kneeling is present but
not important.

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11. Crouching: Bending body downward and forward by
bending legs and spine

The Task Force identified the following activities as
representative of crouching required by the job:

- Crouches to couple air hoses (EXHIBIT I)
- Crouches to align switches
- Crouches to apply and release hand brakes

Task Force Conclusion #11: Crouching is present and
important.

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12. Crawling: Moving about on hands and knees or hands
and feet

Task Force Conclusion #12: Crawling is present but not
important.

13. Reaching: Extending the hand(s) and arm(s) in any direction

The Task Force identified the following activities as representative of reaching required by the job:

- Reaches to open and close angle cocks
- Reaches to grasp hand holds (EXHIBIT J)

Task Force Conclusion #13: Reaching is present and important.

14. Handling: Seizing, holding, grasping, turning or otherwise working with hand or hands (fingering not involved)

The Task Force identified the following activities as representative of handling required by the job:

- Pulls coupling lever (EXHIBIT K)
- Grasps hand holds
- Couples air hoses
- Turns angle cocks
- Holds switch, lantern while signaling*

Task Force Conclusion #14: Handling is present and important.

*Added by the R.P.A, Steering Committee

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15. Fingering: Picking, pinching, or otherwise working with fingers primarily (rather than with whole hand or arm as in handling)

The Task Force identified the following activities as representative of fingering required by the job:

- Replaces air hose gasket
- Removes pins from knuckles
- Prepares and lights fusees (flares) (EXHIBIT L)
- Uses fingers to operate radios

Task Force Conclusion #15: Fingering is present and important.

16. Feeling: Perceiving attributes of objects such as size, shape, temperature, or texture by means of receptors in skin, particularly those of finger tips

Task Force Conclusion #16: Feeling is present but not important.

17. Talking: Expressing or exchanging ideas by means of spoken word

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The Task Force identified the following activity as representative of talking required by the job:

- Transmits information and/or instructions in person or by radio to others (failure to talk clearly can result in loss of life and/or serious property damage)

Task Force Conclusion #17: Talking is present and important.

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18. Nearing: Perceiving nature of sounds by ear

The Task Force identified the following activities as representative of the hearing required by the job:

- Receives information and/or instruction in person or via electronic equipment, sometimes frequently in the presence of high noise levels
- Receives audible signals such as engine whistles and bells, exploded torpedoes, and horns

(Failure to hear and interpret voice communications and/or audible signals can result in loss of life and/or serious property damage)

Task Force Conclusion #18: Hearing is present and important.

19. Visual acuity, far: Clarity of vision at 20 feet or more

The Task Force identified the following activities representative of acuity, far:

- Observes and distinguishes hand and other signals at a distance up to one mile and occasionally at greater distance
- Constantly watches for defects and malfunctions such as hot boxes, sticking brakes, shifting loads and dragging or derailed equipment from front or rear of moving train (EXHIBIT M)

Task Force Conclusion #19: Visual acuity, far, is present and important.

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20. Visual acuity, near: Clarity of vision at 20 inches or less

The Task Force identified the following activities as representative of visual acuity, near, required by the job:

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- Reads a wide variety of handwritten and/or printed material including train orders, instructions, and timetables

Task Force Conclusion #20: Visual acuity, near, is present and important.

21. Depth Perception: Three-dimensional vision; Ability to judge distance and space relationships so as to see objects where and as they actually are

The Task Force identified the following activities as representative of depth perception required by the job:

- Judges distances and speeds in the process of getting on and off moving equipment and when coupling cars (EXHIBIT N)
- Judges distances in order to stop short of obstructions

Task Force Conclusion #21: Depth perception is present and important.

22. Field of Vision: Area that can be seen up and down or to right or left while eyes are fixed on a given point

The Task Force identified the following activities as representative of field of vision required by the job:

- Performs numerous activities requiring field of vision adequate to encompass ground condition, adjacent track, close clearance, moving equipment/and protruding objects

Task Force Conclusion #22: Field of vision is present and important.

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23. Visual Accommodation: Adjustment of lens of eye to bring an object into sharp focus. This item is especially important when doing near-point work at varying distances from eye

The Task Force identified the following activities as representative of the visual accommodation required by the job:

- Looks alternately at printed material (switch list, computer print-out) and information on car such as car initial and number, bad order tickets, sometimes shifting vision to other crew members. (May involve adjusting vision from 20 inches to 20 feet to 40 yards or more)

Task Force Conclusion #23: Visual accommodation is present and important.

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24. Color Vision: Ability to identify and distinguish colors

The Task Force identified the following activities as *representative of color vision required by the job:

- Distinguishes color displayed by signals and other informational signs and apparatus such as lights, flags, reflectorized devices, colored placards (including multiple colored signals), Red, yellow, and green are involved.*

Task Force Conclusion #24: Color vision is present and important.

*Color designations added by the RPA Steering Committee.

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25. Inside/Outside

Inside: Protection from weather conditions but not necessarily from temperature changes

Outside: No effective protection from weather

The Task Force agreed on these statements:

- Performs various duties inside engine or caboose and receives instructions inside buildings
- Performs job regardless of weather conditions and at any time of day or night

Task Force Conclusion #25: The average person in the job spends 10% of his time inside and 90% outside.

26. Extreme Cold: Temperature sufficiently low to cause marked bodily discomfort

The Task Force agreed to this statement:

- Limited to weather conditions; during periods of extreme cold, work activity becomes more difficult and frequently more hazardous so that extra precautions must be taken

Task Force Conclusion #26: Exposure to extreme cold is present and important.

27. Cold/Temperature Changes: Variations in temperature which accompany extreme cold and are sufficiently marked and abrupt to cause marked bodily reactions

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Task Force Conclusion #27: Exposure to cold temperature changes is present but not important.

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32. Noise: Noise of sufficient magnitude, either constant or intermittent, to cause marked distraction or possible hearing loss

Task Force Conclusion #32: Noise is present but not important.

33. Vibrations: Sufficient vibration to cause bodily harm if endured day after day

Task Force Conclusion #33: Vibration is present but not important.

34. Hazards: Conditions in which there is danger to life, health, or bodily injury

The Task Force agreed to these statements:

- Climbs on and off moving equipment where the hazards is intensified by adverse weather conditions
- Couples and uncouples cars and performs other activities in the proximity of moving equipment
- Exposed to hazardous material transported by the railroad

Task Force Conclusion #34: Exposure to hazards is present and important.

35. Fumes: Solid particles generated by condensation from the gaseous state, generally after volatilization from molten metals, and often accompanied by a chemical reaction such as toxidization

Task Force Conclusion #35: Fumes are present but not important.

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36. Odors: Noxious non-toxic smells

Task Force Conclusion #36: Odors are present but not important.

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37. Dust: Solid particles generated by handling, crushing, grinding, rapid impact, detonation, and decrepitation of organic and inorganic materials such as rock, ore, metal, coal, wood, and grain

Task Force Conclusion #37: Dust is present but not important.

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38. Mist: Suspended liquid droplets generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as splashing, foaming, and atomizing

Task Force Conclusion #38: Mist is present but not important.

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39. Gases: Normally formless fluids which occupy the space of enclosure and which can be changed to the liquid or solid state only by the combined effect of increased pressure and decreased temperature

Task Force Conclusion #39: Gases are present but not important.

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40. Poor ventilation: Insufficient or excessive movement or air causing a feeling of suffocation or exposure to drafts

Task Force Conclusion #40: Poor ventilation is not present.

This Job Analysis Summary was reviewed and approved by the Project Steering Committee of the Railroad Personnel Association on May 31, 1977.

Robert L. Wilson for the Committee

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28. Extreme Heat: Temperature sufficiently high to cause marked bodily discomfort

The Task Force Agreed to this statement:

- Limited to weather conditions; extremely high outside temperatures are intensified by heat reflected from equipment

Task Force Conclusion #28: Exposure to extreme heat is present and important.

29. Heat/Temperature Changes: Variations in temperature which *accompany extreme heat and are sufficiently marked and abrupt to cause marked bodily reactions

Task Force Conclusion #29: Exposure to heat temperature change is present but not important.

30. Wet: Contact with water or other liquids

The Task Force agreed to this statement:

- Limited to weather conditions; exposed to wet equipment, ground conditions; may limit vision

Task Force Conclusion #30: Exposure to wet conditions present and important.

31. Humidity: Atmospheric conditions with moisture content sufficientiyhight to cause marked bodily discomfort

Task Force Conclusion #31: Exposure to humidity is present but not important

CERTIFICATE

The undersigned met at 400 west Madison Street, Chicago, Illinois on May 12, 1977, to participate in job analysis activity designed to determine the physical demands and environmental conditions for the job of Trainman/Switchman. After extensive discussion we developed the attached document under the general guidance of Dr. C. H. Lawshe. We individually and collectively certify that the physical demands and environmental conditions presented in the document accurately and fairly represent the job as we know it on our respective properties.

BURLINGTON NORTHERN, INC.

Harry R. Scheunemann, Trainman/Switchman

W. W. Francis, Assistant Superintendent

CHESSIE SYSTEM-BALTIMORE & OHIO CHICAGO TERMINAL RAILROAD CO.

Euegene J. Langel, Trainman/Switchman

Irwin L. Czerwinski, Trainmaster

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CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD

Michael G. Lawson, Trainman/Switchman

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Harold T. Buckman, Trainman

G L. Walker, Trainmaster

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LOUISVILLE AND NASHVILLE RAILROAD

Michael C. Tabor, Trainmaster

MISSOURI, PACIFIC RAILROAD COMPANY

Richard Turner, Superintendent Operation

SOUTHERN RAILWAY SYSTEM

Olin G. Mills, Assistant to General
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A.L. Hassler, Supervisor Train Service
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Chicago, Illinois
May 12, 1977