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Whole-body Vibration Assessment of the M915A2 Truck Tractor

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Fort Rucker, Alabama 36362-0577

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All new tactical vehicles and aircraft are required to be evaluated for potential whole-body vibration (WBV) health hazards to their crewmembers. A health hazard assessment (HHA) was performed on the M915A2 truck tractor by the U.S. Army Aeromedical Research Laboratory, as requested by the U.S. Army Environmental Hygiene Agency. Tests were conducted at Aberdeen Proving Ground, Maryland, over paved surface, cross-country, and Belgian Block terrain types. The M915A2 was tested in bobtail (no trailer), unloaded, and loaded configurations for each of the test terrains. The results of these tests show the lowest tolerance levels, in general, were experienced on the cross-country course, with less severe WBV occurring on the Belgian Block course, followed by the primary terrain course.

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The HHA recommendation for the M915A2, operating in its intended environment, is that WBV be limited to the following exposure limits for each test condition: WBV is not to exceed 8.97, 17.19, and 18 hours in any 24-hour period on paved surfaces for the bobtail, unloaded, and loaded configurations, respectively, for speeds up to 45 mph. Exposure limits for the cross-country terrain, for speeds up to 12 mph, are 8.56, 17.19, and 10.28 hours in any 24-hour period for the bobtail, unloaded, and loaded configurations, respectively. For the Belgian block terrain, WBV in any 24-hour period should not exceed 9.88, 14.56, and 17.09 hours for the bobtail, unloaded and loaded configurations, respectively, for speeds up to 25 mph.

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Introduction

All new tactical vehicles and aircraft are required to be evaluated for potential whole-body vibration (WBV) health hazards to their crewmembers. This requirement is contained in AR 40-10, "Health hazard assessment program in support of the Army materiel acquisition decision process." In support of this program, the U.S. Army Aeromedical Research Laboratory (USAARL) was requested by the U.S. Army Environmental Hygiene Agency (USAEHA) to perform a Health Hazard Assessment (HHA) on the M915A2 truck tractor.

The M915A2 truck tractor* (hereafter referred to as "M915A2") is a 14 ton, 6 x 4 commercially designed truck tractor built by Freightliner Corporation* (Figure 1). It is powered by a Detroit Diesel DDE engine* which develops 400 hp at 2100 rpm. The transmission is a Detroit Diesel Allison HT 740 CR automatic* with 4 forward gears and one reverse gear. The M915A2 is intended for use with the M871 (22-ton) and M872 (34-ton) flatbed semitrailers, and the M1062 7500-gallon fuel tanker. The M915A2 primarily will be used in the Communications Zone (COMMZ) over primary and secondary roads and, occasionally, on off-road terrain. These vehicle configurations are considered when designing the test matrix for measuring the WBV signatures.

The methods for measuring and analyzing WBV are found in the International Organization for Standardization's (ISO) guideline entitled "Guide for the evaluation of human exposure to whole-body vibration (ISO 2631)." ISO 2631 is reflected in MIL-STD-1472D, "Human engineering design criteria for military systems, equipment and facilities." The relative severity of the processed WBV signatures are interpreted using the Risk Assessment Codes (RAC) found in AR 40-10. These publications as a set define the criteria used in evaluating the WBV signatures of the M915A2.

ISO 2631 identifies three criteria for the evaluation of human exposure to WBV which can be described in terms of intensity, frequency, direction, and duration. These criteria are the preservation of comfort, the preservation of working efficiency, and the preservation of health or safety. They are known formally as the reduced comfort boundary (RCB), fatigue-decreased proficiency boundary (FDPB), and the exposure limit (EL), respectively.

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* See list of manufacturers.

Figure 1. M915A2 truck tractor.

The RACs, as described in AR 40-10, Appendix B, require the classification of a health hazard according to its severity and probability. Processing vibration signatures using ISO-2631 results in measurements of vibration severity, but does not yield a measure of the probability of occurrence. RACs are obtained by combining vibration severity with the probability that the test condition will occur in a real life scenario. For vibration, RACs would be determined for each vibration amplitude at each direction and frequency.

Methods

Whole-body vibration data for the M915A2 was collected at Aberdeen Proving Ground (APG), Maryland, by the U.S. Army Combat Systems Test Activity (USACSTA) in coordination with the Response and Tolerance Branch of USAARL. A test matrix was developed that represented the planned operating environment of the M915A2 with respect to terrain type, load configuration, and vehicle speed (Table 1).

Table 1.

Test matrix for WBV testing of the M915A2.

	Terrain		
Vehicle speed(m.p.h.)	Paved surface	Cross country	Belgian block
8		X	
10		X	
12		X	
15			X
20			X
25			X
35	X		
45	X		
55	X		

* Each configuration shown was tested for the loaded, unloaded, and bobtail load cases.

Experimental conditions

The M915A2 was tested under three terrain conditions: primary, cross-country, and Belgian block. The primary surface was a 3-mile, smooth, level, straight, asphalt test track. The cross-country surface was a rough dirt road with numerous potholes and uneven ruts. It had been used recently for the testing of track vehicles. The Belgian block was an oval cobblestone road approximately ½-mile long with an irregular pattern of 3-inch crests. These crests were spaced such that there was no correlation between the locations of the crests for the right and left wheel track. All three courses are part of the APG test track facilities. Characterizations of these surfaces are available from APG.

The M915A2 was tested under three load conditions: bobtail, unloaded, and loaded configuration. The bobtail configuration consisted of the tractor without the trailer attached. The unloaded configuration consisted of the tractor with an empty 22-ton M871 low-bed semitrailer attached. The loaded configuration

consisted of the tractor with the M871 trailer attached and with a load of 44,000 lbs.

The M915A2 was tested using vehicle speeds ranging from 8 to 55 m.p.h. Specific vehicle speed selection depended on the test terrain and mirrored likely employment scenarios. On the paved course, the M915A2 was tested at three speeds: 35, 45, and 55 m.p.h. On the cross-country course, it was tested at 8, 10, and 12 m.p.h. And on the Belgian block course it was tested at three speeds: 15, 20, and 25 m.p.h.

The test matrix consisted of combinations of terrain surface, load configuration, and vehicle speed, which resulted in a total of 27 vehicle runs. Seat pad accelerations were collected from the instrumented driver and passenger seat for each of the X- (fore/aft), Y- (left/right), and Z- (up/down) axes. Combinations of vehicle test runs with vibration axes yielded 162 distinct data trials.

The seats in the M915A2 were adjusted so the distance from the floor to the underside of the seat frame was 11 inches. This corresponds to a seat height at approximately one-half the possible stroke. The driver was 5'10" tall and weighed 156 lbs. The passenger was 6'3" tall and weighed 192 lbs.

Instrumentation

Seat pad accelerations were obtained in the X-, Y-, and Z-axes for both the driver and passenger seats. Three Endevco model 2265C-25 accelerometers*, in a triaxial arrangement, were attached to a disk placed between the seat pad and the subjects' buttocks. Each of the accelerometers were connected to a signal conditioner which provided excitation, amplification, calibration, and low-pass filtering. The accelerometers were low-pass filtered at 100 Hz using a six-pole Butterworth filter. A diagram of the data acquisition system is included as Figure 2.

Filtered acceleration signals from the signal conditioner were connected to an EMR Model 372-03 pulse code modulation (PCM) encoder*. The encoder multiplexed the incoming analog signals which then were sampled at 416.67 Hz per channel. The incoming analog signal was sampled using a sample-and-hold amplifier, digitized using a 10-bit successive approximation analog-to-digital converter, and then converted to a nonreturn-to-zero level (NRZ-L) code for transmission. The encoded PCM data then was input to a Conic model CTL 510 transmitter* for transmission at 237 MHz to the remote data handling facility. The signal conditioner, encoder, and transmitter were mounted on the back of the M915A2 cab during the entire test.

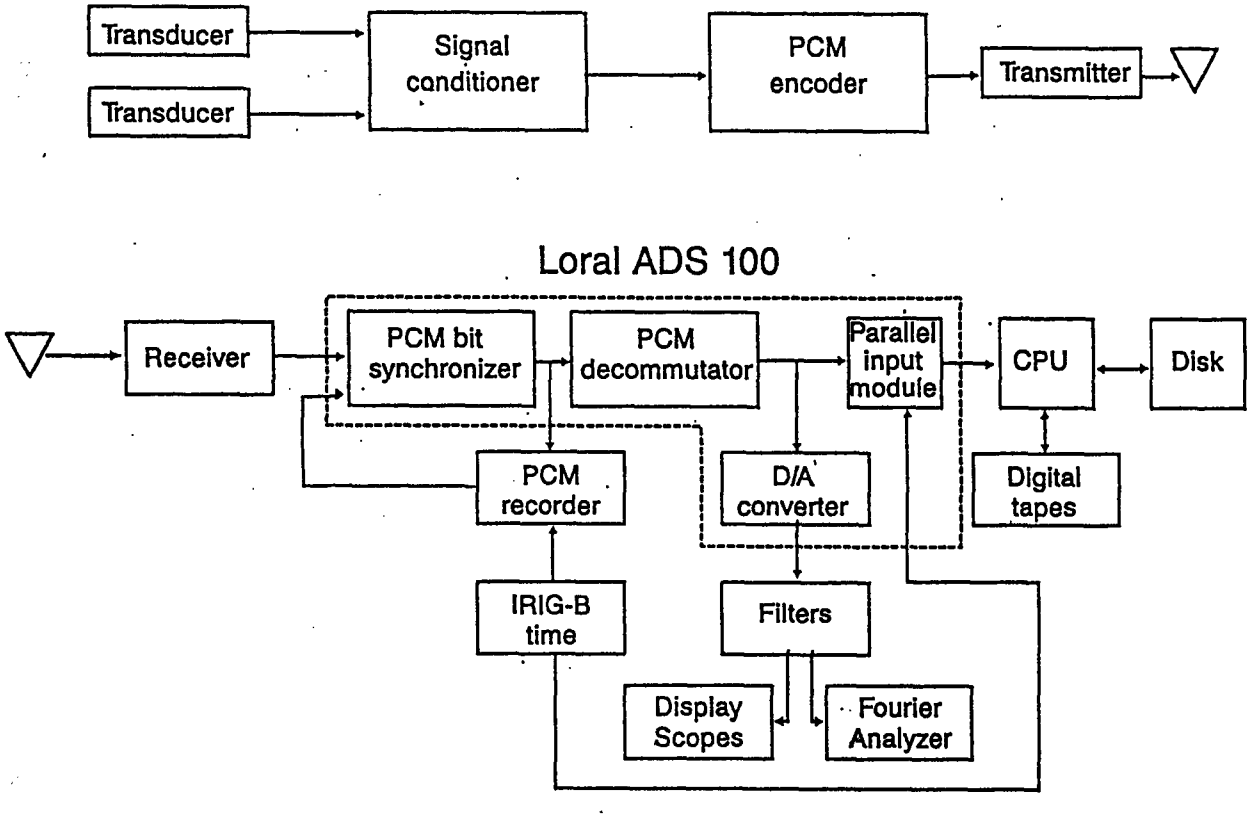

Figure 2. Data acquisition system.

The transmitted NRZ-L code was received by a Scientific Atlanta series 420S receiver* and passed into a Loral Instrumentation ADS-100 system*. The input buffer and PCM bit synchronizer modules recovered the serial pulse train from the data link noise and disturbances. The pulse was recorded on a Honeywell model 101 PCM tape recorder* along with voice annotation of the individual test runs and IRIG-B time code. Simultaneously, the PCM pulse train was passed to a PCM decommutator and demultiplexed into 16-bit words.

From this point, the pulse train was sent to both a digital-to-analog (D/A) converter and a parallel input module. The D/A converter passed the pulse train through a filter, external to the ADS-100 system, for real time display and fourier analysis. The parallel input module was used to input digital IRIG-B time code into the ADS-100. The pulse train passed out of the ADS-100 system from the input module to the host computer--a Hewlett Packard model 21MX-E series minicomputer*. The data were stored temporarily on the HP system disk and later transferred to digital tape to provide a permanent storage medium. The ADS-100 system was independent of the host control; however, software residing on the minicomputer controlled the hand shaking between the ADS-100 and the HP21MX-E during data acquisition.

Analysis

Triaxial seat pad vibration data were processed using the methods prescribed in ISO 2631 for broadband signals using third-octave analysis with weighting. Digitized acceleration signals from the X-, Y-, and Z-axes, from both the driver and passenger seat pad accelerometers, were read into a Dolch model 486 portable computer*. A USAARL-developed automated analysis program was used to produce tabular and graphic plots of the acceleration data. These plots (Appendix B) were used to identify vibration exposure limits which occurred under projected normal daily operating conditions.

The RACs require classification of the health hazard according to the hazard severity and probability. Since the ISO 2631 standard does not use RACs directly, the severity of the hazard may be estimated reasonably from the worst-case exposure before the onset of ELs (i.e., for any vibration frequency and direction). An indicator which may be used for the assessment of hazard severity is the duration of safe exposure (DSE). The DSE is defined as the length of time a person can be exposed to WBV before reaching the health and safety exposure limit (HSEL). Thus, a long DSE indicates tolerable WBV, whereas a short DSE indicates severe WBV. In order to translate the DSEs to hazard severity, Table 2 was used to define the category (I-IV) of exposure.

Table 2.

Hazard severity classification.

Attribute	Category	Duration of safe exposure (DSE) to WBV
Catastrophic	I	Less than 5 minutes
Critical	II	Between 5 and 30 minutes
Marginal	III	Between 30 minutes and 4 hours
Negligible	IV	More than 4 hours

Hazard severity categories are defined as follows:

Category I - Catastrophic: Hazard may cause death or total loss of a bodily system.

Category II - Critical: Hazard may cause severe bodily injury, severe occupational illness, or major damage to a bodily system.

Category III - Marginal: Hazard may cause minor bodily injury, minor occupational illness, or minor damage to a bodily system.

Category IV - Negligible: Hazard would cause less than minor bodily injury, minor occupational illness, or minor bodily system damage.

The operational environments of the M915A2 determine the likelihood of occurrence, or hazard probability level, of exposure to WBV. These levels, identified as levels A through E in AR 40-10, with their corresponding operating conditions relevant to the WBV signatures in the M915A2, are listed in Table 3.

Operating the M915A2 over paved surfaces represents approximately 75 percent of the total mission, therefore, the probability of WBV exposure over similar courses is frequent and may be assigned hazard probability level A. The operation over cross-country roads is assigned a Hazard Probability Level B, which represents approximately 20 percent of its mission time. Operating over unimproved secondary roads, represented by the Belgian block, is within the M915A2 mission, but its occurrence should be only occasional, prompting the assignment of hazard probability level C to this course.

Table 3.

Hazard probability classification.

Attribute	Level	Road/terrain type, operating speed
Frequent	A	Primary roads, 40-65 m.p.h. Cross-country, 8 m.p.h. and under
Probable	B	Primary roads, 20-40 m.p.h. Cross-country, 9-16 m.p.h.
Occasional	C	Belgian block, 5-15 m.p.h.
Remote	D	Belgian block, above 15 m.p.h.
Improbable	E	Conditions unlikely to occur

Hazard severity categories and levels are used to find the RACs for each test condition. Using Table 4, the RACs are found at the intersection of the category and level. Overall RAC for the vehicle then is determined by weighting the individual test RACs according to the percent of mission time the run represented and then averaging and rounding to a final RAC.

Table 4.

RAC determination.

	Hazard probability levels				
Hazard category	A	B	C	D	E
I	1	1	1	2	3
II	1	1	2	3	4
III	2	3	3	4	5
IV	3	5	5	5	5

Results

The duration of exposure (in hours) necessary to reach the HSEL was calculated for all 54 data sets. Since the M915A2 mission requires 10 hours of operation over primary, secondary, and cross-country terrain, the exposure times of less than 10 hours were flagged for assessment and are listed in Table 5.

The DSEs for passenger and driver ranged from a low of 6.31 hours to a high of 35.69 hours. For speeds up to 45 mph, exposure limits for the primary surface indicate that WBV exposures in any 24-hour period be limited to 18 hours for the loaded configuration, 8.97 hours for the bobtail configuration and 22 hours for the unloaded configuration. It should be noted here that tests on the primary terrain at 55 mph resulted in a considerable increase in vibration, and exposure at this speed should be limited to 6.31 hours. Exposure limits for the cross-country terrain indicate WBV exposure be limited to 10.28, 8.56, and 17.19 hours for the loaded, bobtail, and unloaded configurations, respectively, for speeds ranging from 8 to 12 mph. Exposure limits for the Belgian block surface for speeds ranging from 15 to 25 mph indicate WBV exposure be limited to 17.09, 9.88, and 14.56 hours for the loaded, bobtail, and unloaded configurations, respectively.

The frequencies at which the HSELs were reached fell in the range from 2.2 to 7.1 Hz for both passenger and driver. The majority of the HSELs occurred at frequency levels in the range of 4.5 to 7.1 Hz, which lies in the WBV resonance frequency range (4 to 8 Hz).

Because the DSEs were well above the 4-hour mark as defined in Table 2, hazard severity was determined to be negligible for all the data sets for both passenger and driver. This resulted in RAC categories of 4 for both positions. RAC exposure probability included remote, occasional, probable, and frequent for the passenger and driver. Overall RACs were 3 and 5 for both positions. The single RAC for the M915A2 was determined by weighting the individual RACs according to their percentage of total mission time and then averaging and rounding to a final RAC. The overall RAC for the M915A2 truck was calculated to be 4.

Discussion

For the worst case on each test course, the lowest tolerance levels were experienced on the primary surface (6.31 hours, run 026, 55 mph), with less severe WBV occurring on the Belgian block course (9.88 hours, run 008), followed by the cross-country course (8.56 hours, run 010). However, the general trend of the

Table 5.

Seat HSEL for times of less than 10 hours with respect to Z-axis, vibration frequency, vehicle speed, terrain surface, and vehicle load.

Determination of RAC categories					Determination of RAC levels					Over-all RAC
DSE hours	Hz	Seat position	Hazard severity	RAC cate-gory	Test course	Config-uration	Speed (MPH)	Exposure proba-bility	RAC level	
6.31	7.1	Passenger	Negligible	IV	Primary	Loaded	55	Frequent	A	3
8.56	7.1	Driver	Negligible	IV	Cross-country	Bobtail	12	Probable	B	5
8.97	5.7	Passenger	Negligible	IV	Primary	Bobtail	45	Frequent	A	3
9.88	4.5	Driver	Negligible	IV	Belgian block	Loaded	8	Occasion-al	C	5

exposure limits indicates that overall, the lowest tolerance levels were experienced on the cross-country course with DSEs ranging from 8.56 to 28.56 hours. Next, the tolerances for the Belgian block course ranged from 9.88 to 35.69 hours. Finally, the highest tolerance levels overall were experienced on the primary course with DSEs ranging from 6.31 to 36.69 hours.

The WBV experienced by the vehicle crewmen differed for seating position. The passenger position data typically showed a lower exposure limit as compared to the driver position for most of the data trials. This situation is most apparent under the Belgian block surface where vehicle roll occurred. A likely reason for this result is that the passenger does not have hand holds which can be used to dampen WBV. By grabbing the steering wheel, the driver can reduce the amount of upper body sway. This in turn lowers the amount of induced seat motion resulting in a lower apparent WBV measurement at that seating position. The addition of both right and left hand holds for the passenger would reduce the amount of vibration measured at that position and likely would improve the perceived ride quality.

Conclusion

Results from this WBV test indicate that while operating the M915A2 in its intended operational environment, both driver and passenger were exposed to an overall RAC of 4. It is recommended that exposure to WBV be restricted to the following:

1. Paved surface, up to 45 mph: Bobtail configuration, not more than 9 continuous hours in any 24-hour period.

2. Paved surface, up to 45 mph: Unloaded configuration, not more than 22 continuous hours in any 24-hour period.

3. Paved surface, up to 45 mph: Loaded configuration, not more than 18 continuous hours in any 24-hour period.

4. Cross-country terrain, up to 12 mph: Bobtail configuration, not more than 9 continuous hours in any 24-hour period.

5. Cross-country terrain, up to 12 mph: Unloaded trailer, not more than 17 continuous hours in any 24-hour period.

6. Cross-country terrain, up to 12 mph: Loaded trailer, not more than 10 continuous hours in any 24-hour period.

7. Belgian block, up to 25 mph: Bobtail configuration, not more than 10 continuous hour in any 24-hour period.

8. Belgian block, up to 25 mph: Unloaded configuration, not more than 15 continuous hours in any 24-hour period.

9. Belgian block, up to 25 mph: Loaded configuration, not more than 17 continuous hours in any 24-hour period.

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Appendix A.

Manufacturer's list

Conic/Loral Data Systems
9020 Balboa Avenue
San Diego, CA 92123

EMR/Fairchild Weston Systems
P.O. Box 3041
Sarasota, FL 33578

Freightliner Corporation
P.O. Box 3849
Portland, OR 97208

Honeywell
Honeywell Plaza
Minneapolis, MN 55408

Hewlett-Packard Company
4700 Bayou Boulevard
Pensacola, FL 32502

Larson-Davis Laboratories
280 South Main
Pleasant Grove, UT 84062

Loral Instrumentation
8401-T Aero Dr.
San Diego, CA 92123

Scientific Atlanta
1-T Technology Pky.
P.O. Box 105600
Atlanta, GA 30348

TEAC Corporation of America
7733 Telegraph Road
Montebello, CA 90640

Appendix B.

ISO tables and graphs.

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-01 Passenger

21-SEP-93 15:29:37

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Paved**
4:	Position:.....	**Passenger**
5:	Speed:.....	**35 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.1400**	**0.1250**	**3.600**	**17.250**	**39.183**
2.85	0.1400	0.0982	5.133	23.183	51.367
4.48	0.2000	0.0893	5.883	25.967	57.117
7.12	0.2700	0.0758	7.383	31.433	68.117
1.83	0.0700	0.0700	8.233	34.500	74.250

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
8.95	**0.8800**	**0.1966**	**1.750**	**9.650**	**23.050**
4.48	0.3400	0.1518	2.667	13.500	31.367
3.46	0.1400	0.0809	6.750	29.183	63.500
7.12	0.2800	0.0787	7.017	30.183	65.500
2.85	0.0900	0.0632	9.450	38.867	82.867

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.2300**	**0.2300**	**2.350**	**12.217**	**28.550**
4.48	0.2300	0.2300	2.350	12.217	28.550
8.95	0.2500	0.2235	2.467	12.683	29.550
2.24	0.1700	0.1272	5.733	25.433	56.000
2.85	0.1500	0.1266	5.783	25.550	56.250

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

X

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-01

February 14, 1992

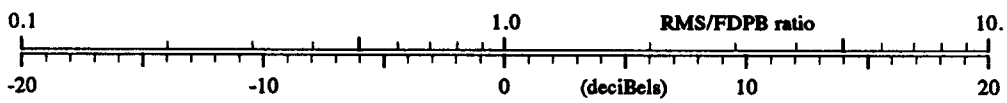
Passenger seat

M915a2 truck

Exposure: 10h 0m

(Hz)		RMS / FDPB
1.02	X	0.03 / 0.191
	Y	0.04 / 0.191
	Z	0.03 / 0.531
1.42	X	0.05 / 0.191
	Y	0.03 / 0.191
	Z	0.04 / 0.450
1.83	X	0.07 / 0.191
	Y	0.02 / 0.191
	Z	0.07 / 0.396
2.24	X	0.14 / 0.214
	Y	0.06 / 0.214
	Z	0.17 / 0.358
2.85	X	0.14 / 0.273
	Y	0.09 / 0.273
	Z	0.15 / 0.317
3.46	X	0.11 / 0.331
	Y	0.14 / 0.331
	Z	0.12 / 0.288
4.48	X	0.20 / 0.429
	Y	0.34 / 0.429
	Z	0.23 / 0.268
5.70	X	0.06 / 0.545
	Y	0.09 / 0.545
	Z	0.06 / 0.268
7.12	X	0.27 / 0.681
	Y	0.28 / 0.681
	Z	0.23 / 0.268
8.95	X	0.26 / 0.856
	Y	0.88 / 0.856
	Z	0.25 / 0.300
11.39	X	0.12 / 1.090
	Y	0.22 / 1.090
	Z	0.09 / 0.381
14.24	X	0.12 / 1.363
	Y	0.11 / 1.363
	Z	0.09 / 0.477
17.90	X	0.20 / 1.713
	Y	0.20 / 1.713
	Z	0.08 / 0.599
22.58	X	0.11 / 2.161
	Y	0.12 / 2.161
	Z	0.06 / 0.756
28.48	X	0.22 / 2.725
	Y	0.11 / 2.725
	Z	0.05 / 0.954
36.01	X	0.28 / 3.446
	Y	0.09 / 3.446
	Z	0.05 / 1.206
45.17	X	0.19 / 4.322
	Y	0.04 / 4.322
	Z	0.04 / 1.513
56.97	X	0.54 / 5.451
	Y	0.16 / 5.451
	Z	0.06 / 1.908
71.82	X	0.10 / 6.872
	Y	0.05 / 6.872
	Z	0.06 / 2.405

21-SEP-93 15:29:37



Course: Paved
Speed: 35 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-01 Driver

21-SEP-93 15:29:38

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Paved**
4:	Position:.....	**Driver**
5:	Speed:.....	**35 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.1700**	**0.0759**	**7.367**	**31.433**	**68.117**
7.12	0.2000	0.0562	11.017	44.367	93.750
8.95	0.1900	0.0425	15.800	60.500	125.000
2.24	0.0400	0.0357	19.550	72.867	149.000
2.85	0.0500	0.0351	20.000	74.250	151.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
8.95	**0.5400**	**0.1207**	**3.800**	**18.017**	**40.800**
4.48	0.2200	0.0982	5.133	23.183	51.367
3.46	0.0900	0.0520	12.183	48.367	101.500
7.12	0.1800	0.0506	12.650	49.867	104.500
2.85	0.0600	0.0421	15.933	61.000	126.250

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.3400**	**0.3400**	**1.217**	**7.250**	**17.833**
8.95	0.3200	0.2860	1.650	9.167	22.050
4.48	0.2100	0.2100	2.717	13.717	31.750
2.24	0.1700	0.1272	5.733	25.433	56.000
2.85	0.1500	0.1266	5.783	25.550	56.250

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

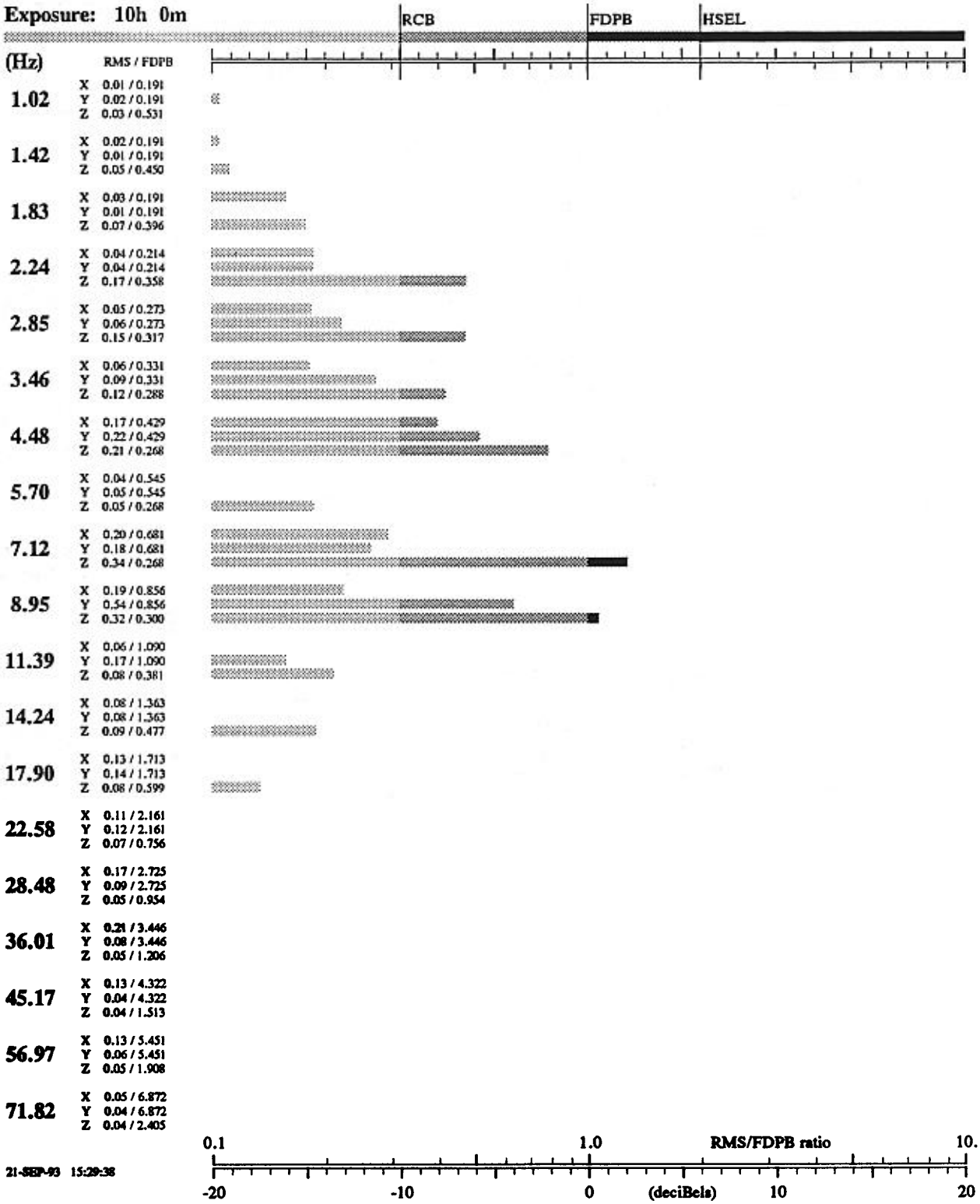
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-01 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:38

Course: Paved
Speed: 35 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-03 Passenger

21-SEP-93 15:29:38

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Paved**
4:	Position:.....	**Passenger**
5:	Speed:.....	**55 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3800**	**0.1696**	**2.233**	**11.717**	**27.500**
2.24	0.1800	0.1607	2.433	12.550	29.300
5.70	0.3600	0.1263	3.550	17.050	38.750
7.12	0.4200	0.1180	3.933	18.550	41.867
2.85	0.1500	0.1053	4.650	21.300	47.617

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.5500**	**0.1545**	**2.600**	**13.217**	**30.683**
8.95	0.5100	0.1140	4.133	19.333	43.500
1.83	0.0600	0.0600	10.117	41.183	87.500
1.42	0.0600	0.0600	10.117	41.183	87.500
1.02	0.0600	0.0600	10.117	41.183	87.500

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
5.70	**0.3000**	**0.3000**	**1.517**	**8.600**	**20.800**
7.12	0.2900	0.2900	1.617	9.000	21.683
4.48	0.2700	0.2700	1.817	9.900	23.617
8.95	0.2300	0.2056	2.817	14.083	32.550
2.85	0.2300	0.1941	3.067	15.150	34.800

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

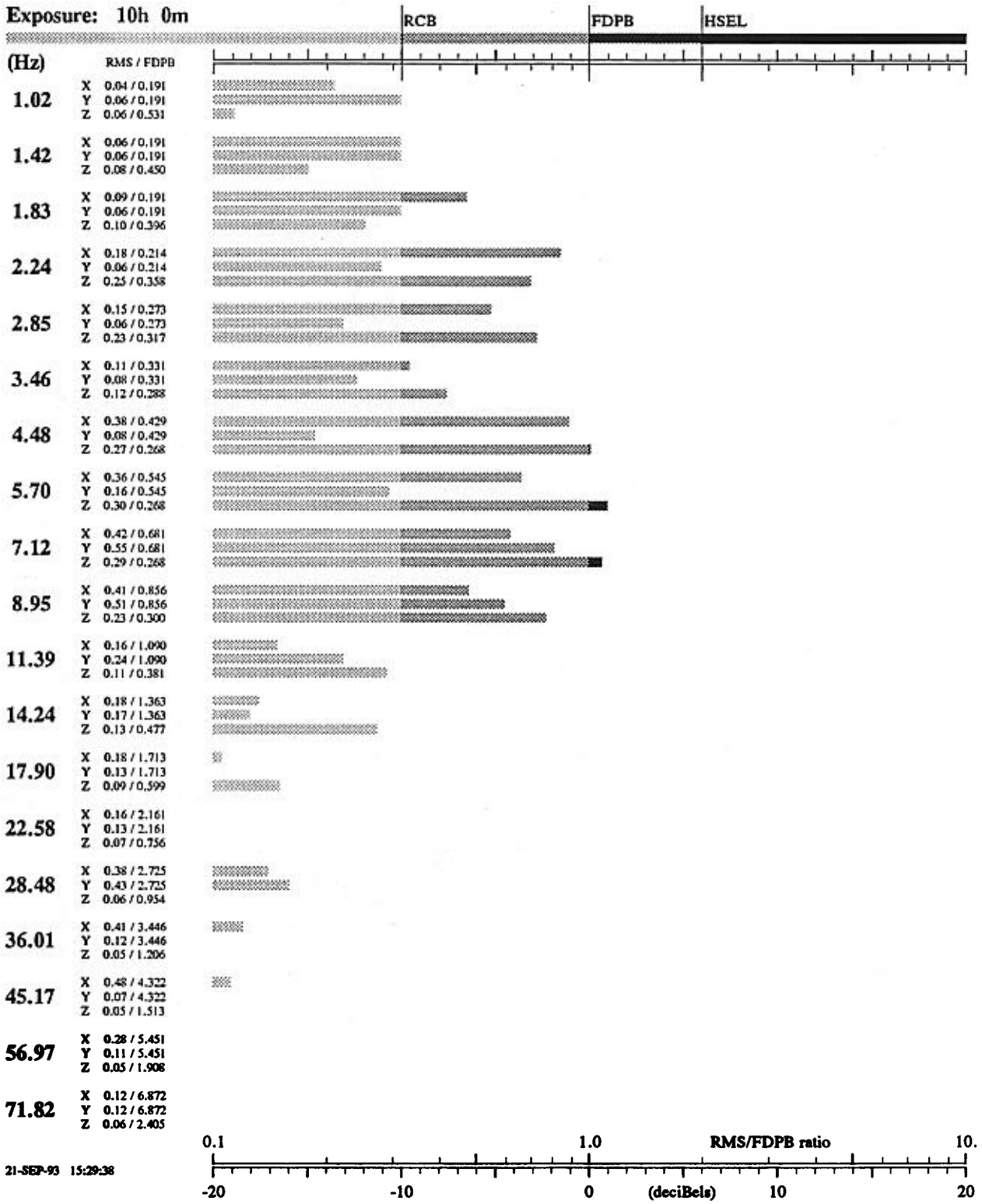
X: Longitudinal
Y: Transverse
Z: Vertical

RUN-03

February 14, 1992

Passenger seat

M915a2 truck



Course: Paved
Speed: 55 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-03 Driver

21-SEP-93 15:29:38

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Paved**
4:	Position:.....	**Driver**
5:	Speed:.....	**55 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2100**	**0.0937**	**5.483**	**24.500**	**54.117**
5.70	0.1800	0.0632	9.450	38.867	82.867
2.24	0.0700	0.0625	9.583	39.300	83.750
7.12	0.1900	0.0534	11.800	47.000	98.867
2.85	0.0700	0.0491	13.117	51.500	107.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.3200**	**0.0899**	**5.833**	**25.750**	**56.617**
8.95	0.3100	0.0693	8.350	34.933	75.117
5.70	0.1100	0.0386	17.767	67.000	137.750
4.48	0.0800	0.0357	19.550	72.867	149.000
2.24	0.0400	0.0357	19.550	72.867	149.000

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.3300**	**0.3300**	**1.283**	**7.550**	**18.500**
8.95	0.3000	0.2682	1.833	10.000	23.800
5.70	0.2000	0.2000	2.933	14.583	33.617
2.24	0.2500	0.1871	3.250	15.867	36.300
2.85	0.2100	0.1773	3.533	17.000	38.617

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

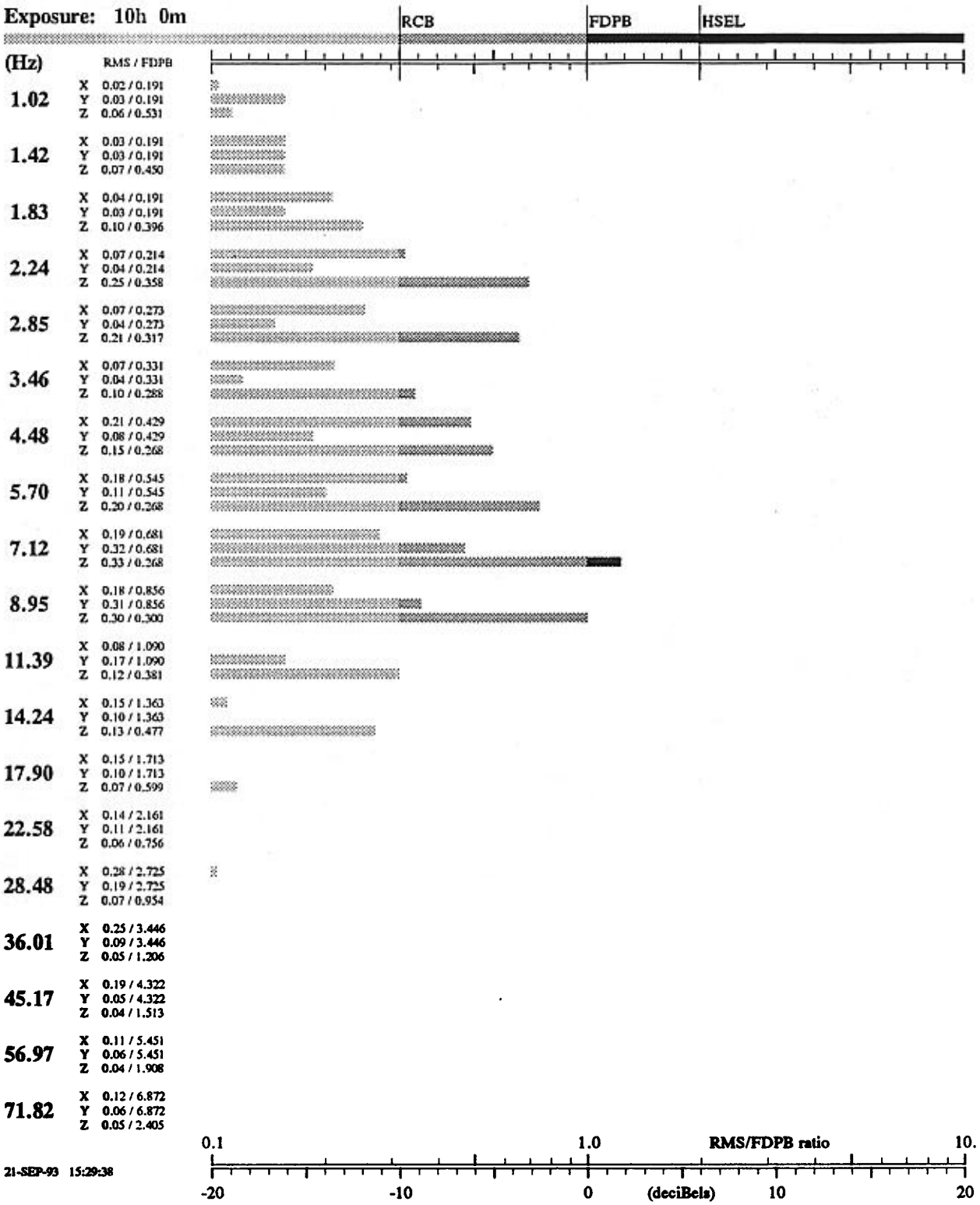
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-03 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



Course: Paved
Speed: 55 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-04 Passenger

21-SEP-93 15:29:38

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Paved**
4:	Position:.....	**Passenger**
5:	Speed:.....	**45 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
5.70	**0.8100**	**0.2842**	**0.867**	**5.833**	**14.650**
2.24	0.1700	0.1518	2.667	13.500	31.367
4.48	0.2800	0.1250	3.600	17.250	39.183
7.12	0.3500	0.0983	5.133	23.117	51.367
2.85	0.1400	0.0982	5.133	23.183	51.367

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
8.95	**0.5600**	**0.1251**	**3.600**	**17.250**	**39.117**
5.70	0.2800	0.0982	5.133	23.183	51.367
3.46	0.1100	0.0636	9.367	38.550	82.250
7.12	0.2100	0.0590	10.333	42.000	89.000
11.39	0.3200	0.0562	11.017	44.367	93.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
5.70	**0.5800**	**0.5800**	**0.367**	**3.350**	**8.967**
7.12	0.2500	0.2500	2.067	10.967	25.867
8.95	0.2700	0.2413	2.183	11.467	27.000
2.85	0.1900	0.1604	4.100	19.217	43.250
4.48	0.1600	0.1600	4.117	19.267	43.367

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

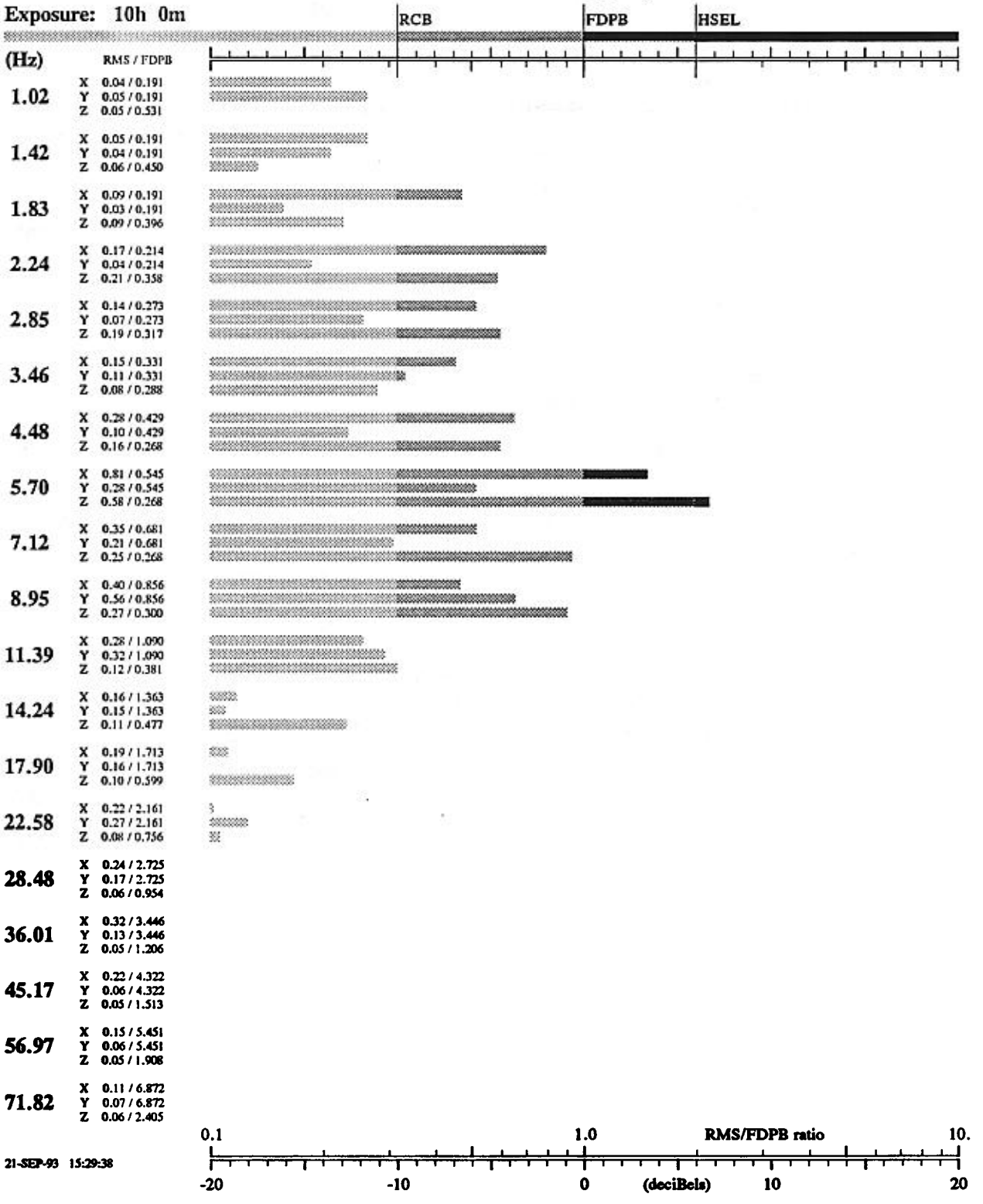
RUN-04

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



Course: Paved
Speed: 45 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-04 Driver

21-SEP-93 15:29:38

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Paved**
4:	Position:.....	**Driver**
5:	Speed:.....	**45 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
5.70	**0.4000**	**0.1404**	**3.017**	**14.933**	**34.367**
2.24	0.0700	0.0625	9.583	39.300	83.750
7.12	0.2000	0.0562	11.017	44.367	93.750
4.48	0.1200	0.0536	11.717	46.750	98.500
3.46	0.0900	0.0520	12.183	48.367	101.500

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
8.95	**0.4000**	**0.0894**	**5.867**	**25.933**	**57.000**
5.70	0.1800	0.0632	9.450	38.867	82.867
11.39	0.2300	0.0404	16.800	63.867	131.750
7.12	0.1400	0.0393	17.367	65.750	135.250
2.85	0.0500	0.0351	20.000	74.250	151.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
5.70	**0.3900**	**0.3900**	**0.900**	**6.000**	**15.017**
7.12	0.3000	0.3000	1.517	8.600	20.800
8.95	0.3000	0.2682	1.833	10.000	23.800
2.85	0.1800	0.1519	4.433	20.550	46.000
2.24	0.2000	0.1497	4.533	20.933	46.750

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

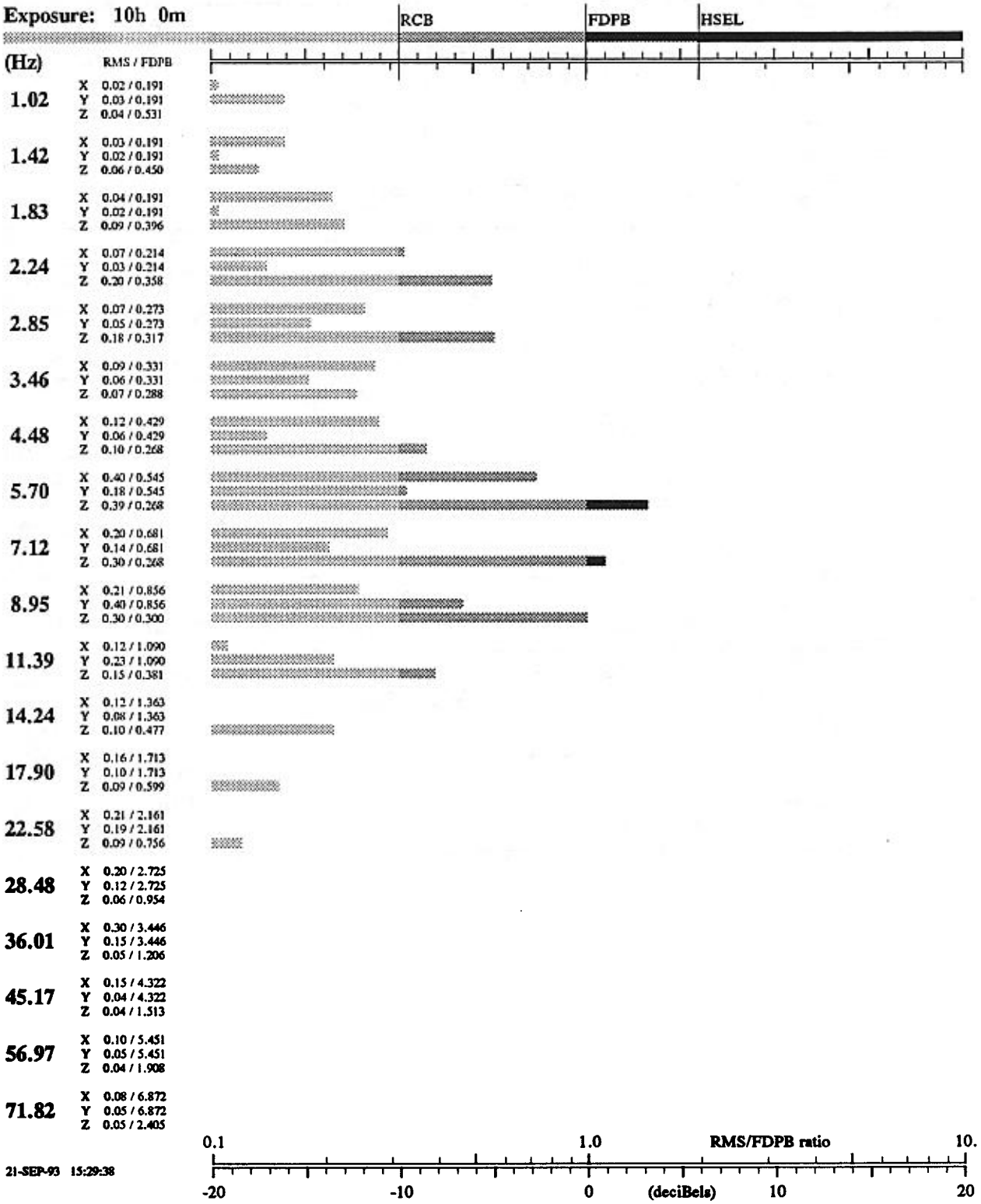
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-04 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



Course: Paved
Speed: 45 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-05 Passenger

21-SEP-93 15:29:39

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Secondary a**
4:	Position:.....	**Passenger**
5:	Speed:.....	**15 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.8100**	**0.3616**	**0.517**	**4.117**	**10.750**
2.24	0.1600	0.1429	2.933	14.583	33.617
5.70	0.3800	0.1333	3.267	15.933	36.433
1.83	0.1200	0.1200	3.833	18.150	41.050
7.12	0.4100	0.1152	4.067	19.083	43.000

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.5800**	**0.1629**	**2.383**	**12.333**	**28.867**
8.95	0.7000	0.1564	2.550	13.000	30.250
3.46	0.2400	0.1387	3.067	15.150	34.800
4.48	0.3100	0.1384	3.083	15.183	34.867
1.83	0.1200	0.1200	3.833	18.150	41.050

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.4600**	**0.4600**	**0.633**	**4.733**	**12.183**
5.70	0.2200	0.2200	2.533	12.933	30.117
7.12	0.2100	0.2100	2.717	13.717	31.750
2.24	0.2800	0.2095	2.733	13.750	31.867
2.85	0.2100	0.1773	3.533	17.000	38.617

* International Standards Organization ISO 2631:

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Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

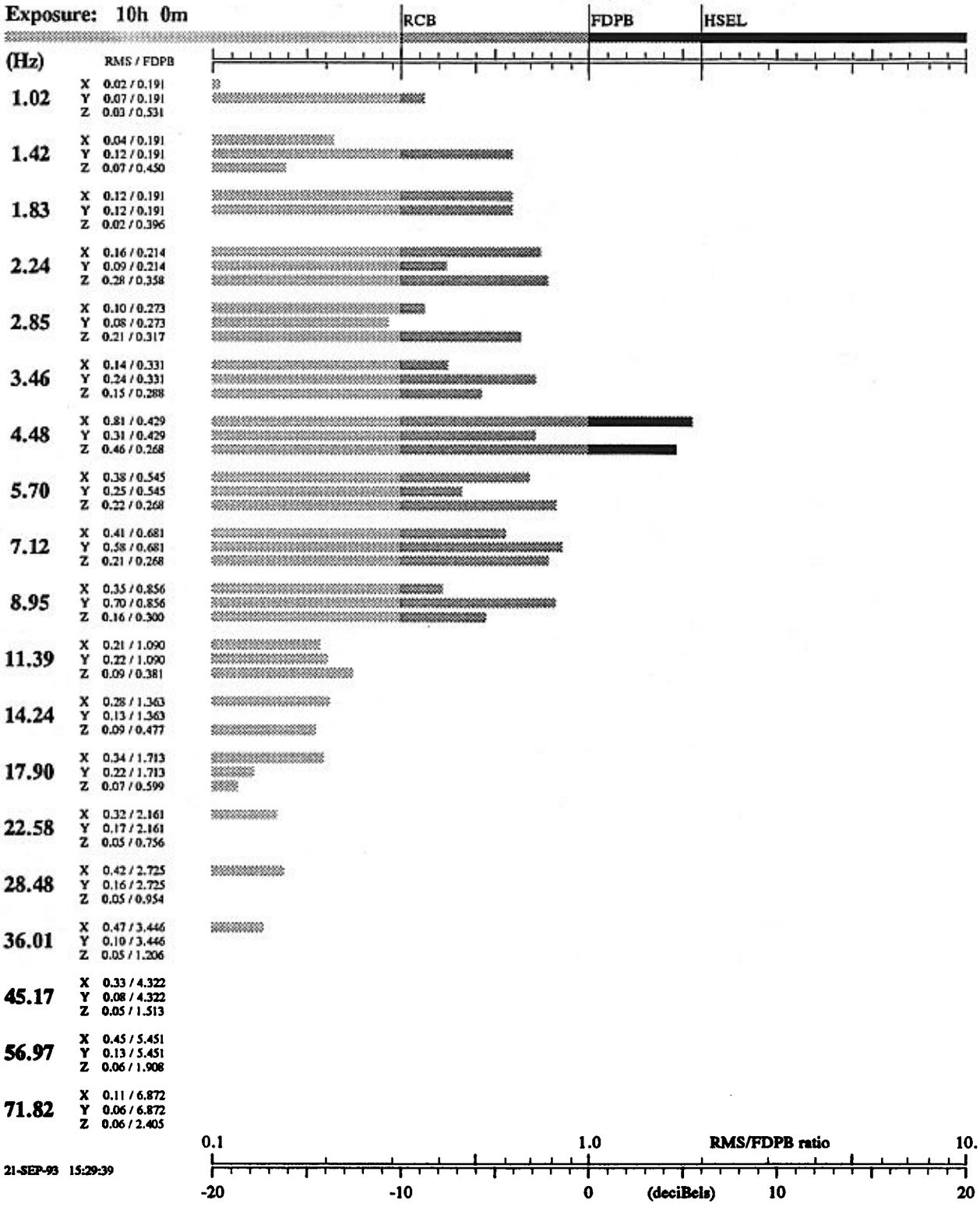
RUN-05

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:39

Course: Secondary a
Speed: 15 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-05 Driver

21-SEP-93 15:29:39

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Secondary a**
4:	Position:.....	**Driver**
5:	Speed:.....	**15 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.4400**	**0.1964**	**1.767**	**9.650**	**23.117**
5.70	0.2000	0.0702	8.200	34.433	74.117
7.12	0.2200	0.0618	9.717	39.800	84.750
3.46	0.1000	0.0578	10.617	42.933	91.000
2.24	0.0600	0.0536	11.717	46.750	98.500

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3000**	**0.1339**	**3.250**	**15.833**	**36.250**
8.95	0.4300	0.0961	5.300	23.800	52.617
7.12	0.3300	0.0927	5.583	24.833	54.750
1.83	0.0800	0.0800	6.850	29.550	64.367
3.46	0.1300	0.0751	7.467	31.800	68.867

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3700**	**0.3700**	**1.050**	**6.450**	**16.050**
7.12	0.2200	0.2200	2.533	12.933	30.117
5.70	0.2000	0.2000	2.933	14.583	33.617
2.24	0.2400	0.1796	3.467	16.717	38.050
8.95	0.1700	0.1520	4.433	20.550	46.000

* International Standards Organization ISO 2631:
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Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

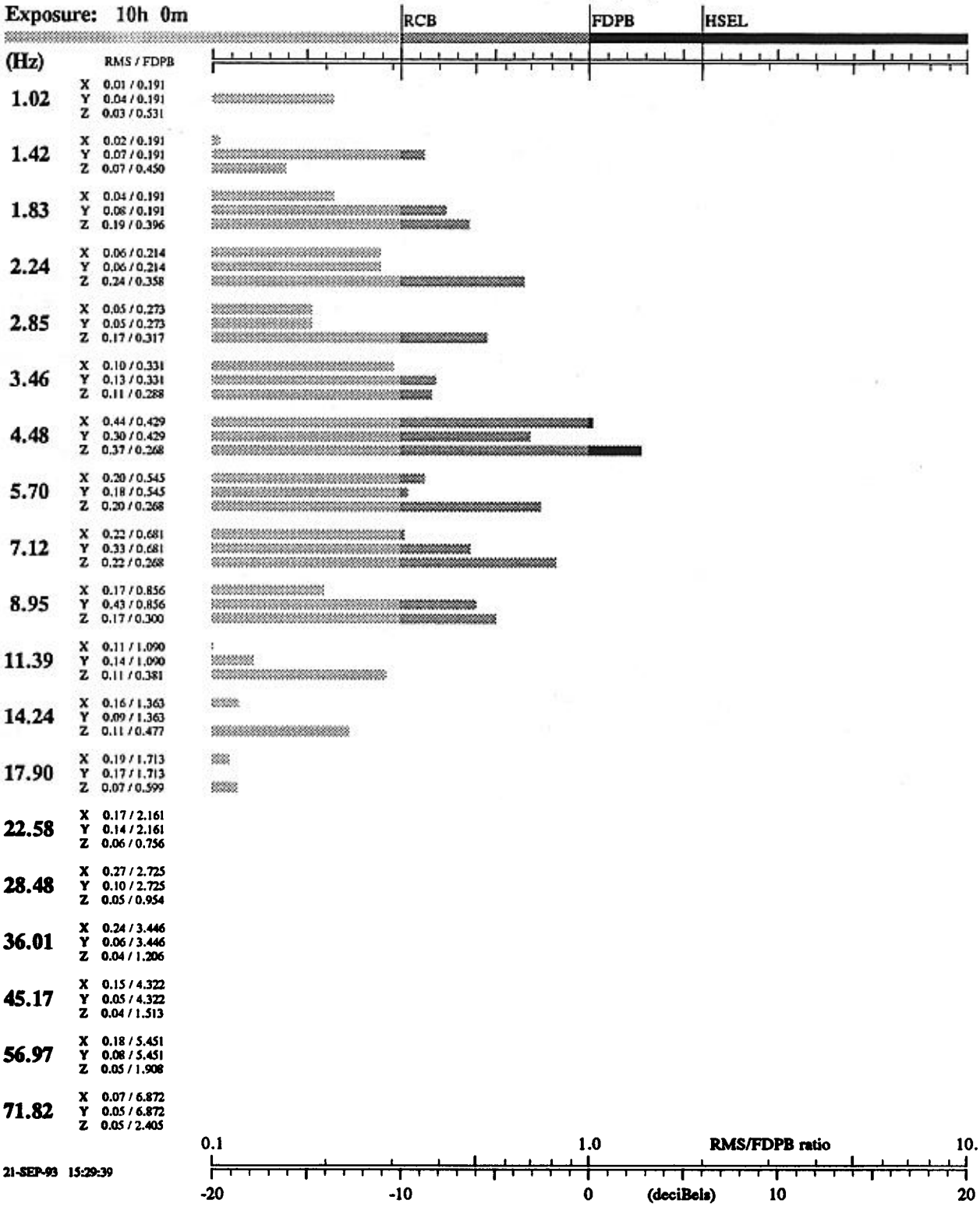
RUN-05

February 14, 1992

Driver seat

M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:39

Course: Secondary a
Speed: 15 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-06 Passenger

21-SEP-93 15:29:39

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Secondary a**
4:	Position:.....	**Passenger**
5:	Speed:.....	**20 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.2900**	**0.2589**	**1.083**	**6.633**	**16.467**
4.48	0.4600	0.2054	1.633	9.117	21.900
5.70	0.4800	0.1684	2.267	11.833	27.750
2.85	0.2200	0.1544	2.600	13.217	30.750
7.12	0.4400	0.1236	3.667	17.500	39.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.7400**	**0.2079**	**1.600**	**8.967**	**21.583**
2.24	0.2200	0.1964	1.767	9.650	23.117
8.95	0.8600	0.1922	1.817	9.933	23.717
5.70	0.4200	0.1474	2.800	14.017	32.433
2.85	0.1700	0.1193	3.867	18.300	41.367

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.2500**	**0.2500**	**2.067**	**10.967**	**25.867**
2.24	0.2900	0.2170	2.583	13.150	30.617
4.48	0.2100	0.2100	2.717	13.717	31.750
2.85	0.2400	0.2026	2.883	14.367	33.117
5.70	0.1900	0.1900	3.183	15.583	35.683

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

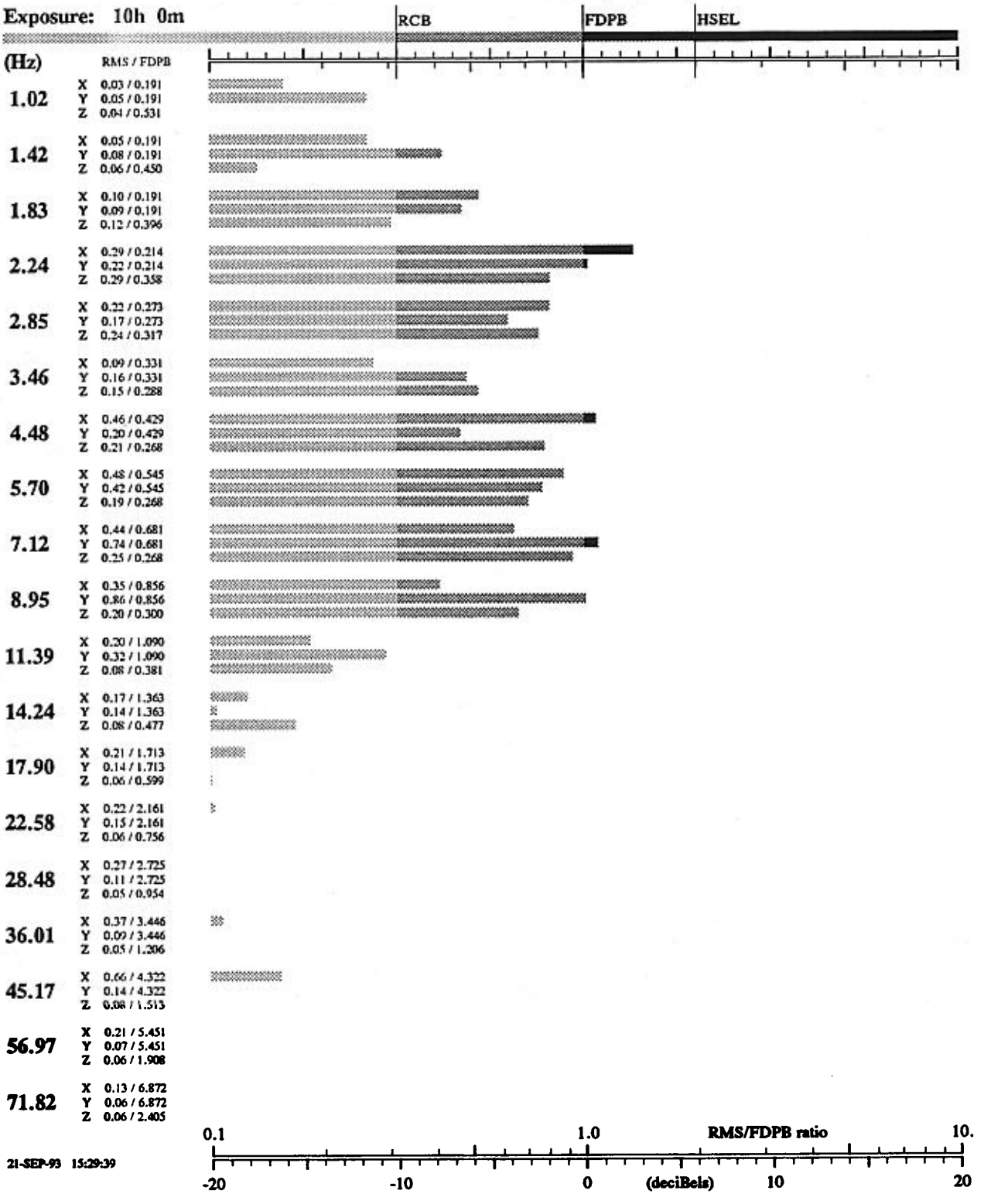
X: Longitudinal
Y: Transverse
Z: Vertical

RUN-06

February 14, 1992

Passenger seat

M915a2 truck



Course: Secondary a
Speed: 20 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-06 Driver

21-SEP-93 15:29:39

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Secondary a**
4:	Position:.....	**Driver**
5:	Speed:.....	**20 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2700**	**0.1205**	**3.800**	**18.050**	**40.867**
5.70	0.2400	0.0842	6.383	27.800	60.867
7.12	0.2700	0.0758	7.383	31.433	68.117
2.24	0.0800	0.0714	8.000	33.750	72.750
2.85	0.0700	0.0491	13.117	51.500	107.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.1500**	**0.1339**	**3.250**	**15.833**	**36.250**
7.12	0.4400	0.1236	3.667	17.500	39.750
8.95	0.5200	0.1162	4.017	18.867	42.617
5.70	0.2800	0.0982	5.133	23.183	51.367
2.85	0.1100	0.0772	7.200	30.800	66.867

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.2800**	**0.2800**	**1.700**	**9.433**	**22.617**
5.70	0.2400	0.2400	2.200	11.550	27.183
4.48	0.2300	0.2300	2.350	12.217	28.550
2.24	0.2900	0.2170	2.583	13.150	30.617
2.85	0.2400	0.2026	2.883	14.367	33.117

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

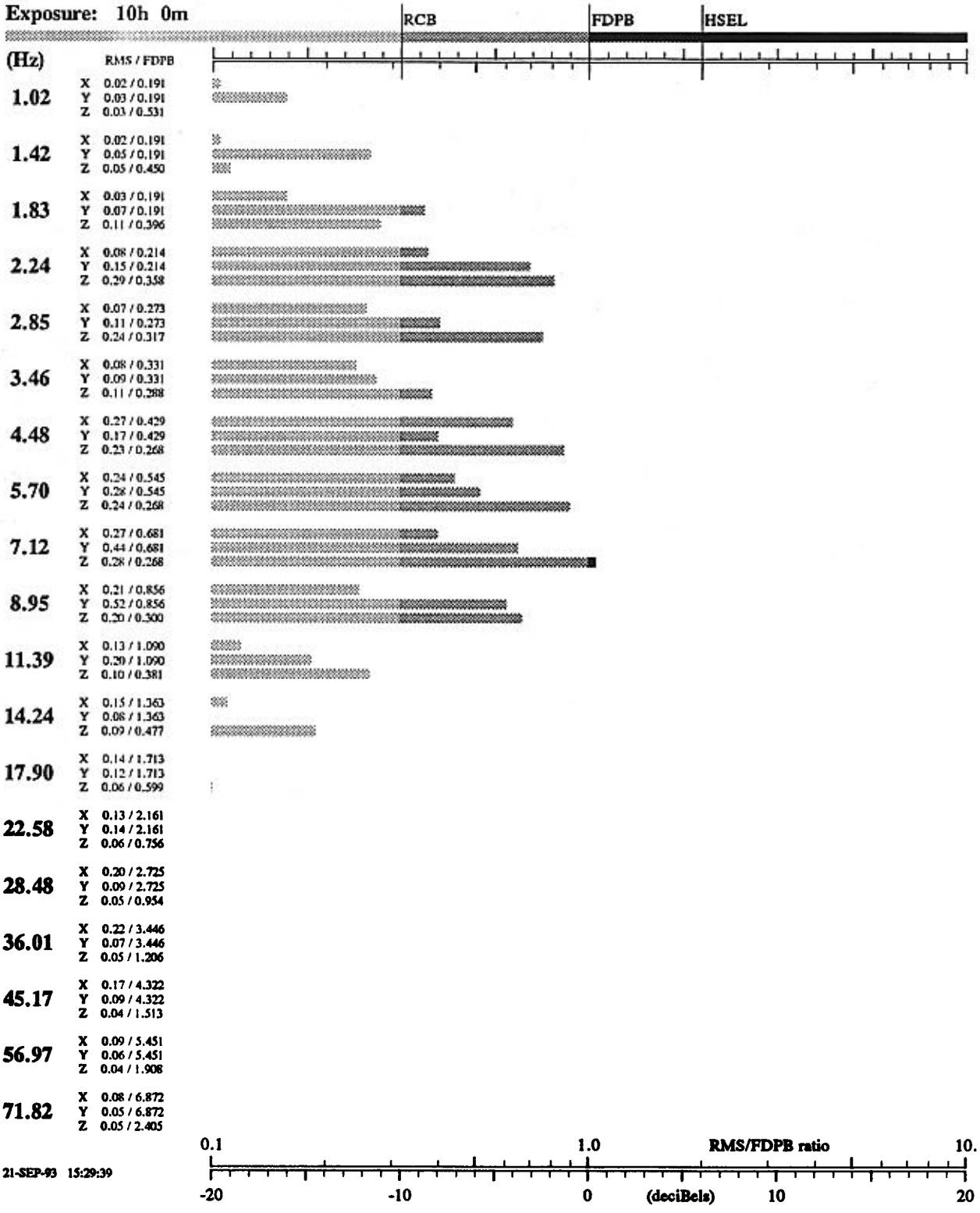
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-06 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



Course: Secondary a
Speed: 20 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-07 Passenger

21-SEP-93 15:29:39

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Secondary a**
4:	Position:.....	**Passenger**
5:	Speed:.....	**25 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.2600**	**0.2321**	**1.317**	**7.717**	**18.867**
4.48	0.5000	0.2232	1.417	8.133	19.800
1.83	0.1700	0.1700	2.233	11.683	27.433
7.12	0.5900	0.1657	2.317	12.083	28.250
2.85	0.2100	0.1474	2.800	14.017	32.433

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**1.3000**	**0.3652**	**0.517**	**4.050**	**10.617**
8.95	1.3100	0.2927	0.817	5.583	14.117
2.24	0.2200	0.1964	1.767	9.650	23.117
2.85	0.2300	0.1614	2.417	12.500	29.183
5.70	0.4400	0.1544	2.600	13.217	30.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.3100**	**0.3100**	**1.433**	**8.217**	**20.000**
8.95	0.2900	0.2592	1.933	10.433	24.800
2.85	0.3000	0.2532	2.017	10.767	25.500
4.48	0.2200	0.2200	2.533	12.933	30.117
3.46	0.2200	0.2046	2.833	14.183	32.750

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

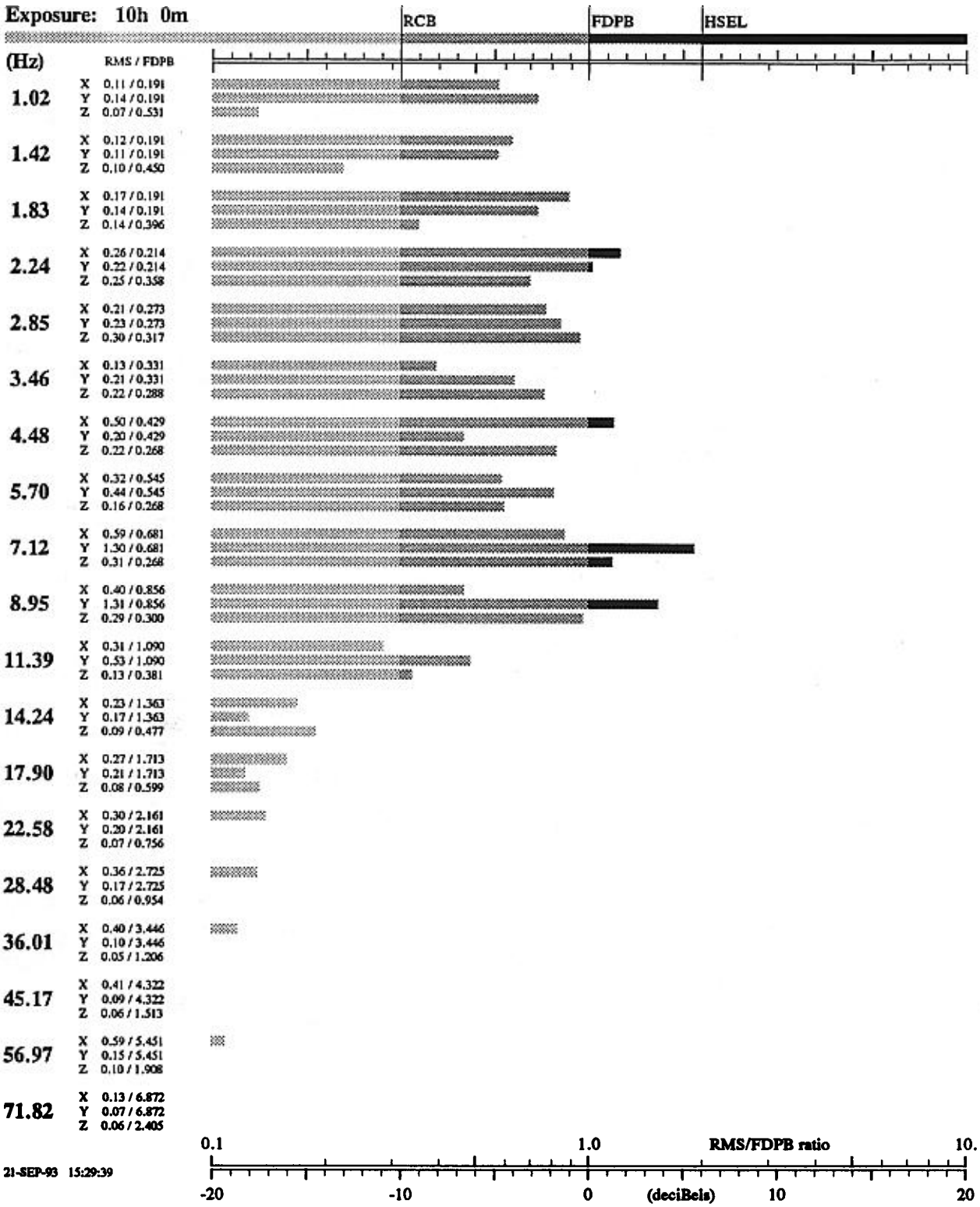
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-07
February 14, 1992

Passenger seat
M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:39

Course: Secondary a
Speed: 25 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-07 Driver

21-SEP-93 15:29:40

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Secondary a**
4:	Position:.....	**Driver**
5:	Speed:.....	**25 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3000**	**0.1339**	**3.250**	**15.833**	**36.250**
7.12	0.3900	0.1096	4.383	20.300	45.500
2.24	0.0900	0.0804	6.817	29.433	64.000
5.70	0.2200	0.0772	7.200	30.800	66.867
2.85	0.0800	0.0561	11.050	44.367	93.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.7800**	**0.2191**	**1.467**	**8.350**	**20.250**
8.95	0.7700	0.1721	2.183	11.500	27.050
2.24	0.1700	0.1518	2.667	13.500	31.367
1.83	0.1100	0.1100	4.350	20.183	45.250
2.85	0.1400	0.0982	5.133	23.183	51.367

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.3700**	**0.3700**	**1.050**	**6.450**	**16.050**
8.95	0.2700	0.2413	2.183	11.467	27.000
4.48	0.2300	0.2300	2.350	12.217	28.550
2.85	0.2500	0.2110	2.700	13.617	31.617
5.70	0.1900	0.1900	3.183	15.583	35.683

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

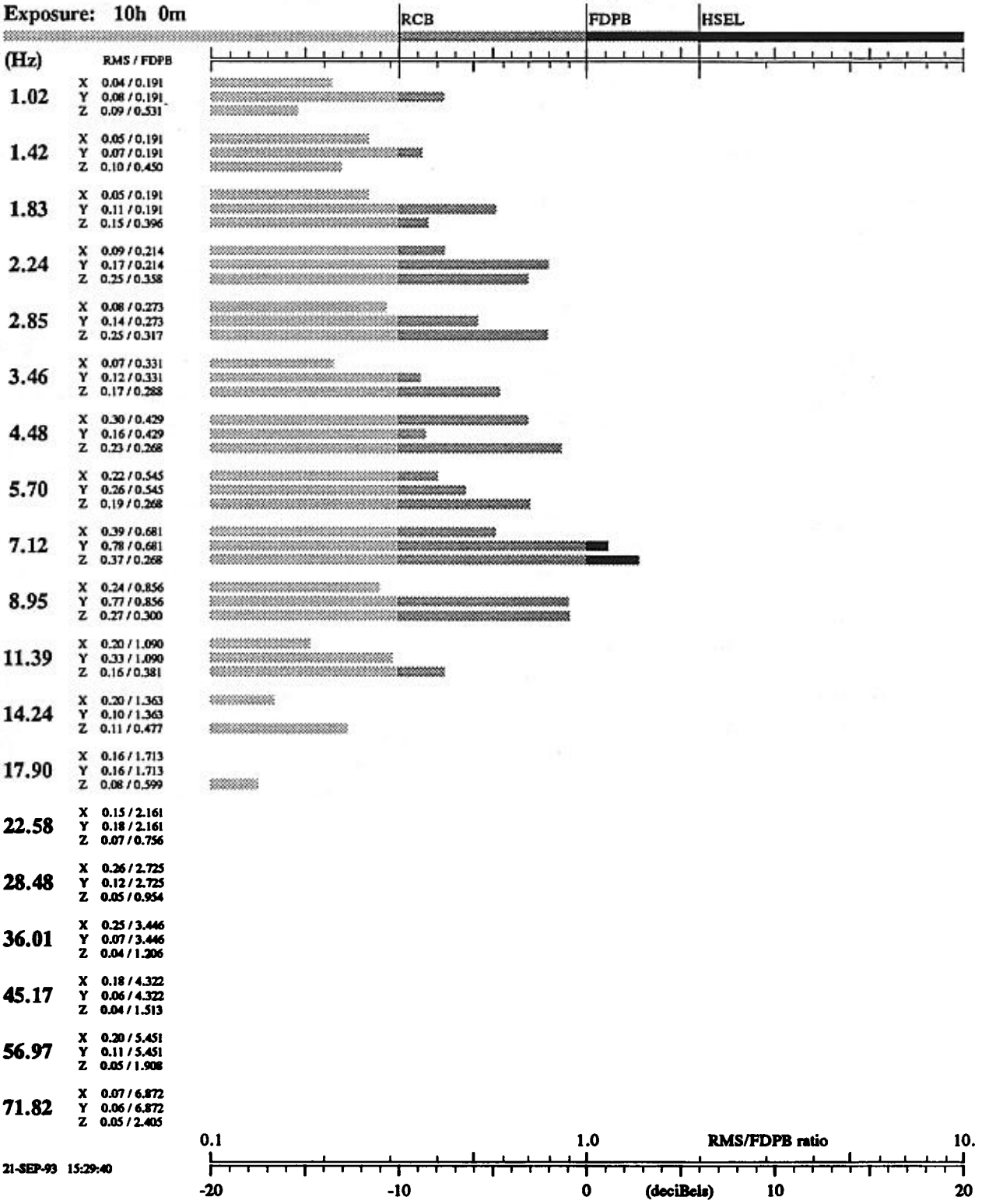
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-07 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:40

Course: Secondary a
Speed: 25 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-08 Passenger

21-SEP-93 15:29:40

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Cross country #1**
4:	Position:.....	**Passenger**
5:	Speed:.....	**8 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**1.0200**	**0.4554**	**0.283**	**2.900**	**7.900**
2.24	0.2400	0.2143	1.517	8.600	20.800
1.83	0.1700	0.1700	2.233	11.683	27.433
2.85	0.2200	0.1544	2.600	13.217	30.750
3.46	0.2600	0.1503	2.717	13.683	31.683

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.2500**	**0.2232**	**1.417**	**8.133**	**19.800**
2.85	0.3000	0.2105	1.567	8.800	21.250
3.46	0.2900	0.1676	2.283	11.900	27.933
1.83	0.1600	0.1600	2.450	12.617	29.500
1.42	0.1500	0.1500	2.717	13.717	31.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3700**	**0.3700**	**1.050**	**6.450**	**16.050**
2.24	0.2500	0.1871	3.250	15.867	36.300
2.85	0.1700	0.1435	4.833	22.000	49.000
5.70	0.1400	0.1400	5.000	22.683	50.367
1.83	0.2000	0.1353	5.250	23.617	52.367

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

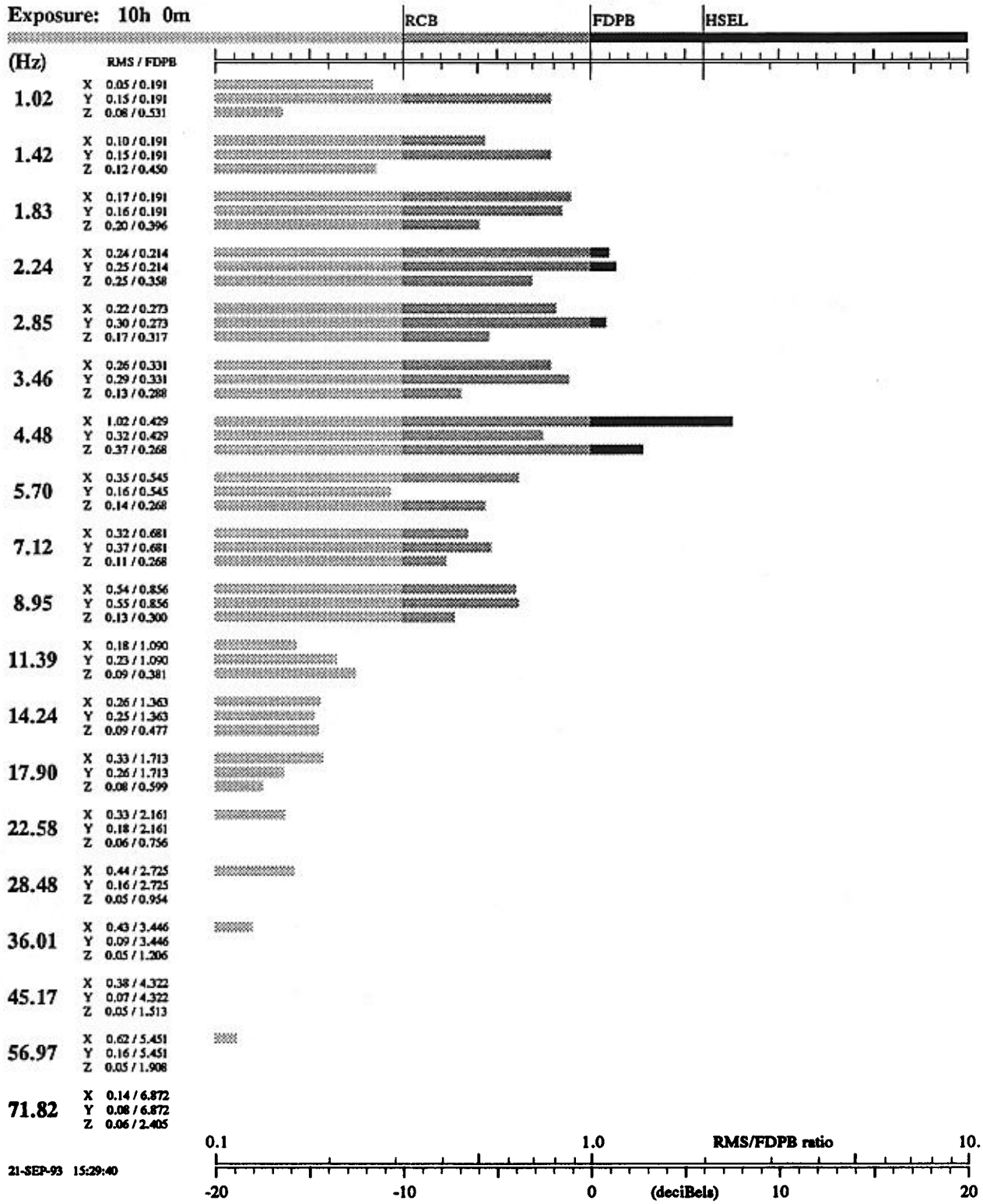
X: Longitudinal
Y: Transverse
Z: Vertical

RUN-08

February 14, 1992

Passenger seat

M915a2 truck



Course: Cross country #1
Speed: 8 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-08 Driver

21-SEP-93 15:29:40

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Cross country #1**
4:	Position:.....	**Driver**
5:	Speed:.....	**8 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.6300**	**0.2813**	**0.883**	**5.917**	**14.833**
2.24	0.1400	0.1250	3.600	17.250	39.183
2.85	0.1300	0.0912	5.700	25.300	55.750
5.70	0.2500	0.0877	6.033	26.500	58.250
1.83	0.0800	0.0800	6.850	29.550	64.367

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.1400**	**0.1250**	**3.600**	**17.250**	**39.183**
4.48	0.2700	0.1205	3.800	18.050	40.867
1.83	0.1200	0.1200	3.833	18.150	41.050
2.85	0.1600	0.1123	4.217	19.683	44.250
1.42	0.1100	0.1100	4.350	20.183	45.250

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.5400**	**0.5400**	**0.500**	**3.733**	**9.867**
5.70	0.2300	0.2300	2.350	12.217	28.550
2.24	0.2800	0.2095	2.733	13.750	31.867
2.85	0.2200	0.1857	3.283	16.017	36.617
7.12	0.1800	0.1800	3.450	16.650	38.000

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

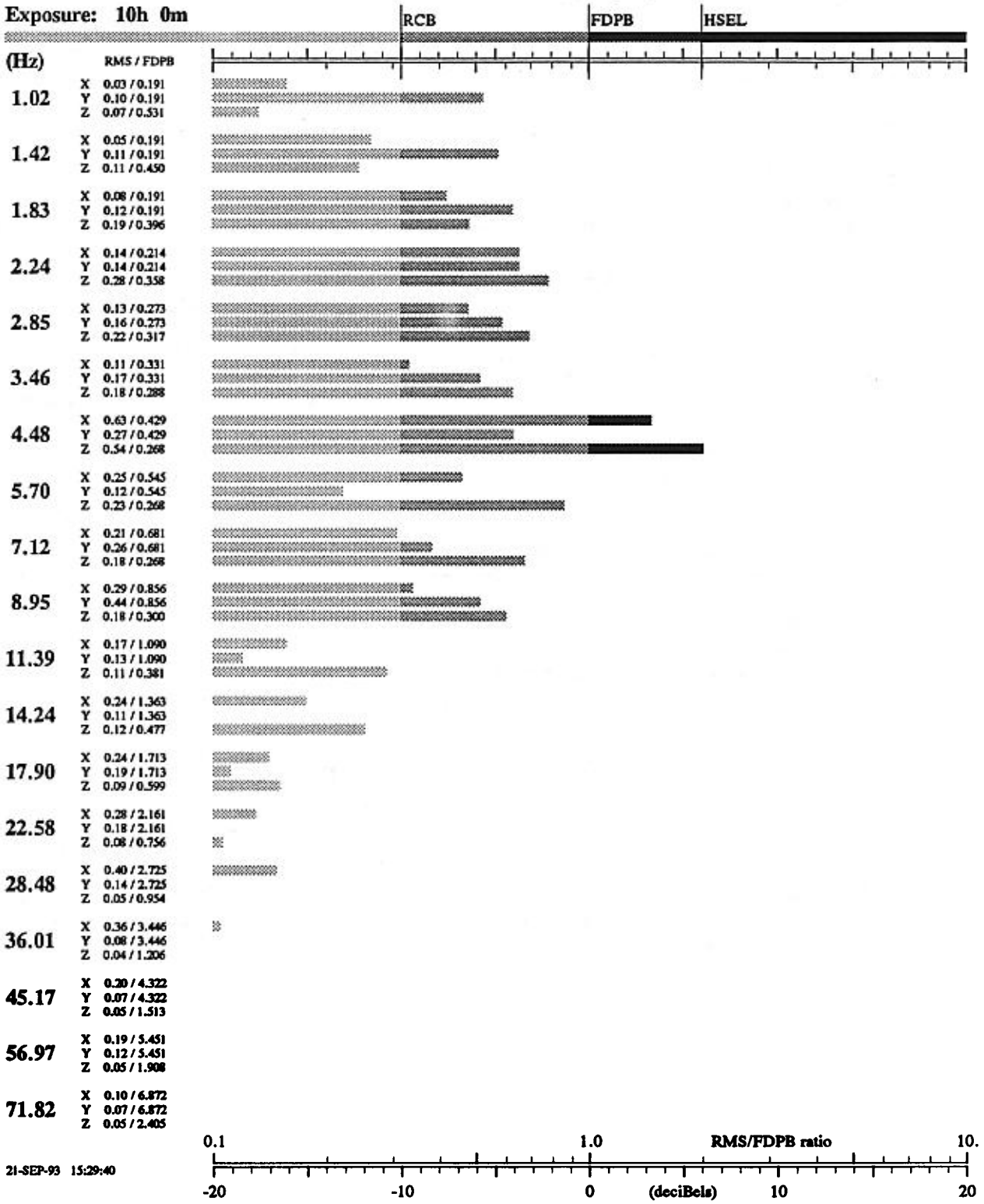
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-08 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:40

Course: Cross country #1
Speed: 8 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-09 Passenger

21-SEP-93 15:29:40

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Passenger
5:	Speed:.....	10 mph
6:	Note:.....	Bobtail (no trailer)

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.9000**	**0.4018**	**0.417**	**3.517**	**9.350**
5.70	0.7500	0.2632	1.050	6.483	16.150
2.24	0.2200	0.1964	1.767	9.650	23.117
3.46	0.2900	0.1676	2.283	11.900	27.933
2.85	0.2000	0.1404	3.017	14.933	34.367

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
3.46	**0.3600**	**0.2081**	**1.600**	**8.933**	**21.550**
2.24	0.2200	0.1964	1.767	9.650	23.117
2.85	0.2600	0.1825	1.983	10.650	25.250
1.42	0.1700	0.1700	2.233	11.683	27.433
4.48	0.3700	0.1652	2.333	12.117	28.367

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2800**	**0.2800**	**1.700**	**9.433**	**22.617**
5.70	0.2400	0.2400	2.200	11.550	27.183
7.12	0.1600	0.1600	4.117	19.267	43.367
2.24	0.2000	0.1497	4.533	20.933	46.750
2.85	0.1500	0.1266	5.783	25.550	56.250

* International Standards Organization ISO 2631:

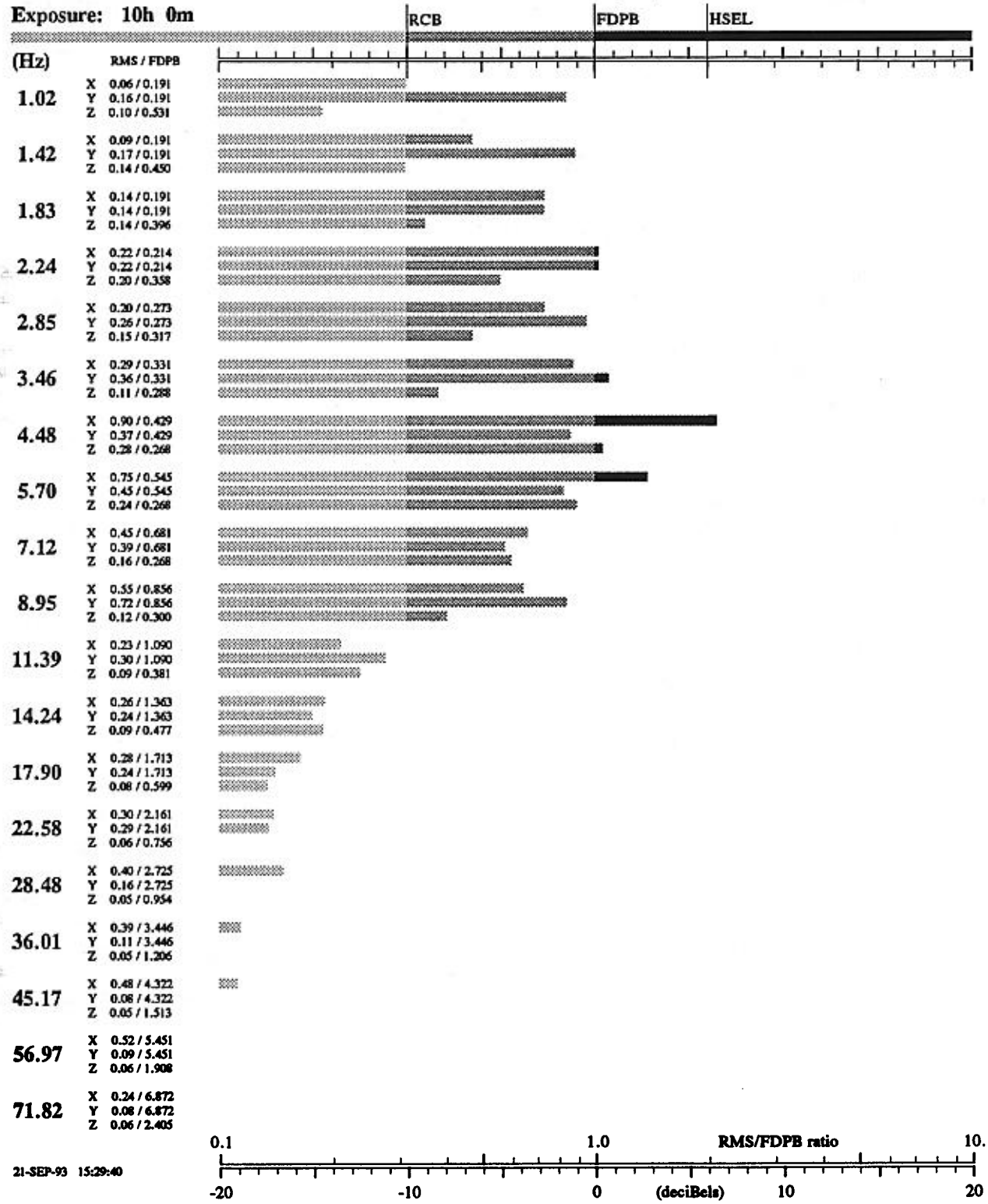
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-09 **Passenger seat**

February 14, 1992 **M915a2 truck**



Course: Cross country #1
Speed: 10 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-09 Driver

21-SEP-93 15:29:41

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Cross country #1**
4:	Position:.....	**Driver**
5:	Speed:.....	**10 mph**
6:	Note:.....	**Bobtail (no trailer)**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.5600**	**0.2500**	**1.167**	**6.967**	**17.217**
5.70	0.5100	0.1789	2.050	10.933	25.800
2.24	0.1200	0.1071	4.533	20.867	46.617
3.46	0.1500	0.0867	6.133	26.867	59.000
7.12	0.3000	0.0843	6.383	27.800	60.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
8.95	**0.5700**	**0.1274**	**3.500**	**16.867**	**38.367**
2.24	0.1400	0.1250	3.600	17.250	39.183
1.42	0.1200	0.1200	3.833	18.150	41.050
4.48	0.2600	0.1161	4.017	18.933	42.617
5.70	0.3200	0.1123	4.217	19.683	44.250

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.5200**	**0.5200**	**0.517**	**3.950**	**10.367**
5.70	0.4700	0.4700	0.617	4.583	11.833
7.12	0.2600	0.2600	1.933	10.400	24.683
8.95	0.2200	0.1966	3.017	14.900	34.300
2.24	0.2600	0.1946	3.067	15.117	34.750

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

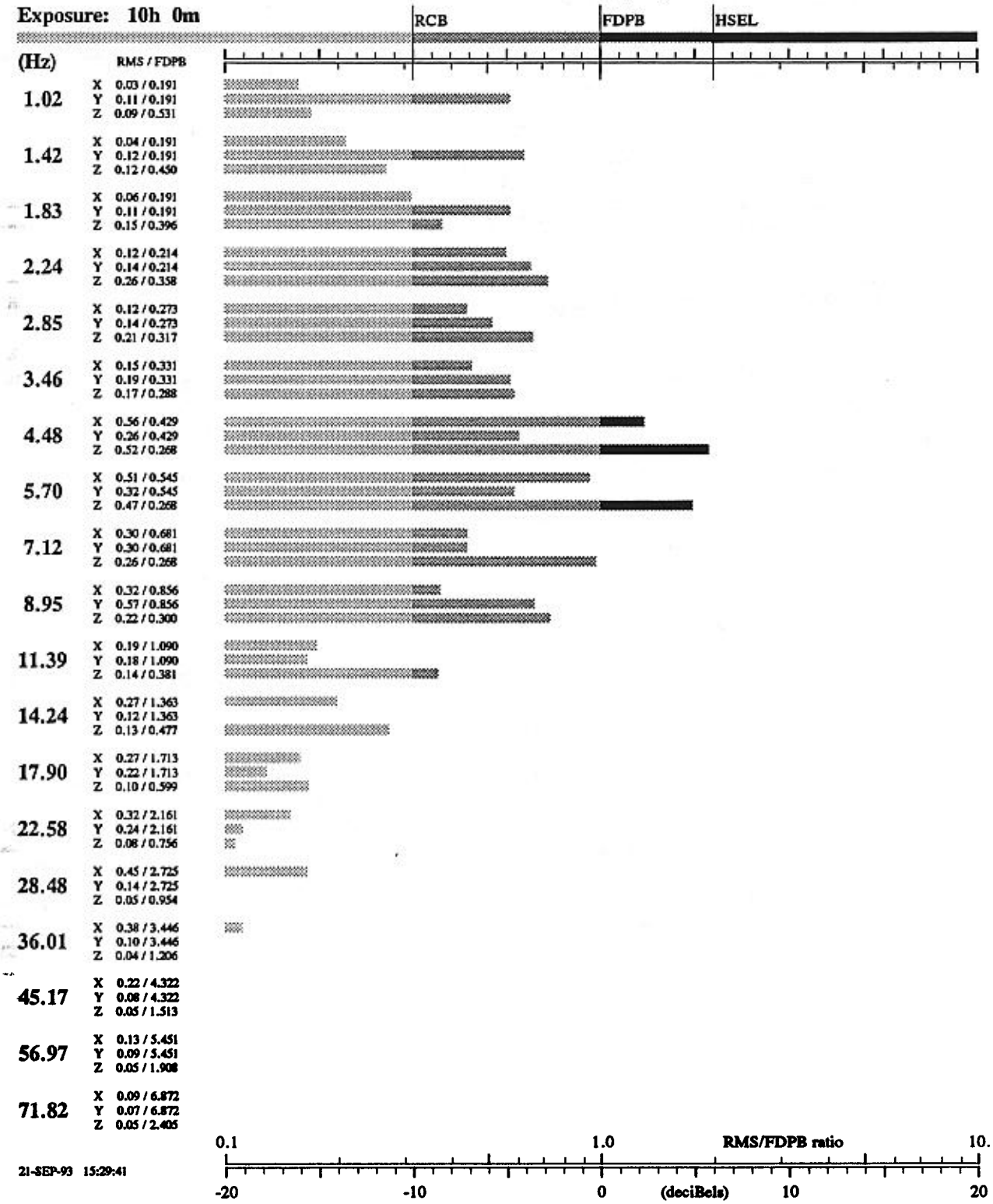
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-09 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



Course: Cross country #1
Speed: 10 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-10 Passenger

21-SEP-93 15:29:41

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Passenger
5:	Speed:.....	12 mph
6:	Note:.....	Bobtail (no trailer)

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.8800**	**0.3929**	**0.467**	**3.633**	**9.633**
7.12	1.3600	0.3820	0.517	3.783	10.000
3.46	0.4900	0.2832	0.883	5.850	14.717
1.83	0.1800	0.1800	2.033	10.833	25.650
5.70	0.4800	0.1684	2.267	11.833	27.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**1.6200**	**0.4551**	**0.283**	**2.900**	**7.900**
5.70	0.6100	0.2140	1.517	8.617	20.800
1.42	0.2000	0.2000	1.700	9.433	22.617
3.46	0.3400	0.1965	1.750	9.650	23.117
8.95	0.8700	0.1944	1.783	9.800	23.367

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.3900**	**0.3900**	**0.900**	**6.000**	**15.017**
4.48	0.2400	0.2400	2.200	11.550	27.183
5.70	0.1500	0.1500	4.533	20.867	46.617
8.95	0.1600	0.1430	4.850	22.117	49.250
1.83	0.2000	0.1353	5.250	23.617	52.367

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

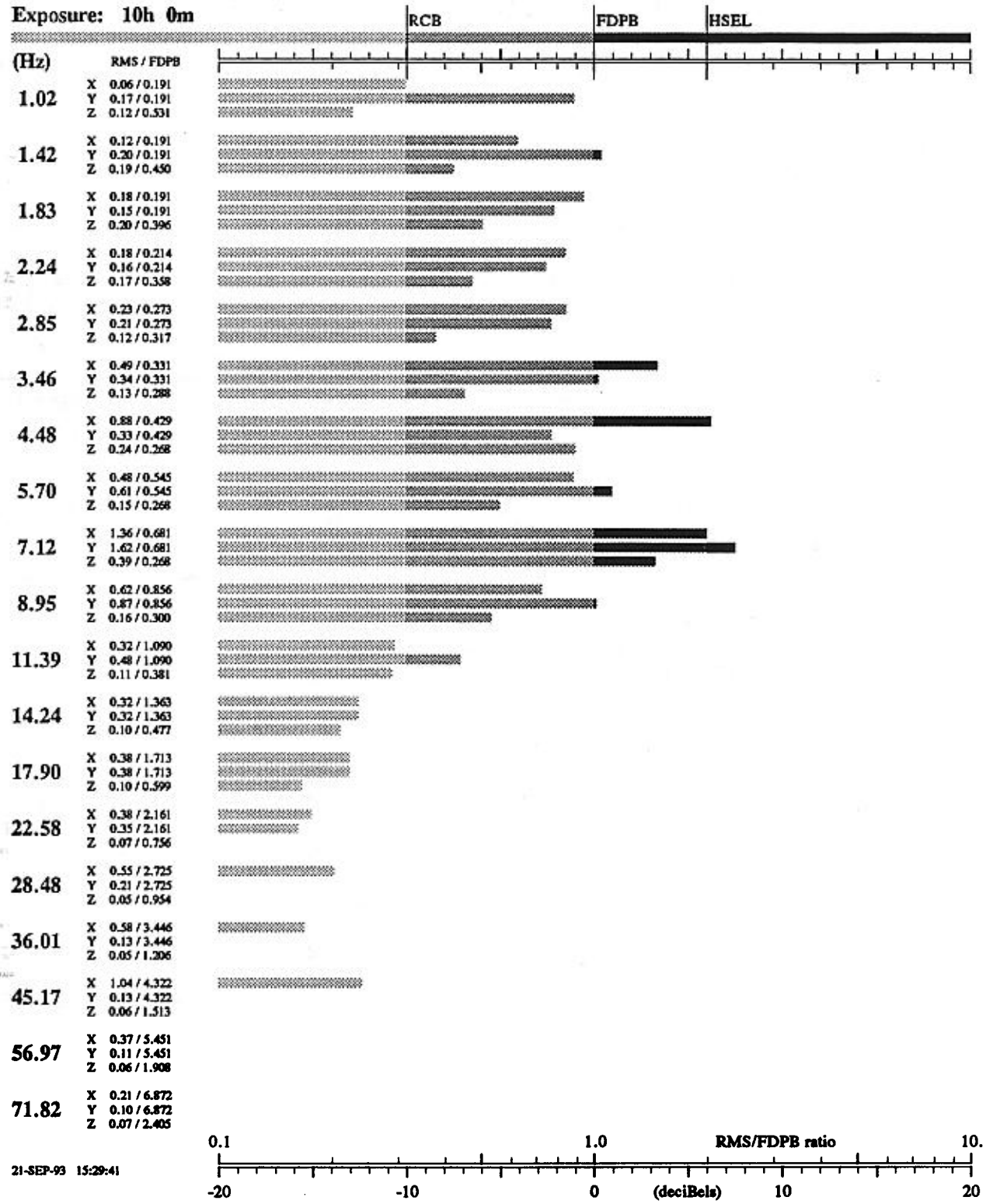
RUN-10

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



Course: Cross country #1
Speed: 12 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-10 Driver

21-SEP-93 15:29:41

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Driver
5:	Speed:.....	12 mph
6:	Note:.....	Bobtail (no trailer)

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.9100**	**0.2556**	**1.117**	**6.750**	**16.750**
4.48	0.5000	0.2232	1.417	8.133	19.800
3.46	0.2200	0.1272	3.500	16.900	38.433
5.70	0.3300	0.1158	4.033	18.967	42.750
2.85	0.1200	0.0842	6.383	27.800	60.867

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**1.1900**	**0.3343**	**0.617**	**4.617**	**11.900**
8.95	0.6800	0.1520	2.667	13.500	31.300
5.70	0.4200	0.1474	2.800	14.017	32.433
1.42	0.1400	0.1400	3.033	14.967	34.433
1.83	0.1200	0.1200	3.833	18.150	41.050

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.6000**	**0.6000**	**0.333**	**3.183**	**8.583**
4.48	0.4000	0.4000	0.867	5.783	14.550
5.70	0.2800	0.2800	1.700	9.433	22.617
8.95	0.2500	0.2235	2.467	12.683	29.550
3.46	0.2100	0.1953	3.050	15.050	34.550

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

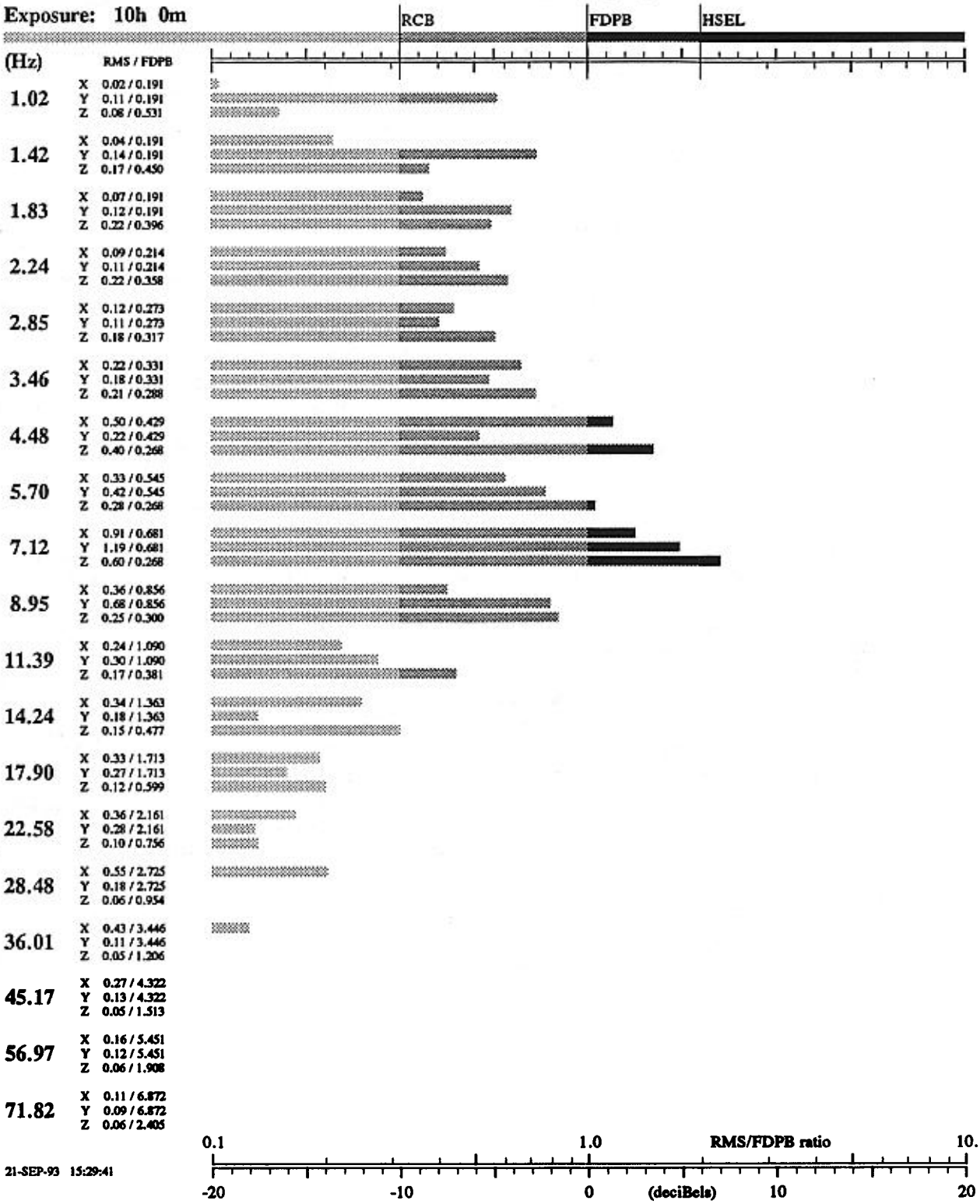
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-10 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:41

Course: Cross country #1
Speed: 12 mph
Note: Bobtail (no trailer)

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-11 Passenger

21-SEP-93 15:29:41

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Passenger
5:	Speed:.....	8 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.5000**	**0.2232**	**1.417**	**8.133**	**19.800**
2.24	0.1800	0.1607	2.433	12.550	29.300
2.85	0.2000	0.1404	3.017	14.933	34.367
3.46	0.2200	0.1272	3.500	16.900	38.433
1.83	0.1100	0.1100	4.350	20.183	45.250

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.02	**0.1900**	**0.1900**	**1.867**	**10.083**	**24.050**
1.42	0.1700	0.1700	2.233	11.683	27.433
3.46	0.2800	0.1618	2.417	12.433	29.050
4.48	0.3400	0.1518	2.667	13.500	31.367
2.85	0.2100	0.1474	2.800	14.017	32.433

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3400**	**0.3400**	**1.217**	**7.250**	**17.833**
3.46	0.2500	0.2325	2.317	12.050	28.183
2.24	0.2900	0.2170	2.583	13.150	30.617
2.85	0.2200	0.1857	3.283	16.017	36.617
1.83	0.1900	0.1285	5.650	25.117	55.367

* International Standards Organization ISO 2631:

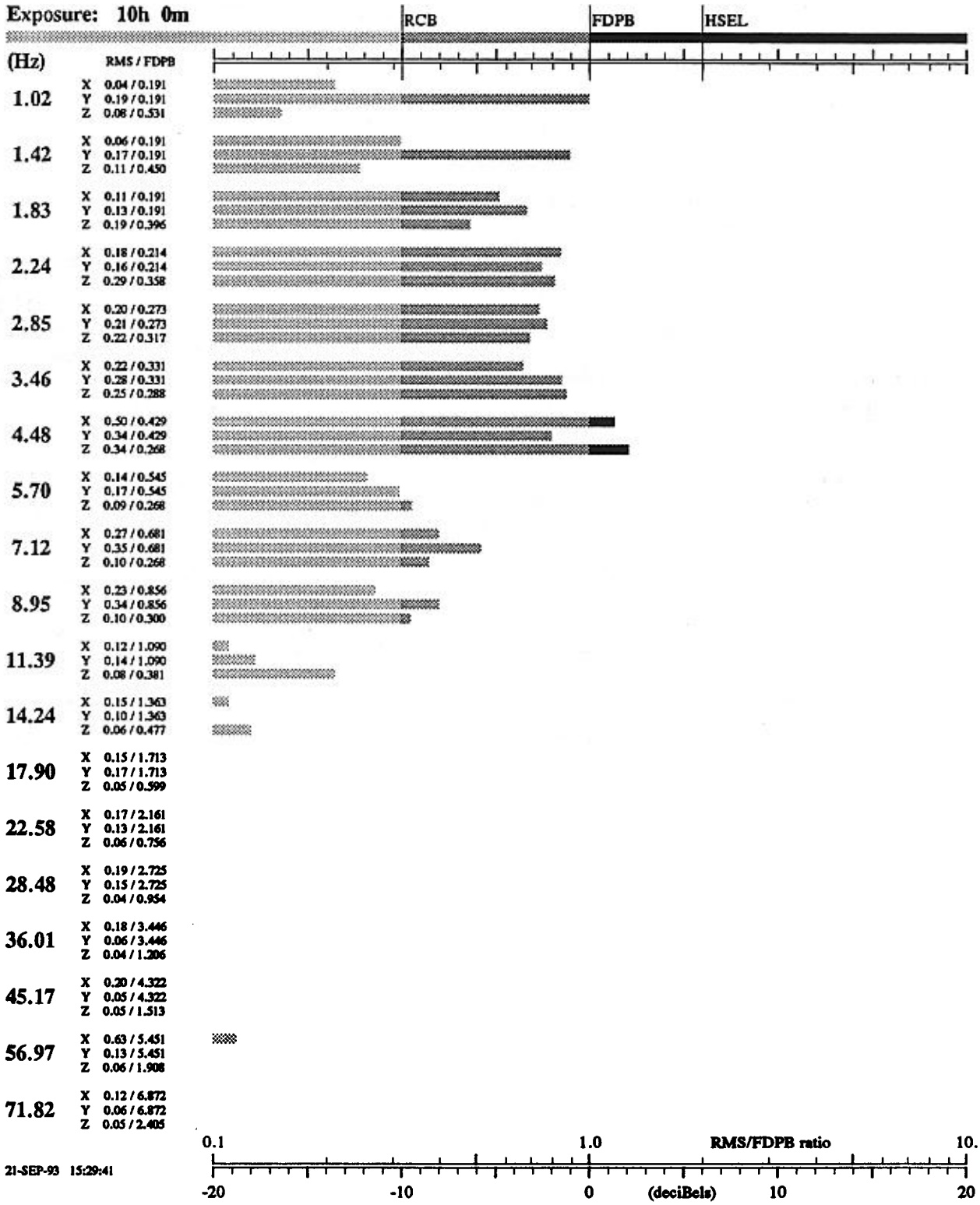
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-11
February 14, 1992

Passenger seat
M915a2 truck



Course: Cross country #1
Speed: 8 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-11 Driver

21-SEP-93 15:29:42

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Driver
5:	Speed:.....	8 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3500**	**0.1563**	**2.550**	**13.017**	**30.300**
3.46	0.2000	0.1156	4.050	19.000	42.867
2.85	0.1200	0.0842	6.383	27.800	60.867
2.24	0.0800	0.0714	8.000	33.750	72.750
7.12	0.1600	0.0449	14.683	56.867	118.000

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.1200**	**0.1071**	**4.533**	**20.867**	**46.617**
1.83	0.1000	0.1000	5.000	22.683	50.367
1.42	0.1000	0.1000	5.000	22.683	50.367
1.02	0.1000	0.1000	5.000	22.683	50.367
3.46	0.1700	0.0983	5.133	23.150	51.367

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2300**	**0.2300**	**2.350**	**12.217**	**28.550**
2.24	0.2700	0.2020	2.883	14.400	33.250
3.46	0.2000	0.1860	3.283	16.000	36.550
2.85	0.2000	0.1688	3.800	18.050	40.867
1.83	0.1700	0.1150	6.617	28.683	62.500

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

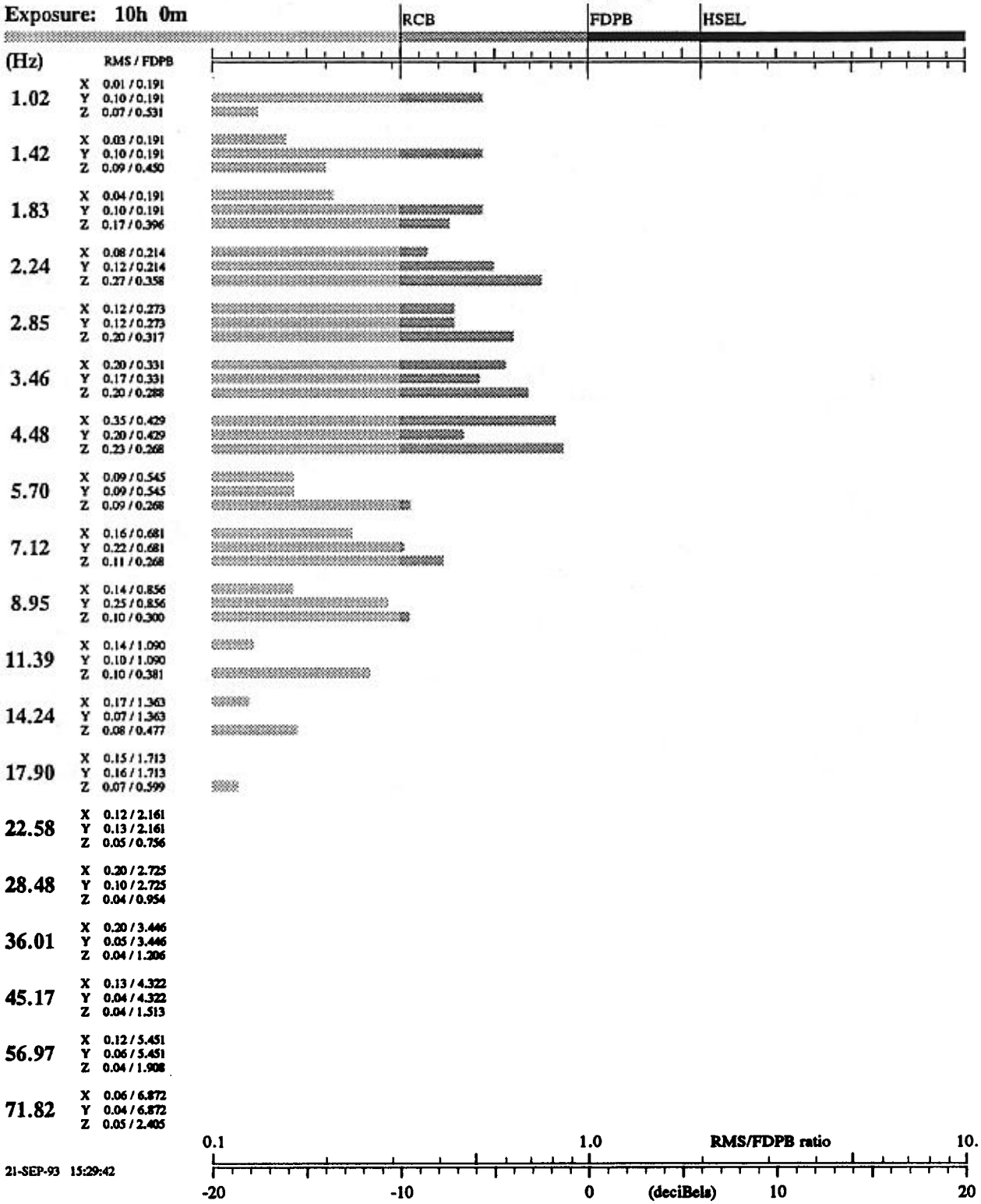
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-11 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



Course: Cross country #1
Speed: 8 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-12 Passenger

21-SEP-93 15:29:42

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Cross country #1**
4:	Position:.....	**Passenger**
5:	Speed:.....	**10 mph**
6:	Note:.....	**Unloaded trailer**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
3.46	**0.3700**	**0.2139**	**1.517**	**8.617**	**20.867**
4.48	0.3900	0.1741	2.150	11.333	26.683
2.24	0.1900	0.1696	2.233	11.717	27.500
5.70	0.3800	0.1333	3.267	15.933	36.433
2.85	0.1700	0.1193	3.867	18.300	41.367

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.42	**0.2200**	**0.2200**	**1.450**	**8.300**	**20.117**
1.02	0.2100	0.2100	1.567	8.833	21.300
3.46	0.3100	0.1792	2.050	10.900	25.800
2.24	0.1900	0.1696	2.233	11.717	27.500
2.85	0.2300	0.1614	2.417	12.500	29.183

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3000**	**0.3000**	**1.517**	**8.600**	**20.800**
3.46	0.2600	0.2418	2.167	11.433	26.933
5.70	0.2400	0.2400	2.200	11.550	27.183
2.85	0.2000	0.1688	3.800	18.050	40.867
2.24	0.2200	0.1646	3.950	18.617	42.000

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

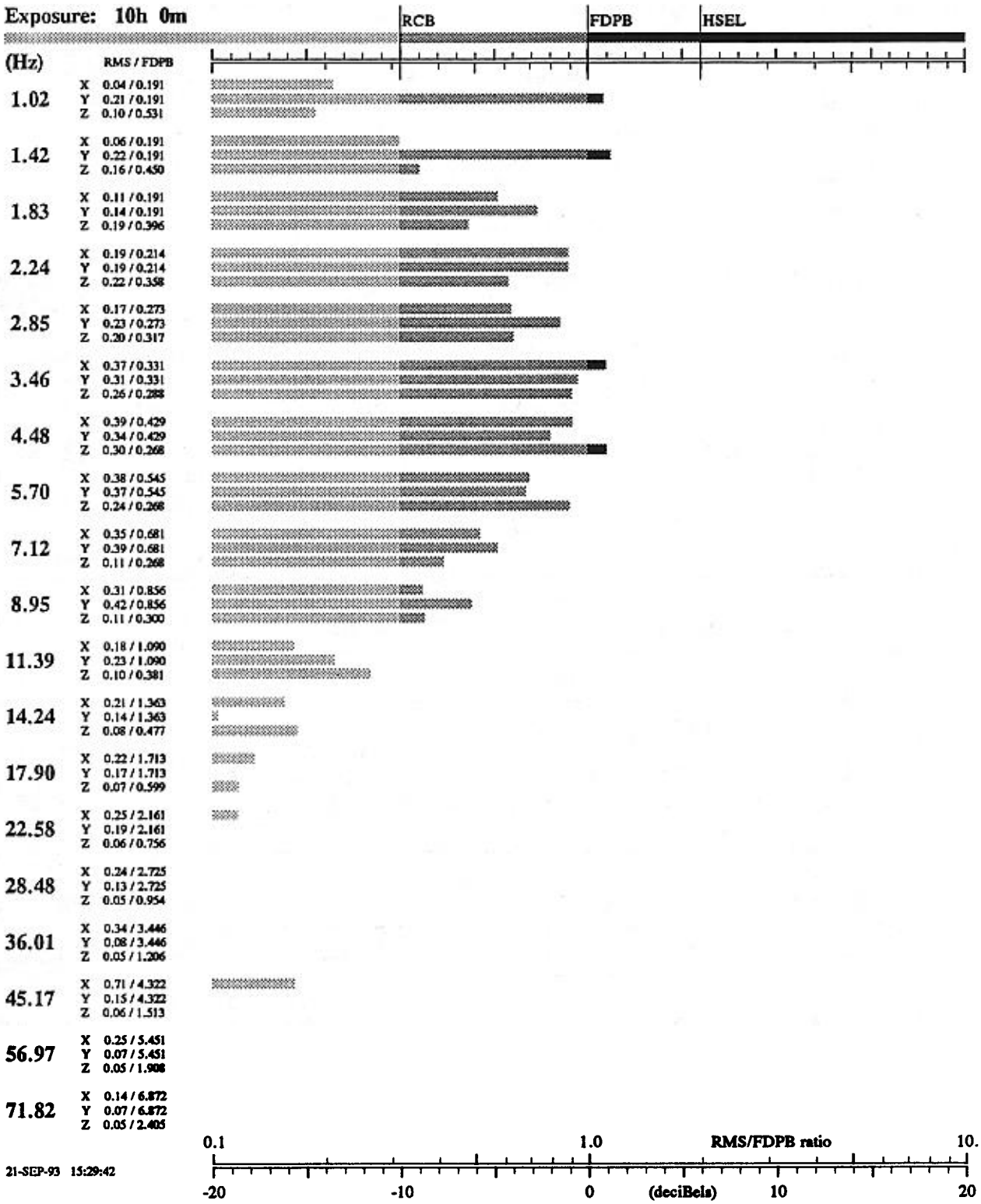
RUN-12

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



Course: Cross country #1
Speed: 10 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-12 Driver

21-SEP-93 15:29:42

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Cross country #1**
4:	Position:.....	**Driver**
5:	Speed:.....	**10 mph**
6:	Note:.....	**Unloaded trailer**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
3.46	**0.3100**	**0.1792**	**2.050**	**10.900**	**25.800**
4.48	0.2500	0.1116	4.267	19.833	44.550
2.85	0.1400	0.0982	5.133	23.183	51.367
5.70	0.2600	0.0912	5.700	25.300	55.750
2.24	0.0800	0.0714	8.000	33.750	72.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.42	**0.1300**	**0.1300**	**3.400**	**16.433**	**37.500**
2.24	0.1300	0.1161	4.017	18.933	42.617
1.02	0.1100	0.1100	4.350	20.183	45.250
3.46	0.1800	0.1040	4.717	21.617	48.250
1.83	0.1000	0.1000	5.000	22.683	50.367

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
5.70	**0.2400**	**0.2400**	**2.200**	**11.550**	**27.183**
4.48	0.2300	0.2300	2.350	12.217	28.550
3.46	0.2300	0.2139	2.650	13.400	31.117
2.85	0.2000	0.1688	3.800	18.050	40.867
2.24	0.2200	0.1646	3.950	18.617	42.000

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

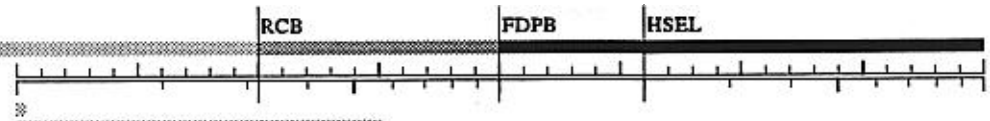
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

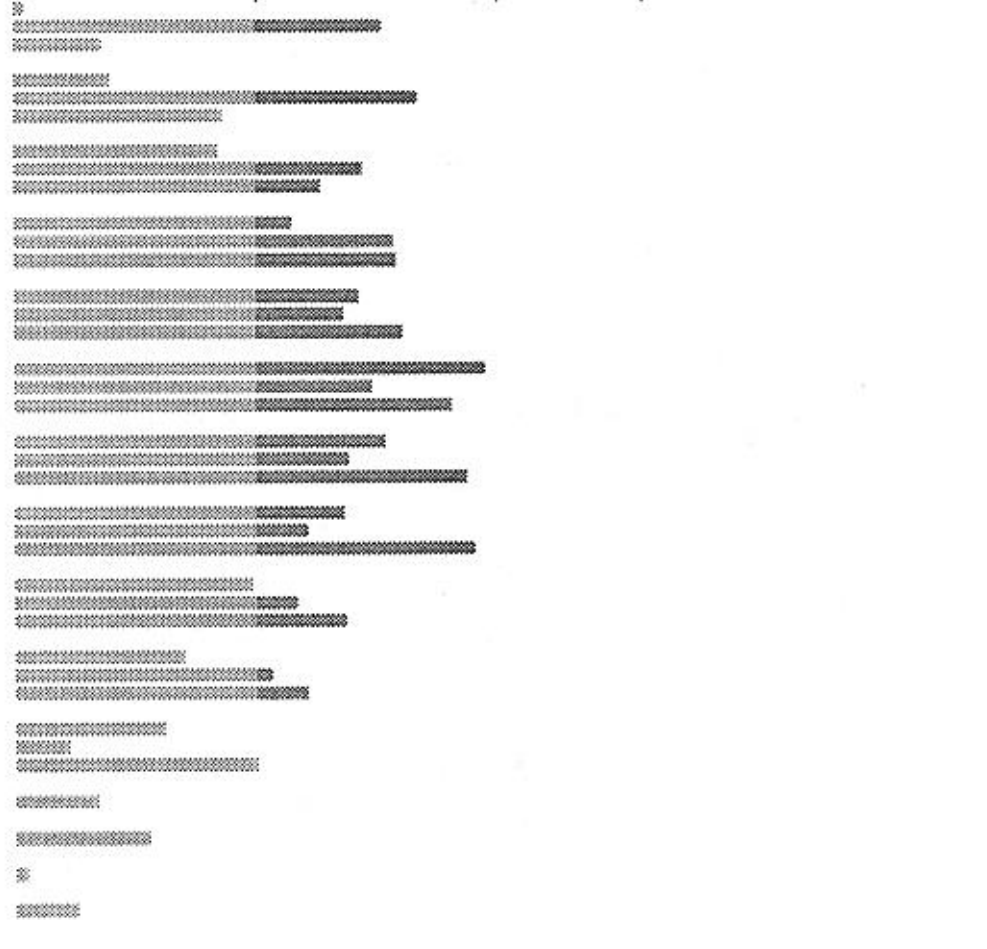
RUN-12 **Driver seat**

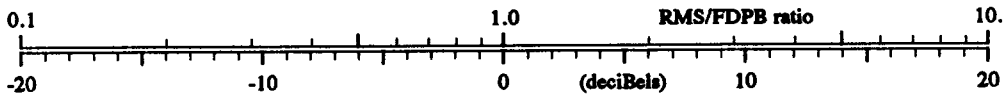
February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



(Hz)		RMS / FDPB
1.02	X	0.02 / 0.191
	Y	0.11 / 0.191
	Z	0.08 / 0.531
1.42	X	0.03 / 0.191
	Y	0.13 / 0.191
	Z	0.12 / 0.450
1.83	X	0.05 / 0.191
	Y	0.10 / 0.191
	Z	0.17 / 0.396
2.24	X	0.08 / 0.214
	Y	0.13 / 0.214
	Z	0.22 / 0.358
2.85	X	0.14 / 0.273
	Y	0.13 / 0.273
	Z	0.20 / 0.317
3.46	X	0.31 / 0.331
	Y	0.18 / 0.331
	Z	0.23 / 0.288
4.48	X	0.25 / 0.429
	Y	0.21 / 0.429
	Z	0.23 / 0.268
5.70	X	0.26 / 0.545
	Y	0.22 / 0.545
	Z	0.24 / 0.268
7.12	X	0.21 / 0.681
	Y	0.26 / 0.681
	Z	0.13 / 0.268
8.95	X	0.19 / 0.856
	Y	0.29 / 0.856
	Z	0.12 / 0.300
11.39	X	0.22 / 1.090
	Y	0.14 / 1.090
	Z	0.12 / 0.381
14.24	X	0.20 / 1.363
	Y	0.09 / 1.363
	Z	0.09 / 0.477
17.90	X	0.18 / 1.713
	Y	0.12 / 1.713
	Z	0.08 / 0.599
22.58	X	0.18 / 2.161
	Y	0.16 / 2.161
	Z	0.07 / 0.756
28.48	X	0.24 / 2.725
	Y	0.10 / 2.725
	Z	0.05 / 0.954
36.01	X	0.27 / 3.446
	Y	0.07 / 3.446
	Z	0.05 / 1.206
45.17	X	0.16 / 4.322
	Y	0.09 / 4.322
	Z	0.04 / 1.513
56.97	X	0.09 / 5.451
	Y	0.06 / 5.451
	Z	0.04 / 1.908
71.82	X	0.07 / 6.872
	Y	0.05 / 6.872
	Z	0.05 / 2.405





21-SEP-93 15:29:42

Course: Cross country #1
Speed: 10 mph
Note: Unloaded trailer

USAARL summary of analysis per ISO-2631* guideline on whole-body vibration (WBV)

RUN-13 Passenger

21-SEP-93 15:29:42

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Passenger
5:	Speed:.....	12 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
3.46	**0.4300**	**0.2486**	**1.167**	**7.017**	**17.333**
7.12	0.8800	0.2472	1.183	7.083	17.433
4.48	0.3900	0.1741	2.150	11.333	26.683
5.70	0.4000	0.1404	3.017	14.933	34.367
1.83	0.1300	0.1300	3.400	16.433	37.500

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.9400**	**0.2640**	**1.050**	**6.467**	**16.083**
3.46	0.3100	0.1792	2.050	10.900	25.800
2.85	0.2400	0.1684	2.267	11.833	27.750
1.42	0.1600	0.1600	2.450	12.617	29.500
4.48	0.3300	0.1473	2.800	14.050	32.433

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
3.46	**0.2800**	**0.2604**	**1.933**	**10.383**	**24.683**
7.12	0.2300	0.2300	2.350	12.217	28.550
4.48	0.2300	0.2300	2.350	12.217	28.550
5.70	0.1600	0.1600	4.117	19.267	43.367
1.83	0.1900	0.1285	5.650	25.117	55.367

* International Standards Organization ISO 2631:

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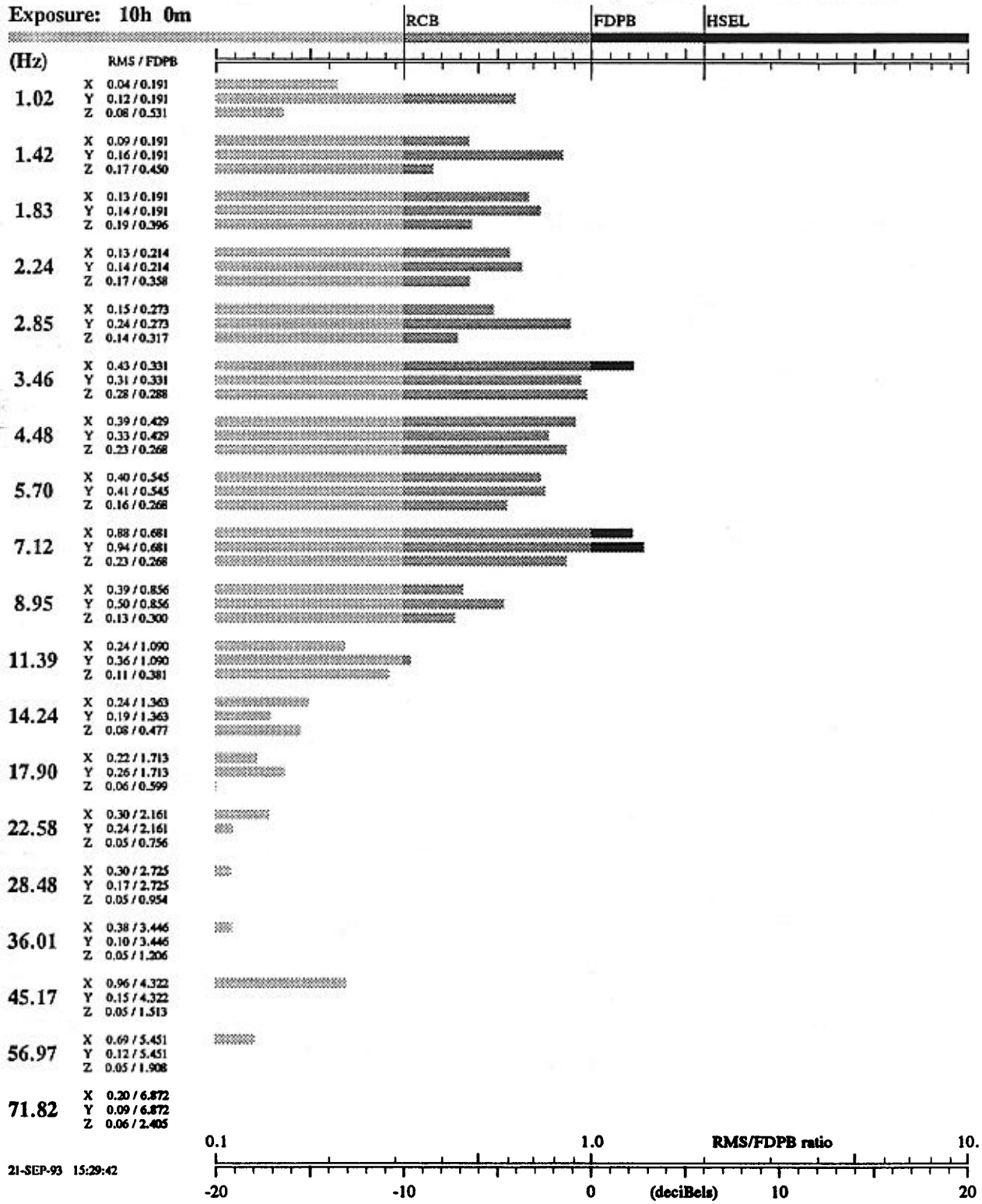
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-13
February 14, 1992

Passenger seat
M915a2 truck



Course: Cross country #1
Speed: 12 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-13 Driver

21-SEP-93 15:29:42

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Driver
5:	Speed:.....	12 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
3.46	**0.3800**	**0.2197**	**1.450**	**8.317**	**20.183**
7.12	0.5600	0.1573	2.517	12.900	30.050
4.48	0.2700	0.1205	3.800	18.050	40.867
5.70	0.2900	0.1018	4.883	22.183	49.367
2.85	0.1200	0.0842	6.383	27.800	60.867

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.6100**	**0.1713**	**2.200**	**11.550**	**27.183**
1.83	0.1200	0.1200	3.833	18.150	41.050
1.42	0.1100	0.1100	4.350	20.183	45.250
3.46	0.1800	0.1040	4.717	21.617	48.250
2.85	0.1400	0.0982	5.133	23.183	51.367

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.3500**	**0.3500**	**1.167**	**6.967**	**17.217**
3.46	0.2600	0.2418	2.167	11.433	26.933
4.48	0.2200	0.2200	2.533	12.933	30.117
5.70	0.2100	0.2100	2.717	13.717	31.750
2.24	0.2100	0.1571	4.233	19.683	44.250

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

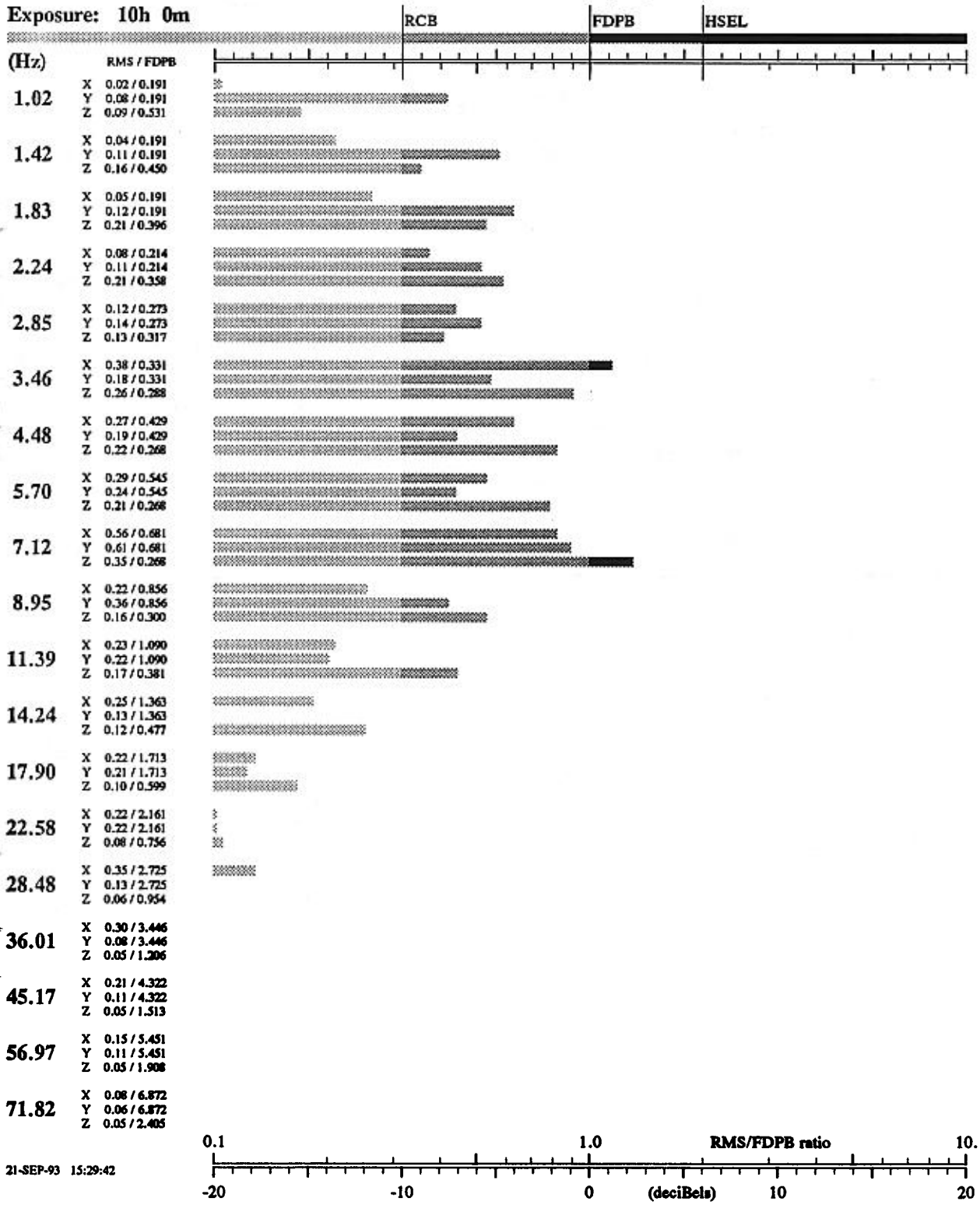
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-13 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:42

Course: Cross country #1
Speed: 12 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-14 Passenger

21-SEP-93 15:29:43

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Paved
4:	Position:.....	Passenger
5:	Speed:.....	35 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3900**	**0.1741**	**2.150**	**11.333**	**26.683**
2.24	0.1100	0.0982	5.133	23.183	51.367
3.46	0.1600	0.0925	5.600	24.900	54.867
2.85	0.1100	0.0772	7.200	30.800	66.867
8.95	0.2800	0.0626	9.567	39.250	83.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3700**	**0.1652**	**2.333**	**12.117**	**28.367**
3.46	0.1900	0.1098	4.367	20.250	45.367
8.95	0.4600	0.1028	4.800	21.933	48.867
7.12	0.2200	0.0618	9.717	39.800	84.750
2.85	0.0700	0.0491	13.117	51.500	107.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3500**	**0.3500**	**1.167**	**6.967**	**17.217**
3.46	0.1600	0.1488	4.583	21.050	47.117
2.85	0.1100	0.0929	8.850	36.750	78.750
2.24	0.1200	0.0898	9.250	38.183	81.500
8.95	0.0900	0.0804	10.717	43.250	91.500

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

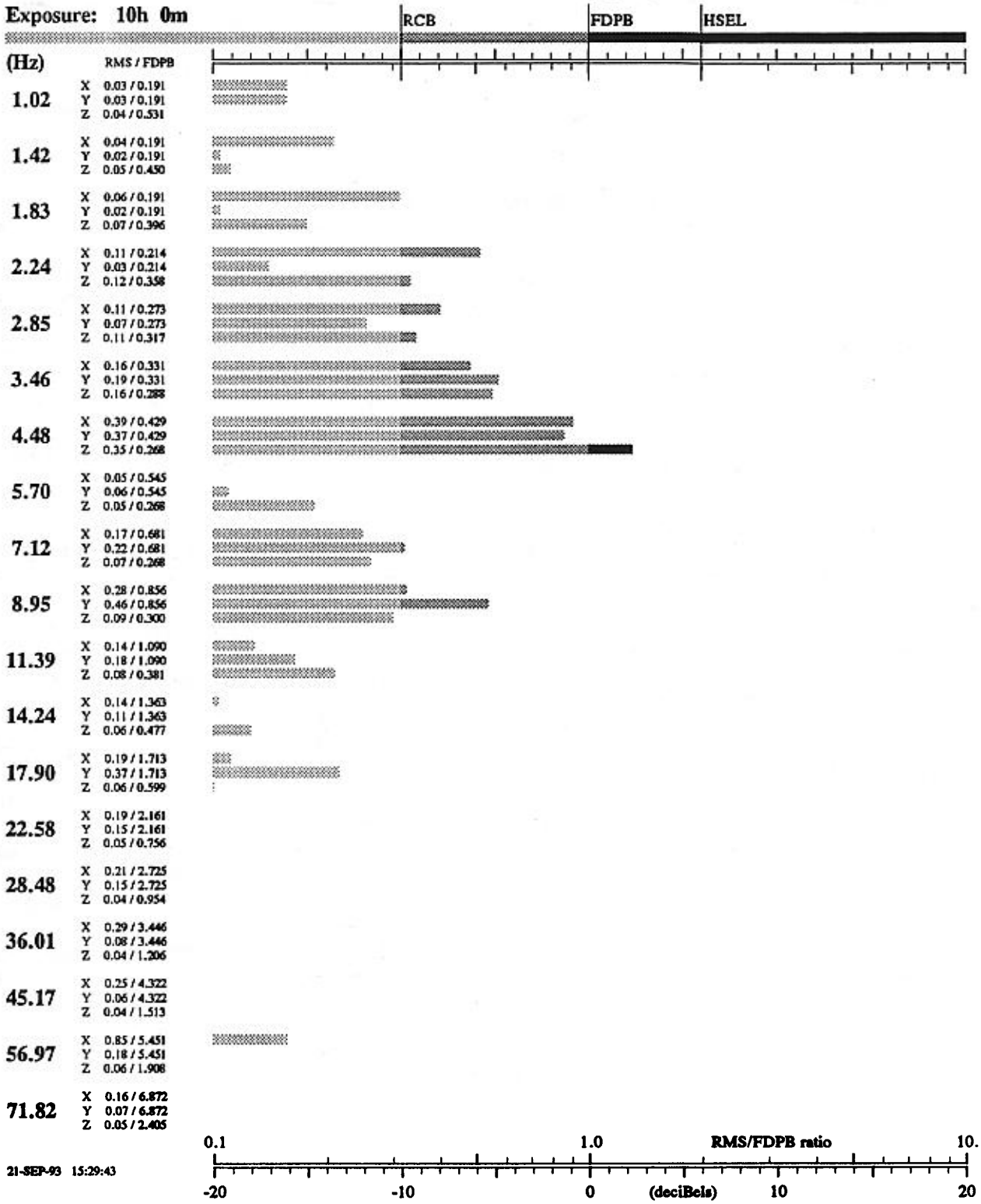
RUN-14

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:43

Course: Paved
Speed: 35 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-14 Driver

21-SEP-93 15:29:43

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Paved
4:	Position:.....	Driver
5:	Speed:.....	35 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3700**	**0.1652**	**2.333**	**12.117**	**28.367**
3.46	0.1600	0.0925	5.600	24.900	54.867
8.95	0.1600	0.0358	19.550	72.750	148.750
2.24	0.0400	0.0357	19.550	72.867	149.000
2.85	0.0500	0.0351	20.000	74.250	151.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2200**	**0.0982**	**5.133**	**23.183**	**51.367**
8.95	0.3400	0.0760	7.367	31.367	68.000
3.46	0.1200	0.0694	8.333	34.867	75.000
7.12	0.1500	0.0421	15.933	61.000	126.000
2.85	0.0500	0.0351	20.000	74.250	151.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2700**	**0.2700**	**1.817**	**9.900**	**23.617**
3.46	0.1300	0.1209	6.167	27.000	59.250
7.12	0.1000	0.1000	8.000	33.750	72.750
2.24	0.1200	0.0898	9.250	38.183	81.500
8.95	0.1000	0.0894	9.317	38.367	82.000

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

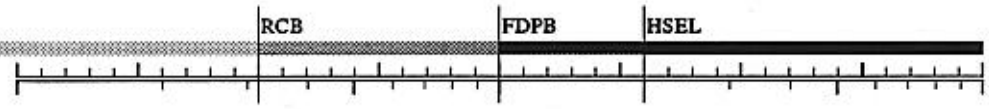
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

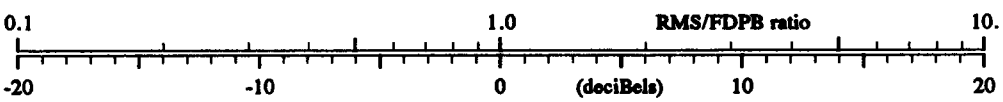
RUN-14 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



(Hz)		RMS / FDPB
1.02	X	0.01 / 0.191
	Y	0.02 / 0.191
	Z	0.04 / 0.531
1.42	X	0.02 / 0.191
	Y	0.01 / 0.191
	Z	0.05 / 0.450
1.83	X	0.02 / 0.191
	Y	0.01 / 0.191
	Z	0.07 / 0.396
2.24	X	0.04 / 0.214
	Y	0.03 / 0.214
	Z	0.12 / 0.358
2.85	X	0.05 / 0.273
	Y	0.05 / 0.273
	Z	0.10 / 0.317
3.46	X	0.16 / 0.331
	Y	0.12 / 0.331
	Z	0.13 / 0.288
4.48	X	0.37 / 0.429
	Y	0.22 / 0.429
	Z	0.27 / 0.268
5.70	X	0.04 / 0.545
	Y	0.04 / 0.545
	Z	0.05 / 0.268
7.12	X	0.11 / 0.681
	Y	0.15 / 0.681
	Z	0.10 / 0.268
8.95	X	0.16 / 0.856
	Y	0.34 / 0.856
	Z	0.10 / 0.300
11.39	X	0.16 / 1.090
	Y	0.12 / 1.090
	Z	0.09 / 0.381
14.24	X	0.17 / 1.363
	Y	0.07 / 1.363
	Z	0.07 / 0.477
17.90	X	0.17 / 1.713
	Y	0.18 / 1.713
	Z	0.08 / 0.599
22.58	X	0.13 / 2.161
	Y	0.16 / 2.161
	Z	0.07 / 0.756
28.48	X	0.20 / 2.725
	Y	0.10 / 2.725
	Z	0.05 / 0.954
36.01	X	0.22 / 3.446
	Y	0.07 / 3.446
	Z	0.04 / 1.206
45.17	X	0.12 / 4.322
	Y	0.04 / 4.322
	Z	0.04 / 1.513
56.97	X	0.16 / 5.451
	Y	0.10 / 5.451
	Z	0.04 / 1.908
71.82	X	0.06 / 6.872
	Y	0.04 / 6.872
	Z	0.05 / 2.405



21-SEP-93 15:29:43

Course: Paved
Speed: 35 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-15 Passenger

21-SEP-93 15:29:43

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Paved**
4:	Position:.....	**Passenger**
5:	Speed:.....	**45 mph**
6:	Note:.....	**Unloaded trailer**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
5.70	**0.2600**	**0.0912**	**5.700**	**25.300**	**55.750**
2.24	0.1000	0.0893	5.883	25.967	57.117
8.95	0.3700	0.0827	6.550	28.433	62.117
4.48	0.1600	0.0714	8.000	33.750	72.750
7.12	0.2500	0.0702	8.200	34.367	74.000

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
5.70	**0.2700**	**0.0947**	**5.400**	**24.183**	**53.500**
11.39	0.3300	0.0579	10.583	42.867	90.750
3.46	0.1000	0.0578	10.617	42.933	91.000
8.95	0.2300	0.0514	12.367	49.000	102.750
1.02	0.0500	0.0500	12.833	50.500	105.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2400**	**0.2400**	**2.200**	**11.550**	**27.183**
5.70	0.2300	0.2300	2.350	12.217	28.550
2.85	0.1900	0.1604	4.100	19.217	43.250
2.24	0.2000	0.1497	4.533	20.933	46.750
3.46	0.1600	0.1488	4.583	21.050	47.117

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

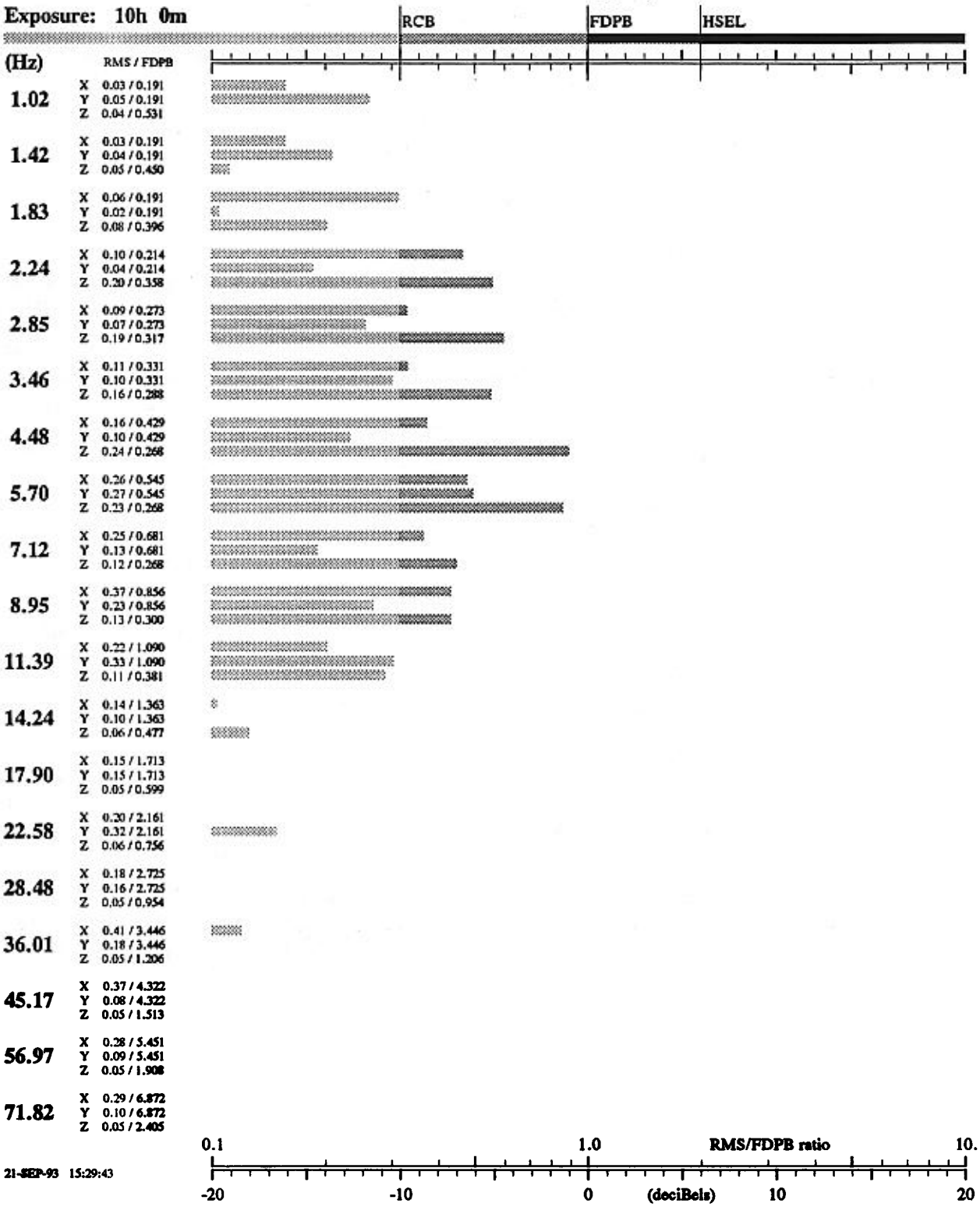
RUN-15

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:43

Course: Paved
Speed: 45 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-15 Driver

21-SEP-93 15:29:43

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Paved
4:	Position:.....	Driver
5:	Speed:.....	45 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
3.46	**0.1300**	**0.0751**	**7.467**	**31.800**	**68.867**
4.48	0.1600	0.0714	8.000	33.750	72.750
5.70	0.1500	0.0526	12.000	47.750	100.250
2.24	0.0500	0.0446	14.800	57.250	118.867
8.95	0.1900	0.0425	15.800	60.500	125.000

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
5.70	**0.1800**	**0.0632**	**9.450**	**38.867**	**82.867**
11.39	0.2000	0.0351	19.967	74.250	151.500
2.85	0.0500	0.0351	20.000	74.250	151.750
3.46	0.0600	0.0347	20.250	75.250	153.500
8.95	0.1500	0.0335	21.117	78.000	158.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
5.70	**0.1900**	**0.1900**	**3.183**	**15.583**	**35.683**
7.12	0.1300	0.1300	5.567	24.800	54.617
2.24	0.1600	0.1197	6.250	27.300	59.867
2.85	0.1400	0.1182	6.367	27.750	60.750
4.48	0.1000	0.1000	8.000	33.750	72.750

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-15 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m

21-SEP-93 15:29:43

Course: Paved
Speed: 45 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-16 Passenger

21-SEP-93 15:29:43

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Paved**
4:	Position:.....	**Passenger**
5:	Speed:.....	**55 mph**
6:	Note:.....	**Unloaded trailer**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.4900**	**0.1376**	**3.117**	**15.300**	**35.117**
4.48	0.1600	0.0714	8.000	33.750	72.750
2.24	0.0800	0.0714	8.000	33.750	72.750
8.95	0.3000	0.0670	8.717	36.250	77.750
2.85	0.0900	0.0632	9.450	38.867	82.867

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.5200**	**0.1461**	**2.833**	**14.183**	**32.750**
8.95	0.2600	0.0581	10.550	42.683	90.500
11.39	0.3100	0.0544	11.500	45.933	96.867
1.42	0.0500	0.0500	12.833	50.500	105.750
1.02	0.0500	0.0500	12.833	50.500	105.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2800**	**0.2800**	**1.700**	**9.433**	**22.617**
7.12	0.2600	0.2600	1.933	10.400	24.683
2.85	0.2700	0.2279	2.383	12.367	28.867
2.24	0.3000	0.2245	2.450	12.583	29.367
3.46	0.2100	0.1953	3.050	15.050	34.550

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

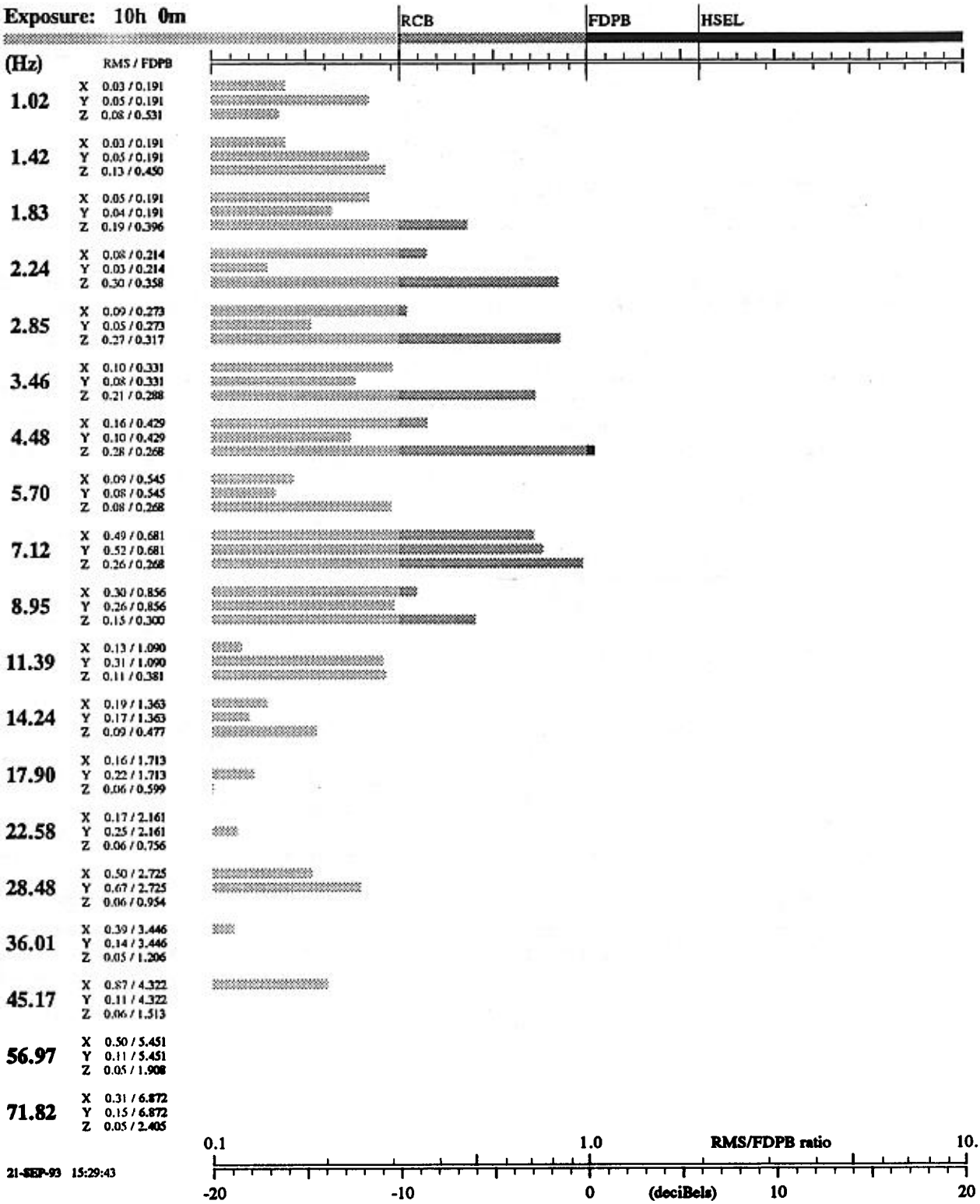
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-16 **Passenger seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:43

Course: Paved
Speed: 55 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-16 Driver

21-SEP-93 15:29:44

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Paved
4:	Position:.....	Driver
5:	Speed:.....	55 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.0900**	**0.0804**	**6.817**	**29.433**	**64.000**
7.12	0.2700	0.0758	7.383	31.433	68.117
1.83	0.0500	0.0500	12.833	50.500	105.750
2.85	0.0700	0.0491	13.117	51.500	107.750
4.48	0.1100	0.0491	13.117	51.500	107.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.4100**	**0.1152**	**4.067**	**19.083**	**43.000**
8.95	0.1800	0.0402	16.867	64.117	132.250
1.42	0.0400	0.0400	17.000	64.500	133.000
2.24	0.0400	0.0357	19.550	72.867	149.000
11.39	0.2000	0.0351	19.967	74.250	151.500

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.3200**	**0.3200**	**1.367**	**7.883**	**19.217**
2.24	0.2400	0.1796	3.467	16.717	38.050
2.85	0.1600	0.1351	5.267	23.683	52.367
8.95	0.1400	0.1251	5.867	25.933	57.000
4.48	0.1100	0.1100	7.033	30.183	65.617

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

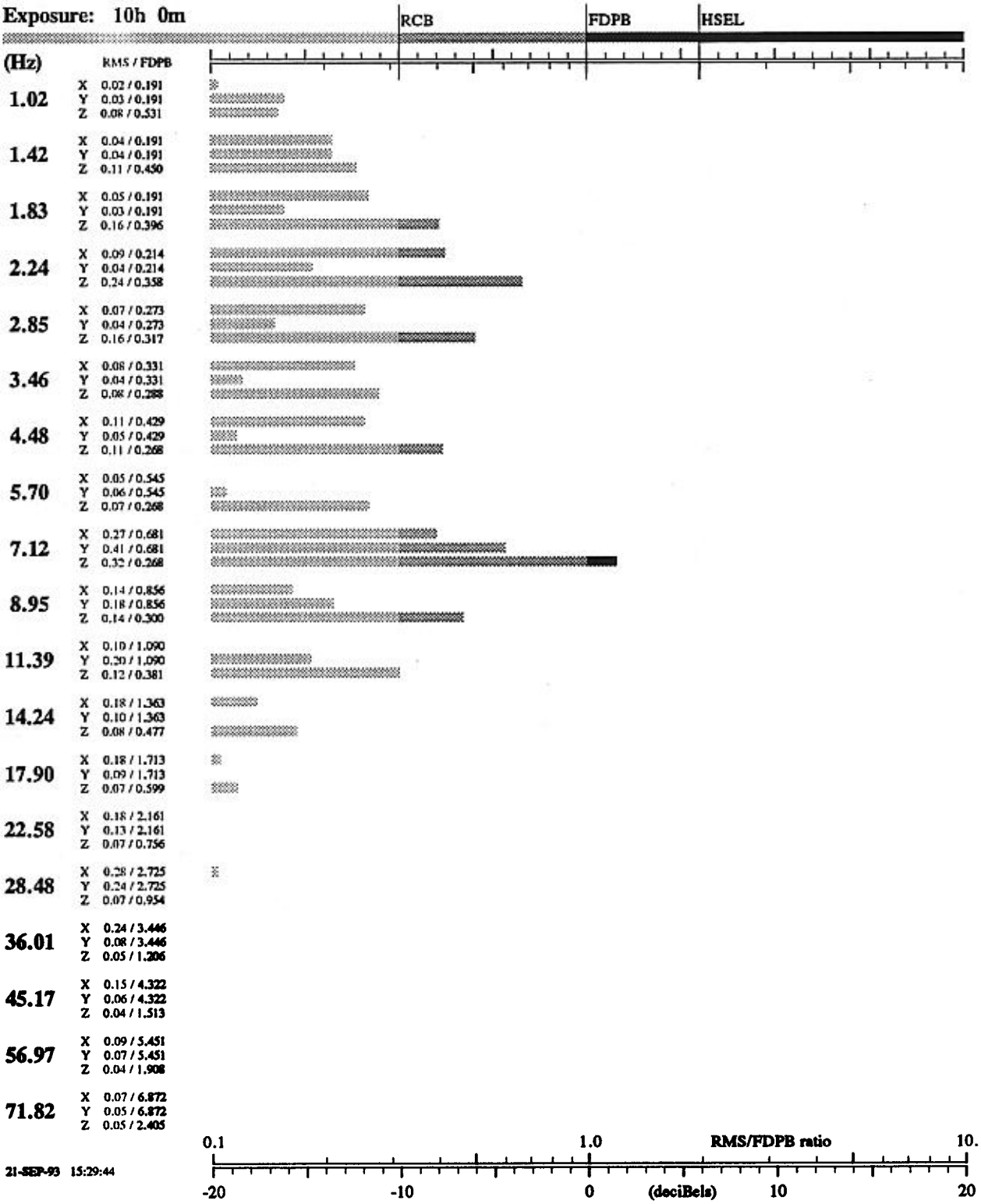
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-16 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:44

Course: Paved
Speed: 55 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-17 Passenger

21-SEP-93 15:29:44

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Passenger
5:	Speed:.....	15 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2900**	**0.1295**	**3.417**	**16.500**	**37.683**
7.12	0.3700	0.1039	4.733	21.617	48.250
3.46	0.1500	0.0867	6.133	26.867	59.000
2.24	0.0900	0.0804	6.817	29.433	64.000
1.83	0.0800	0.0800	6.850	29.550	64.367

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.83	**0.1000**	**0.1000**	**5.000**	**22.683**	**50.367**
1.42	0.1000	0.1000	5.000	22.683	50.367
3.46	0.1600	0.0925	5.600	24.900	54.867
4.48	0.2000	0.0893	5.883	25.967	57.117
7.12	0.3000	0.0843	6.383	27.800	60.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3500**	**0.3500**	**1.167**	**6.967**	**17.217**
3.46	0.2800	0.2604	1.933	10.383	24.683
2.85	0.2600	0.2195	2.533	12.967	30.183
2.24	0.2800	0.2095	2.733	13.750	31.867
7.12	0.1900	0.1900	3.183	15.583	35.683

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

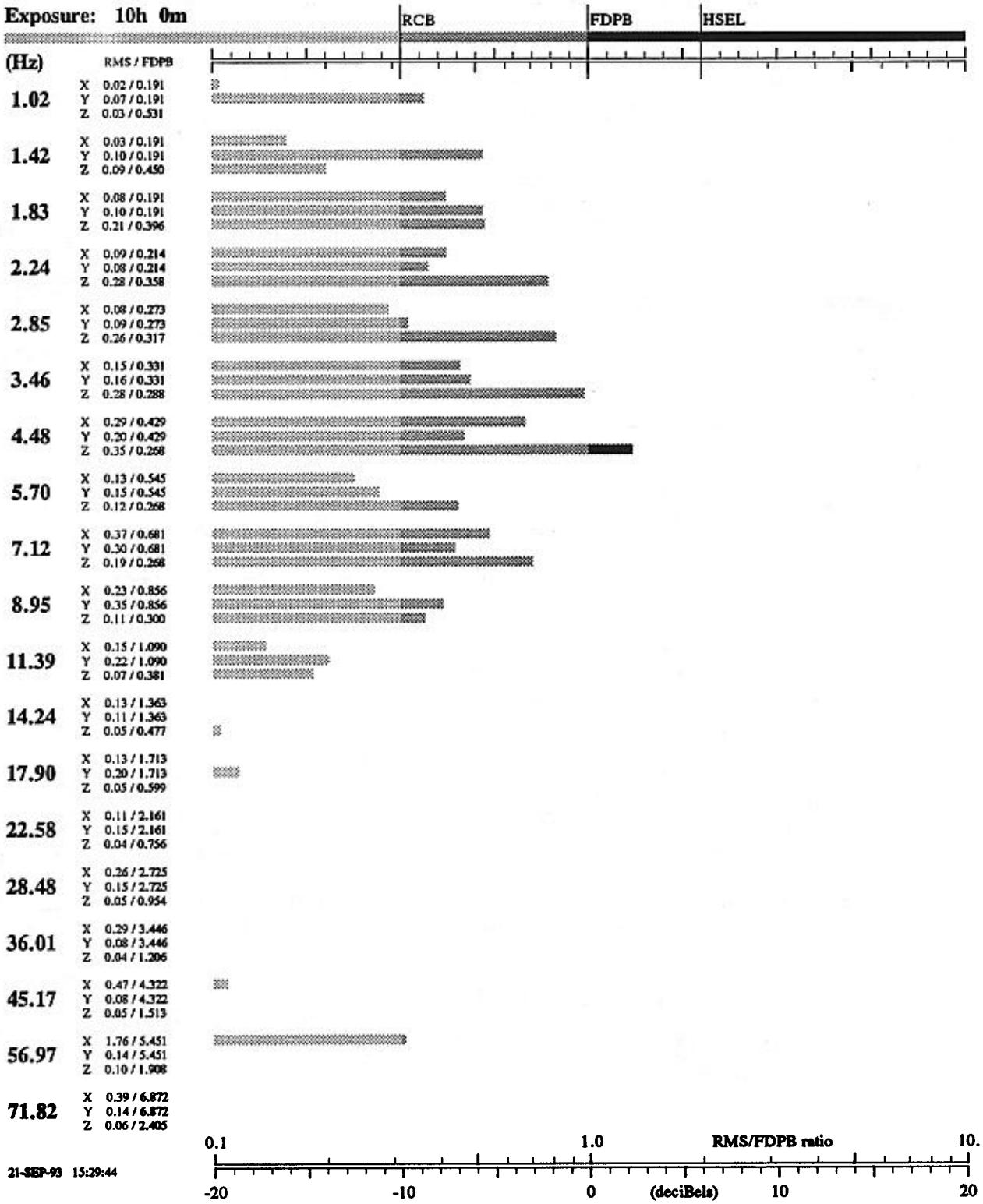
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-17
February 14, 1992

Passenger seat
M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:44

Course: Secondary a
Speed: 15 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-17 Driver

21-SEP-93 15:29:44

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Driver
5:	Speed:.....	15 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2600**	**0.1161**	**4.017**	**18.933**	**42.617**
3.46	0.1700	0.0983	5.133	23.150	51.367
7.12	0.2000	0.0562	11.017	44.367	93.750
1.83	0.0500	0.0500	12.833	50.500	105.750
2.24	0.0500	0.0446	14.800	57.250	118.867

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.83	**0.0900**	**0.0900**	**5.817**	**25.750**	**56.617**
2.24	0.0800	0.0714	8.000	33.750	72.750
1.42	0.0700	0.0700	8.233	34.500	74.250
4.48	0.1400	0.0625	9.583	39.300	83.750
8.95	0.2600	0.0581	10.550	42.683	90.500

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2300**	**0.2300**	**2.350**	**12.217**	**28.550**
7.12	0.1800	0.1800	3.450	16.650	38.000
2.24	0.2100	0.1571	4.233	19.683	44.250
3.46	0.1400	0.1302	5.550	24.750	54.617
2.85	0.1500	0.1266	5.783	25.550	56.250

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

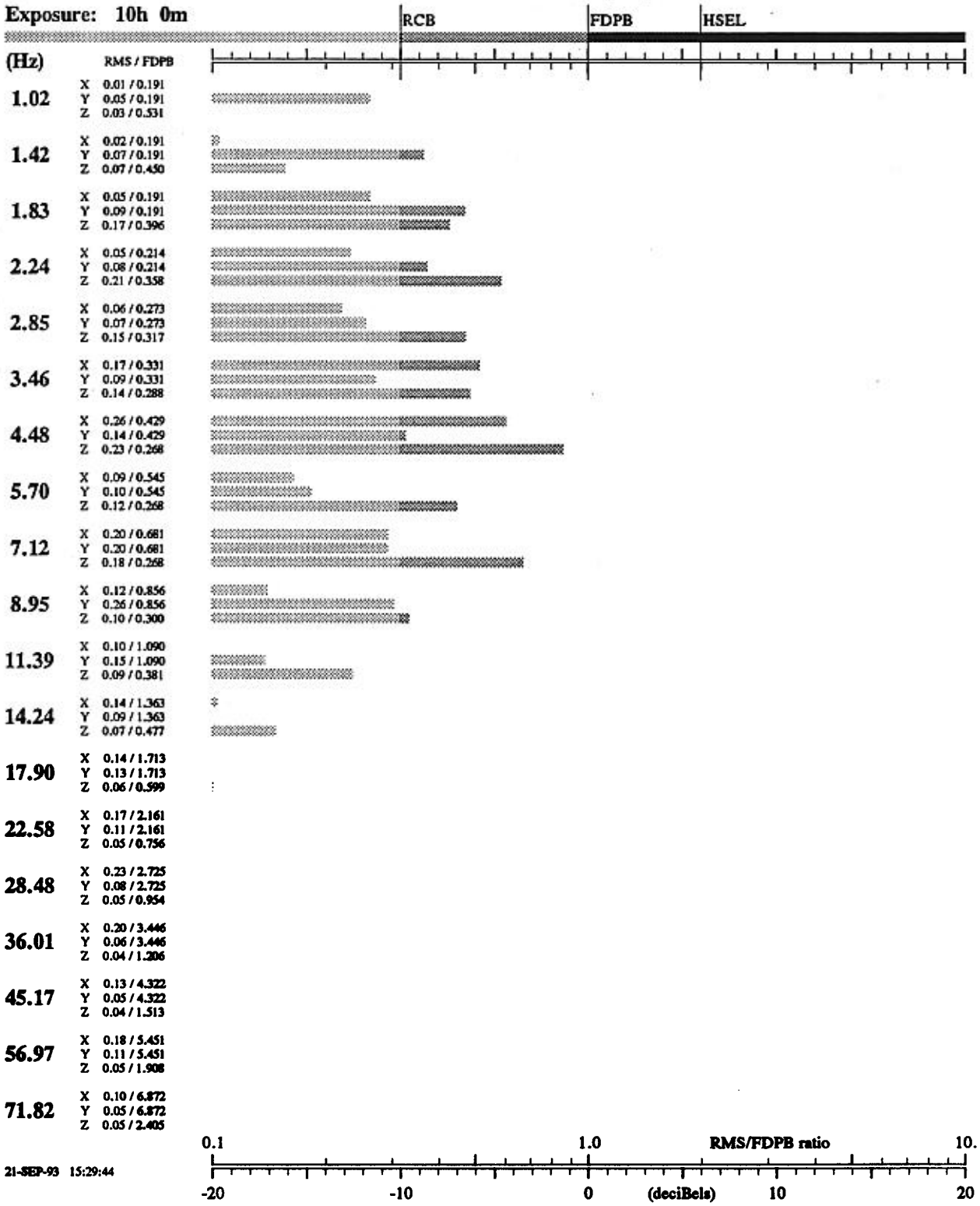
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-17 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:44

Course: Secondary a
Speed: 15 mph
Note: Unloaded trailer

USAARL summary of analysis per ISO-2631* guideline on whole-body vibration (WBV)

RUN-18 Passenger

21-SEP-93 15:29:44

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Passenger
5:	Speed:.....	20 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2600**	**0.1161**	**4.017**	**18.933**	**42.617**
7.12	0.4000	0.1124	4.217	19.683	44.250
3.46	0.1800	0.1040	4.717	21.617	48.250
8.95	0.4000	0.0894	5.867	25.933	57.000
5.70	0.2500	0.0877	6.033	26.500	58.250

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.42	**0.1400**	**0.1400**	**3.033**	**14.967**	**34.433**
2.24	0.1500	0.1339	3.250	15.833	36.250
1.83	0.1100	0.1100	4.350	20.183	45.250
1.02	0.1000	0.1000	5.000	22.683	50.367
8.95	0.4300	0.0961	5.300	23.800	52.617

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.3600**	**0.2694**	**1.817**	**9.933**	**23.683**
4.48	0.2600	0.2600	1.933	10.400	24.683
3.46	0.2600	0.2418	2.167	11.433	26.933
2.85	0.2600	0.2195	2.533	12.967	30.183
7.12	0.2000	0.2000	2.933	14.583	33.617

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

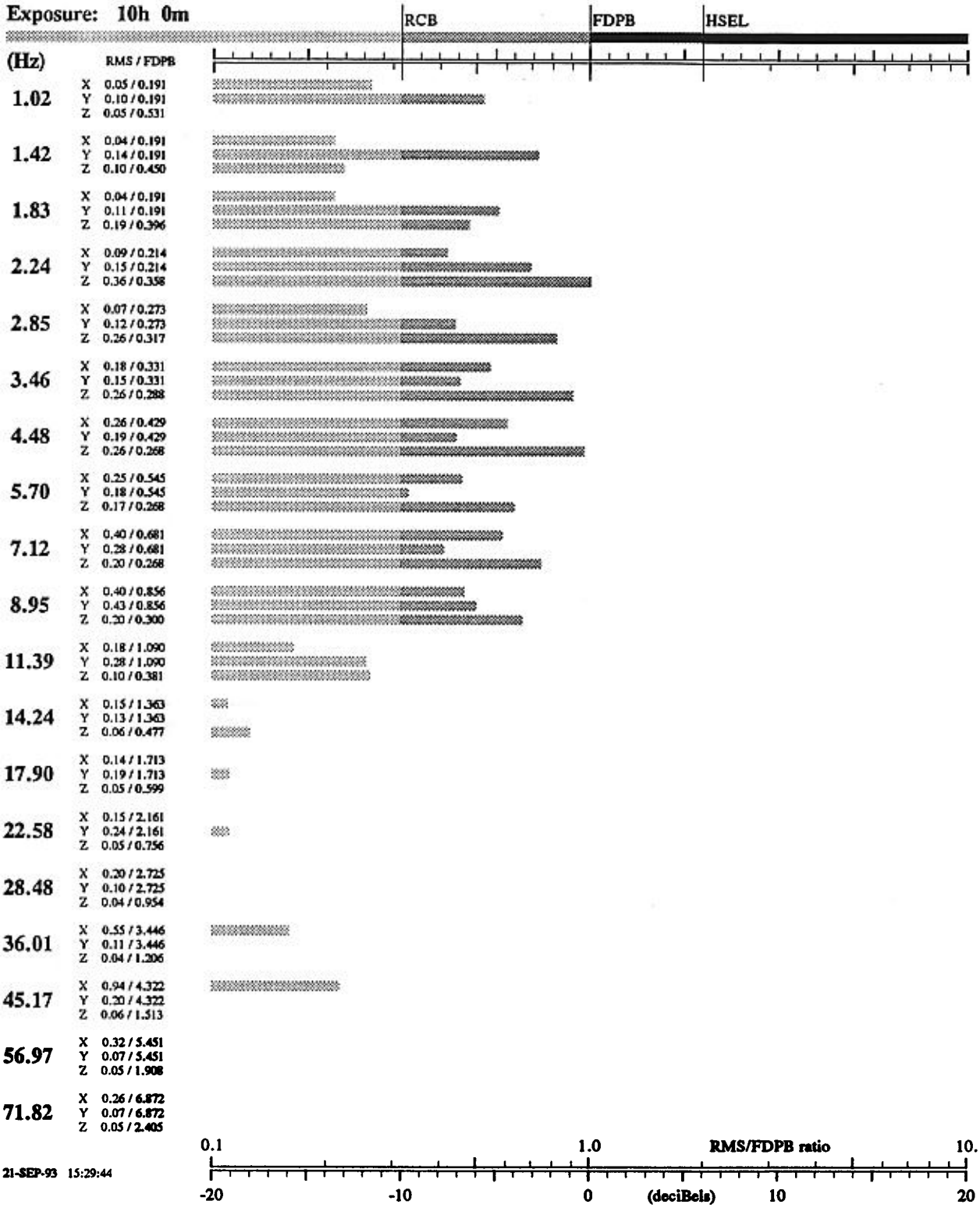
RUN-18

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:44

Course: Secondary a
Speed: 20 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-18 Driver

21-SEP-93 15:29:45

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Driver
5:	Speed:.....	20 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
3.46	**0.1600**	**0.0925**	**5.600**	**24.900**	**54.867**
4.48	0.2000	0.0893	5.883	25.967	57.117
2.24	0.0700	0.0625	9.583	39.300	83.750
7.12	0.1900	0.0534	11.800	47.000	98.867
5.70	0.1100	0.0386	17.767	67.000	137.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.1300**	**0.1161**	**4.017**	**18.933**	**42.617**
1.83	0.0900	0.0900	5.817	25.750	56.617
1.42	0.0800	0.0800	6.850	29.550	64.367
8.95	0.3000	0.0670	8.717	36.250	77.750
1.02	0.0600	0.0600	10.117	41.183	87.500

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.2900**	**0.2170**	**2.583**	**13.150**	**30.617**
7.12	0.2100	0.2100	2.717	13.717	31.750
4.48	0.1500	0.1500	4.533	20.867	46.617
2.85	0.1700	0.1435	4.833	22.000	49.000
8.95	0.1600	0.1430	4.850	22.117	49.250

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

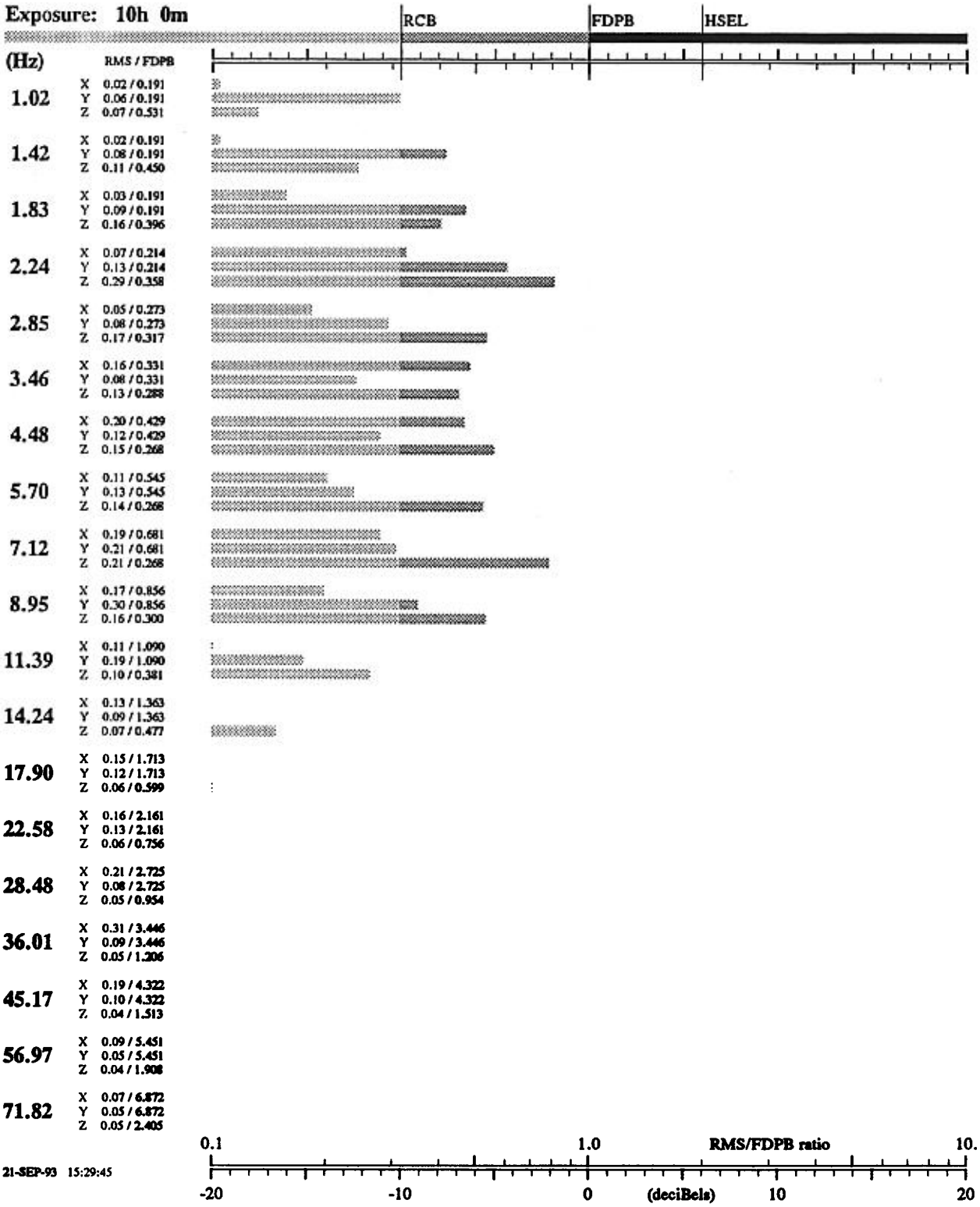
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-18 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



Course: Secondary a
Speed: 20 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-19 Passenger

21-SEP-93 15:29:45

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Passenger
5:	Speed:.....	25 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
8.95	**0.4800**	**0.1073**	**4.517**	**20.833**	**46.617**
7.12	0.3200	0.0899	5.833	25.750	56.617
3.46	0.1400	0.0809	6.750	29.183	63.500
2.85	0.0900	0.0632	9.450	38.867	82.867
2.24	0.0700	0.0625	9.583	39.300	83.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
8.95	**0.5700**	**0.1274**	**3.500**	**16.867**	**38.367**
3.46	0.2200	0.1272	3.500	16.900	38.433
7.12	0.4300	0.1208	3.783	18.000	40.750
2.85	0.1700	0.1193	3.867	18.300	41.367
2.24	0.1100	0.0982	5.133	23.183	51.367

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
3.46	**0.4300**	**0.3999**	**0.867**	**5.783**	**14.550**
2.85	0.3800	0.3208	1.350	7.850	19.183
2.24	0.2700	0.2020	2.883	14.400	33.250
8.95	0.2200	0.1966	3.017	14.900	34.300
7.12	0.1600	0.1600	4.117	19.267	43.367

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

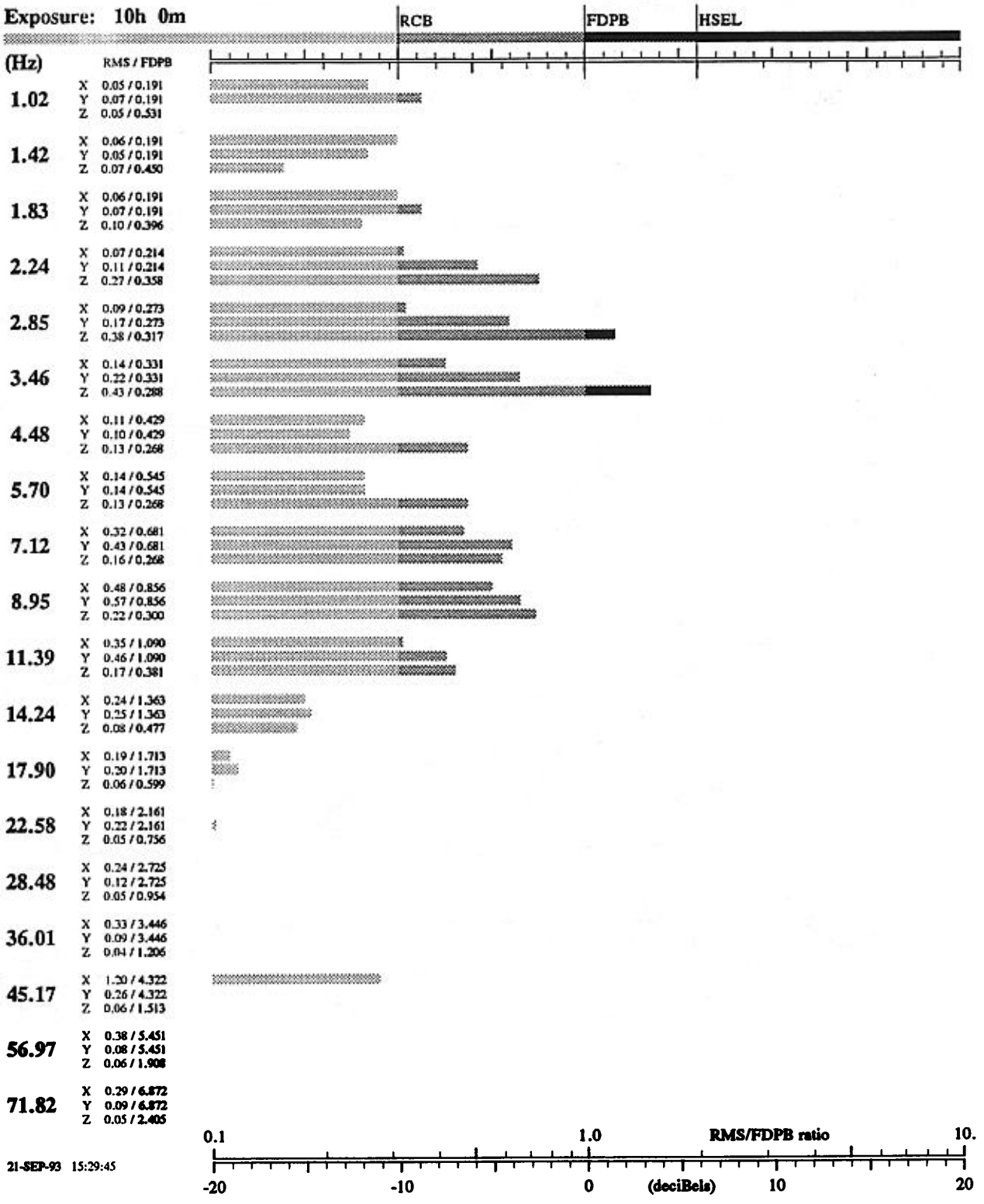
RUN-19

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:45

Course: Secondary a
Speed: 25 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-19 Driver

21-SEP-93 15:29:45

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Driver
5:	Speed:.....	25 mph
6:	Note:.....	Unloaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
3.46	**0.0900**	**0.0520**	**12.183**	**48.367**	**101.500**
7.12	0.1700	0.0478	13.617	53.117	111.000
8.95	0.1900	0.0425	15.800	60.500	125.000
2.85	0.0600	0.0421	15.933	61.000	126.250
4.48	0.0900	0.0402	16.900	64.250	132.250

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
8.95	**0.4600**	**0.1028**	**4.800**	**21.933**	**48.867**
2.24	0.1100	0.0982	5.133	23.183	51.367
2.85	0.1300	0.0912	5.700	25.300	55.750
7.12	0.3200	0.0899	5.833	25.750	56.617
3.46	0.1300	0.0751	7.467	31.800	68.867

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.1900**	**0.1900**	**3.183**	**15.583**	**35.683**
8.95	0.1800	0.1609	4.083	19.150	43.117
3.46	0.1600	0.1488	4.583	21.050	47.117
2.85	0.1600	0.1351	5.267	23.683	52.367
2.24	0.1500	0.1122	6.833	29.500	64.250

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

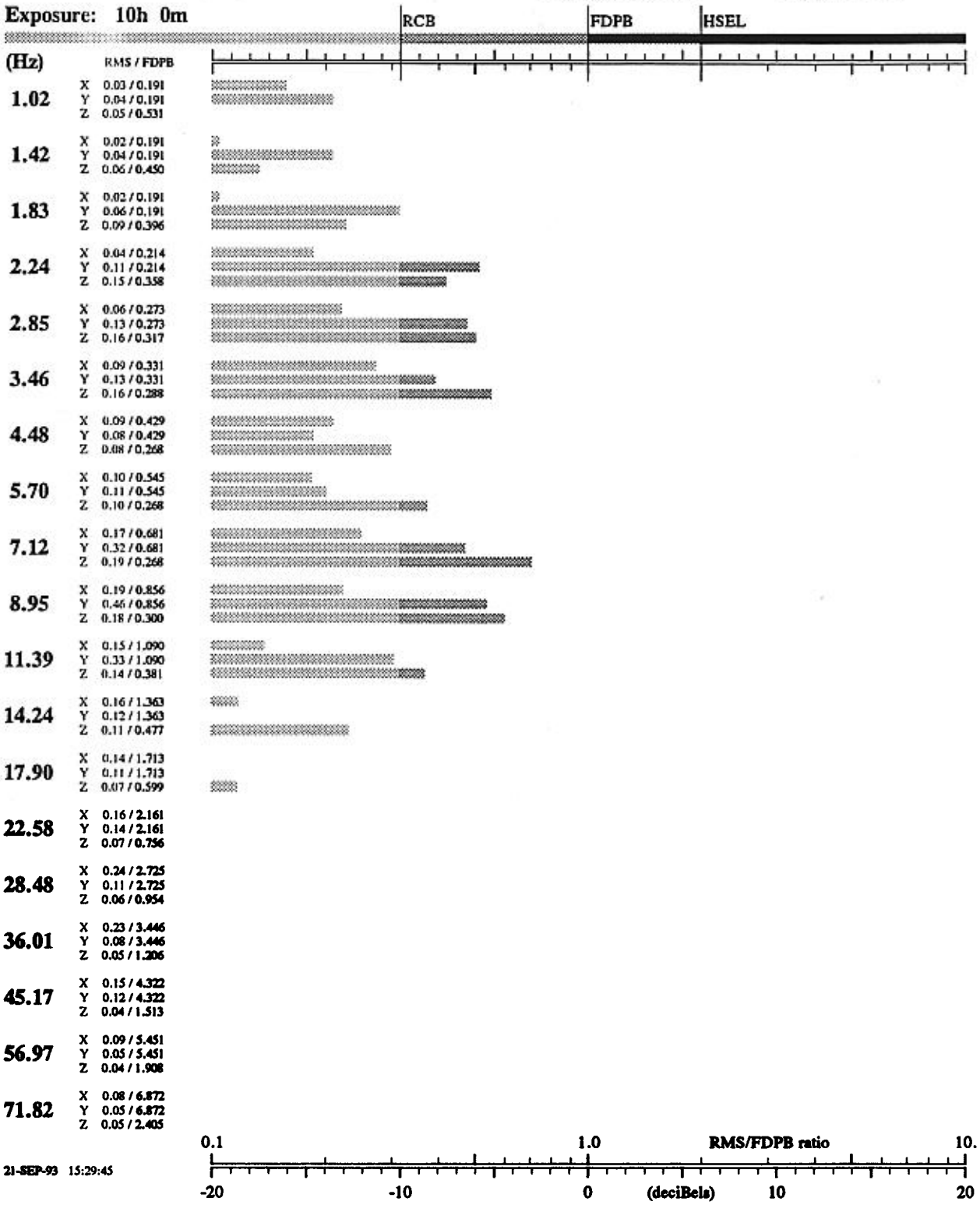
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-19 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:45

Course: Secondary a
Speed: 25 mph
Note: Unloaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-23 Passenger

21-SEP-93 15:29:45

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Passenger
5:	Speed:.....	8 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.6600**	**0.4632**	**0.283**	**2.817**	**7.717**
2.24	0.5000	0.4464	0.300	2.983	8.117
4.48	0.5600	0.2500	1.167	6.967	17.217
1.83	0.1000	0.1000	5.000	22.683	50.367
7.12	0.3500	0.0983	5.133	23.117	51.367

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.2100**	**0.1875**	**1.900**	**10.267**	**24.433**
1.83	0.1600	0.1600	2.450	12.617	29.500
2.85	0.2100	0.1474	2.800	14.017	32.433
1.42	0.1300	0.1300	3.400	16.433	37.500
3.46	0.2200	0.1272	3.500	16.900	38.433

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.7000**	**0.5238**	**0.517**	**3.917**	**10.267**
2.85	0.5700	0.4811	0.583	4.433	11.467
4.48	0.3500	0.3500	1.167	6.967	17.217
3.46	0.2200	0.2046	2.833	14.183	32.750
1.83	0.2600	0.1759	3.567	17.150	39.000

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

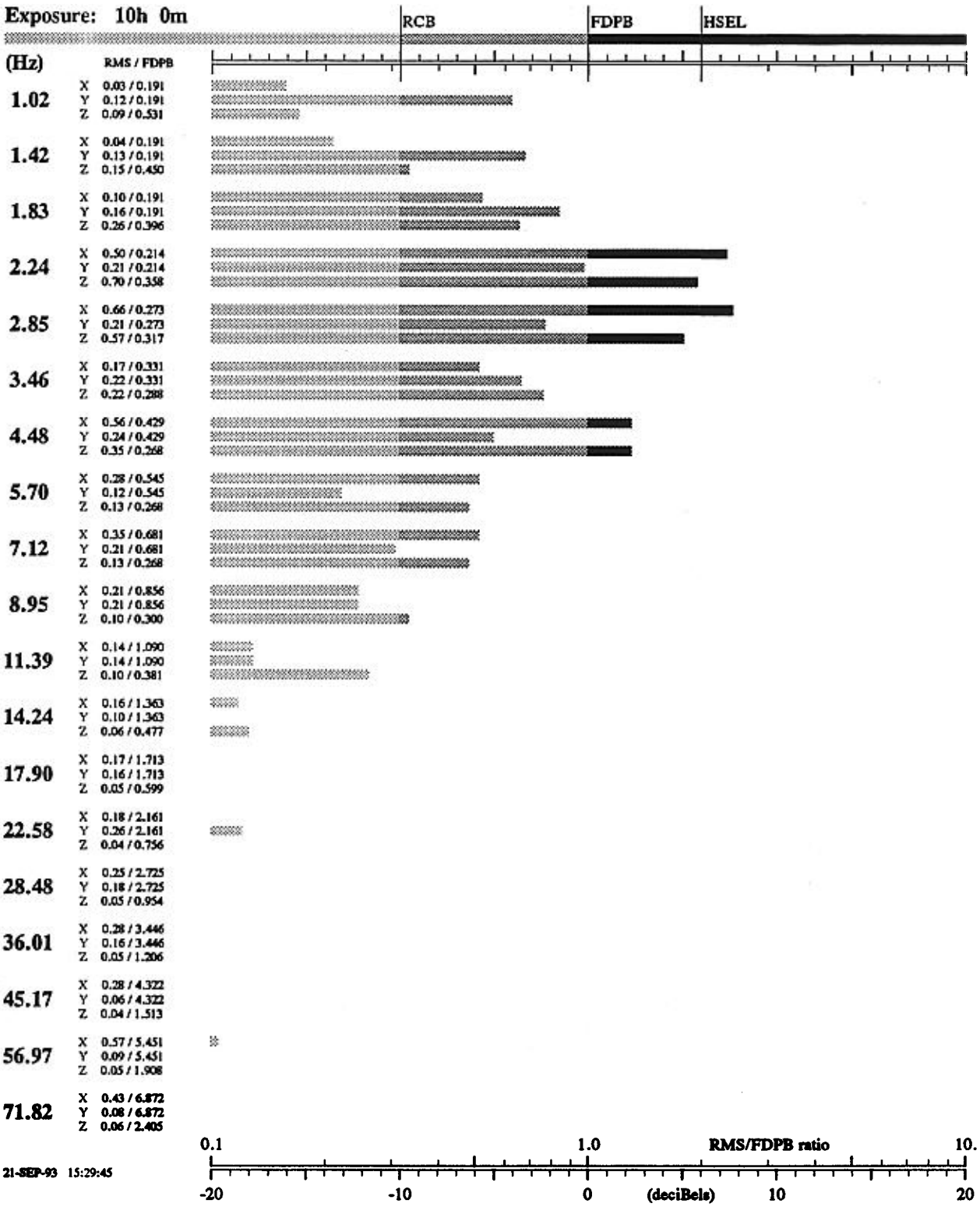
RUN-23

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:45

Course: Cross country #1
Speed: 8 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-23 Driver

21-SEP-93 15:29:45

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Driver
5:	Speed:.....	8 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.4700**	**0.3298**	**0.633**	**4.700**	**12.117**
2.24	0.3600	0.3214	0.667	4.883	12.517
4.48	0.3500	0.1563	2.550	13.017	30.300
7.12	0.2300	0.0646	9.167	37.867	80.867
1.83	0.0600	0.0600	10.117	41.183	87.500

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.83	**0.1700**	**0.1700**	**2.233**	**11.683**	**27.433**
2.24	0.1700	0.1518	2.667	13.500	31.367
1.42	0.1100	0.1100	4.350	20.183	45.250
2.85	0.1200	0.0842	6.383	27.800	60.867
3.46	0.1400	0.0809	6.750	29.183	63.500

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.3200**	**0.2701**	**1.817**	**9.900**	**23.617**
2.24	0.3600	0.2694	1.817	9.933	23.683
4.48	0.2100	0.2100	2.717	13.717	31.750
7.12	0.1400	0.1400	5.000	22.683	50.367
3.46	0.1300	0.1209	6.167	27.000	59.250

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

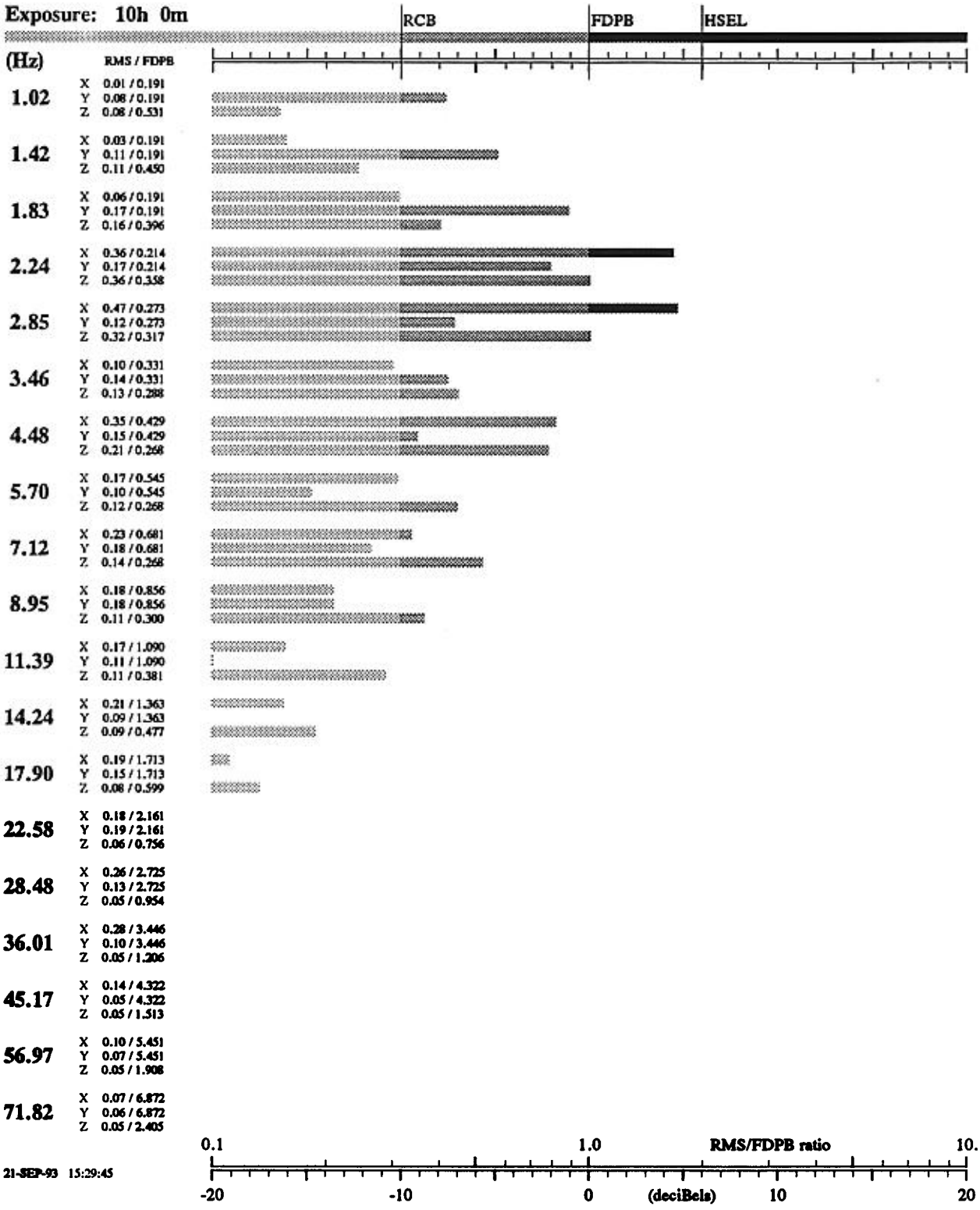
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-23 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:45

Course: Cross country #1
Speed: 8 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-24 Passenger

21-SEP-93 15:29:46

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Passenger
5:	Speed:.....	10 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.6100**	**0.4281**	**0.333**	**3.183**	**8.583**
2.24	0.4100	0.3661	0.517	4.033	10.583
5.70	0.5700	0.2000	1.700	9.433	22.617
4.48	0.3800	0.1696	2.233	11.717	27.500
3.46	0.1900	0.1098	4.367	20.250	45.367

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.2500**	**0.2232**	**1.417**	**8.133**	**19.800**
1.83	0.1700	0.1700	2.233	11.683	27.433
1.42	0.1400	0.1400	3.033	14.967	34.433
2.85	0.1900	0.1333	3.267	15.933	36.433
3.46	0.2300	0.1329	3.283	15.967	36.500

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.5300**	**0.4474**	**0.683**	**4.933**	**12.617**
2.24	0.5300	0.3966	0.883	5.850	14.717
4.48	0.3000	0.3000	1.517	8.600	20.800
3.46	0.2600	0.2418	2.167	11.433	26.933
5.70	0.2400	0.2400	2.200	11.550	27.183

* International Standards Organization ISO 2631:

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Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

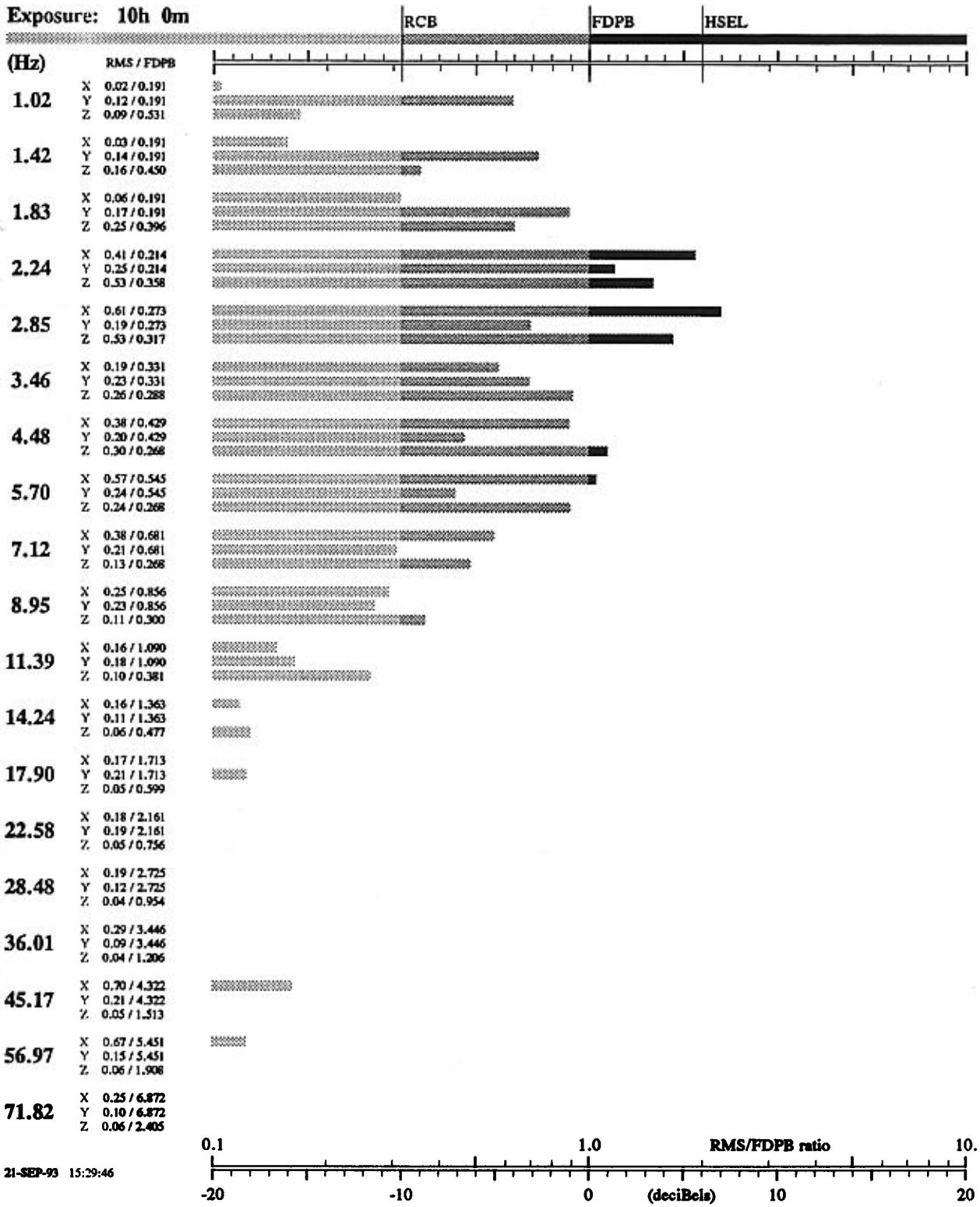
RUN-24

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:46

Course: Cross country #1
Speed: 10 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-24 Driver

21-SEP-93 15:29:46

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Driver
5:	Speed:.....	10 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.4300**	**0.3018**	**0.767**	**5.350**	**13.583**
2.24	0.2800	0.2500	1.167	6.967	17.217
5.70	0.3500	0.1228	3.700	17.650	40.000
4.48	0.2300	0.1027	4.817	21.967	48.867
3.46	0.1300	0.0751	7.467	31.800	68.867

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.1900**	**0.1696**	**2.233**	**11.717**	**27.500**
1.83	0.1500	0.1500	2.717	13.717	31.750
1.42	0.1000	0.1000	5.000	22.683	50.367
3.46	0.1700	0.0983	5.133	23.150	51.367
1.02	0.0800	0.0800	6.850	29.550	64.367

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.3300**	**0.2786**	**1.717**	**9.500**	**22.750**
2.24	0.3300	0.2469	2.100	11.117	26.250
5.70	0.2000	0.2000	2.933	14.583	33.617
4.48	0.1800	0.1800	3.450	16.650	38.000
7.12	0.1600	0.1600	4.117	19.267	43.367

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

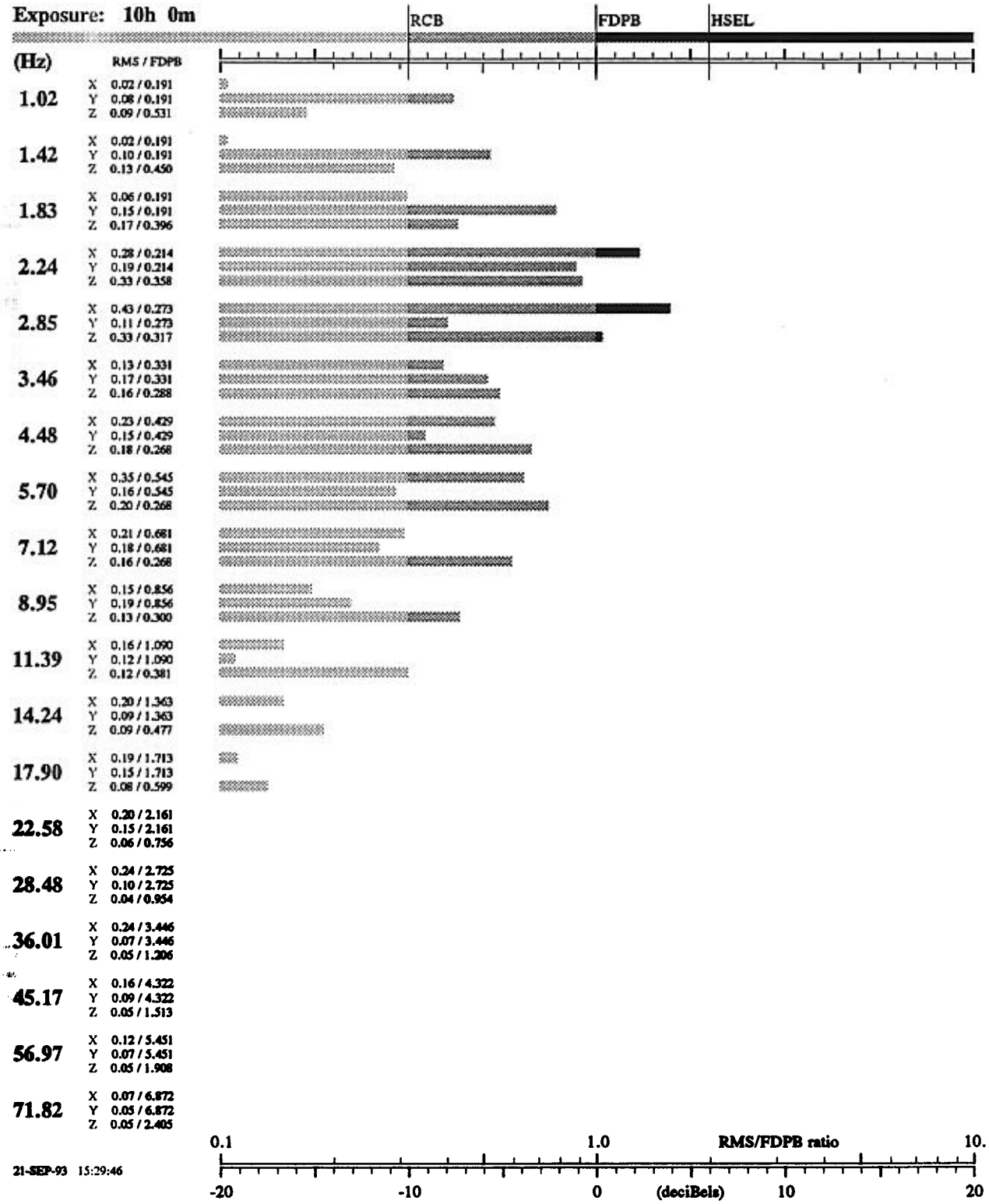
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-24 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:46

Course: Cross country #1
Speed: 10 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-25 Passenger

21-SEP-93 15:29:46

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Passenger
5:	Speed:.....	12 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.7800**	**0.3482**	**0.567**	**4.350**	**11.300**
7.12	1.1200	0.3146	0.700	5.033	12.867
2.24	0.3100	0.2768	0.917	6.050	15.150
2.85	0.3800	0.2667	1.000	6.367	15.867
5.70	0.5400	0.1895	1.867	10.133	24.117

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.2000**	**0.1786**	**2.067**	**10.967**	**25.867**
1.83	0.1600	0.1600	2.450	12.617	29.500
1.42	0.1500	0.1500	2.717	13.717	31.750
3.46	0.2300	0.1329	3.283	15.967	36.500
7.12	0.4500	0.1264	3.533	17.000	38.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3000**	**0.3000**	**1.517**	**8.600**	**20.800**
7.12	0.2100	0.2100	2.717	13.717	31.750
2.24	0.2300	0.1721	3.683	17.617	39.933
5.70	0.1700	0.1700	3.767	17.867	40.500
2.85	0.1900	0.1604	4.100	19.217	43.250

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

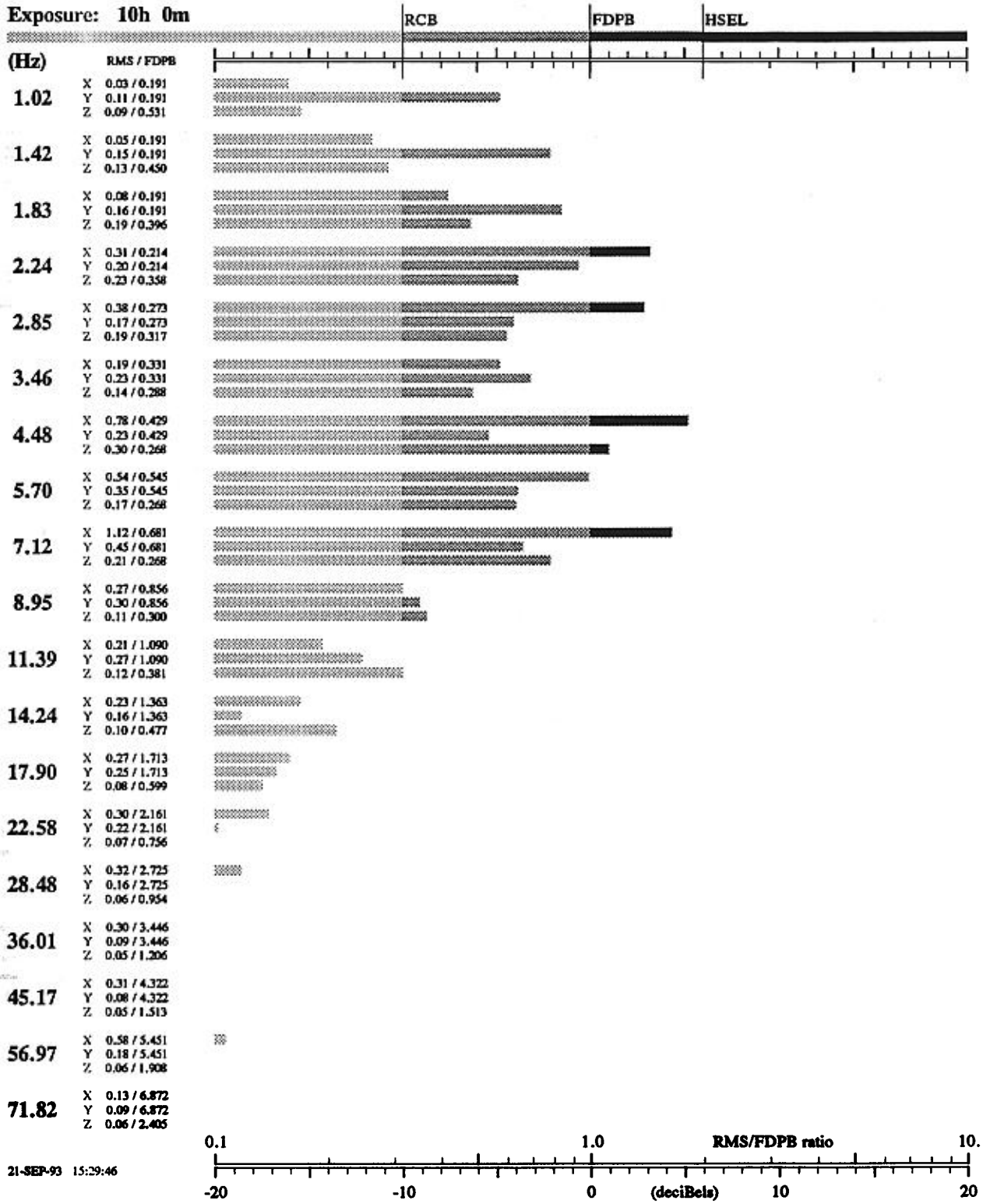
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-25
February 14, 1992

Passenger seat
M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:46

Course: Cross country #1
Speed: 12 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-25 Driver

21-SEP-93 15:29:46

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Cross country #1
4:	Position:.....	Driver
5:	Speed:.....	12 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.4200**	**0.1875**	**1.900**	**10.267**	**24.433**
7.12	0.6400	0.1798	2.033	10.867	25.683
2.24	0.1800	0.1607	2.433	12.550	29.300
2.85	0.2000	0.1404	3.017	14.933	34.367
5.70	0.3400	0.1193	3.867	18.300	41.367

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.83	**0.1300**	**0.1300**	**3.400**	**16.433**	**37.500**
2.24	0.1400	0.1250	3.600	17.250	39.183
1.42	0.1100	0.1100	4.350	20.183	45.250
7.12	0.3000	0.0843	6.383	27.800	60.750
5.70	0.2400	0.0842	6.383	27.800	60.867

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.3300**	**0.3300**	**1.283**	**7.550**	**18.500**
4.48	0.2700	0.2700	1.817	9.900	23.617
5.70	0.2300	0.2300	2.350	12.217	28.550
2.24	0.2400	0.1796	3.467	16.717	38.050
2.85	0.2100	0.1773	3.533	17.000	38.617

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

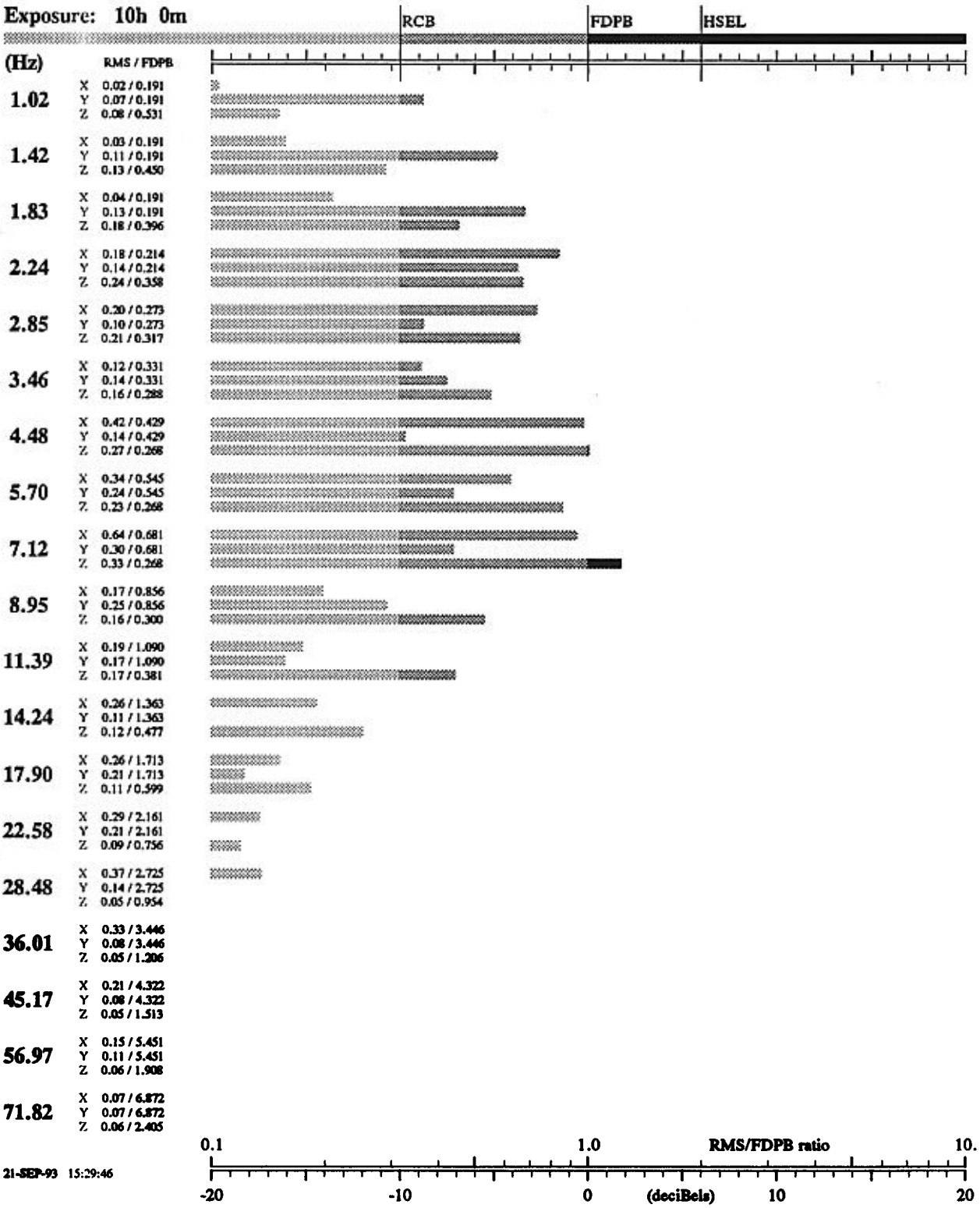
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-25 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:46

Course: Cross country #1
Speed: 12 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-26 Passenger

21-SEP-93 15:29:46

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Paved
4:	Position:.....	Passenger
5:	Speed:.....	55 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.5700**	**0.5089**	**0.233**	**2.433**	**6.783**
2.85	0.6300	0.4421	0.317	3.033	8.217
7.12	0.9900	0.2781	0.917	6.000	15.050
4.48	0.5500	0.2455	1.200	7.150	17.583
8.95	0.4100	0.0916	5.667	25.183	55.500

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.4200**	**0.1180**	**3.933**	**18.550**	**41.867**
2.85	0.1600	0.1123	4.217	19.683	44.250
2.24	0.1200	0.1071	4.533	20.867	46.617
1.83	0.0800	0.0800	6.850	29.550	64.367
3.46	0.1300	0.0751	7.467	31.800	68.867

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.7500**	**0.7500**	**0.200**	**2.250**	**6.317**
2.85	0.3200	0.2701	1.817	9.900	23.617
4.48	0.2500	0.2500	2.067	10.967	25.867
2.24	0.3200	0.2395	2.200	11.583	27.250
3.46	0.1800	0.1674	3.850	18.250	41.250

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

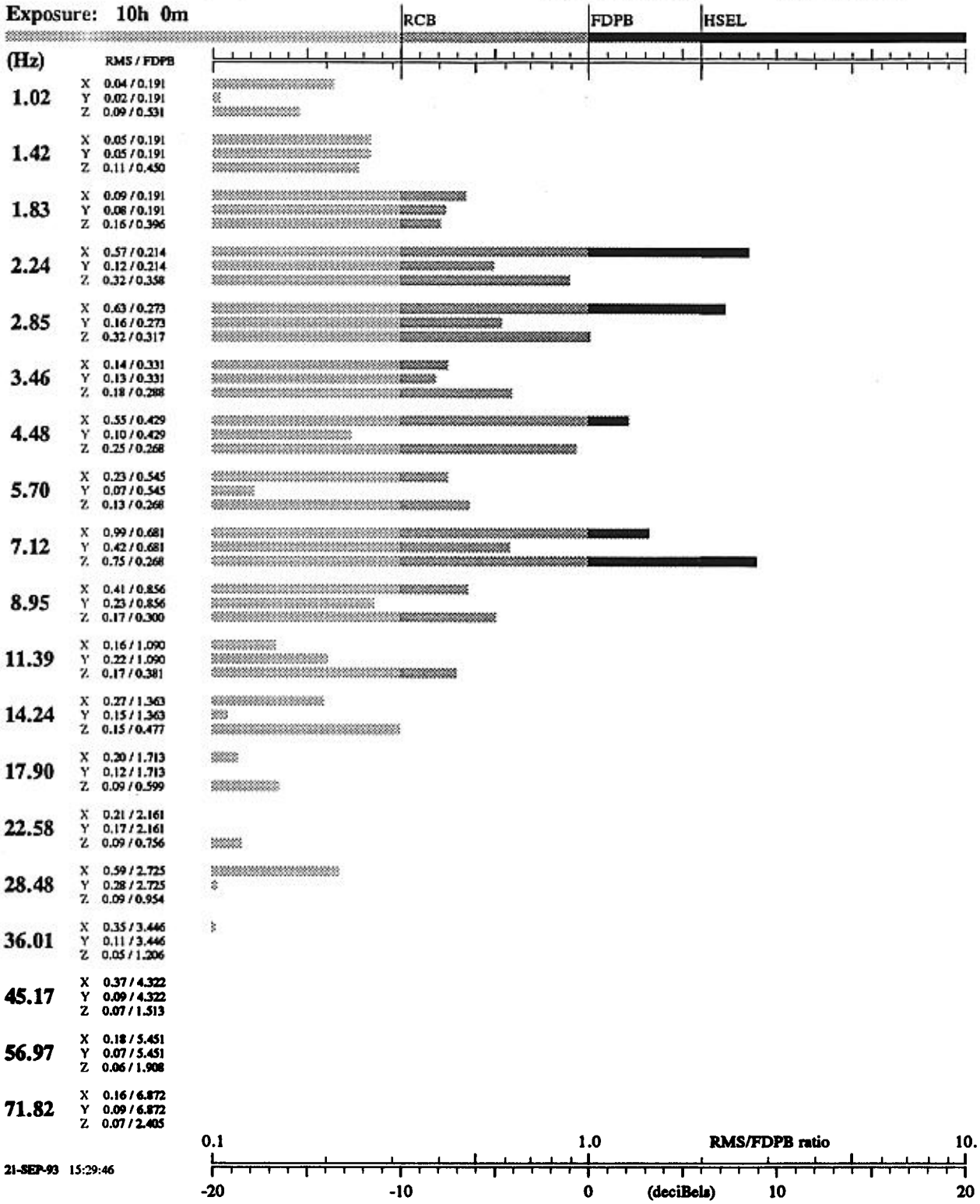
RUN-26

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:46

Course: Paved
Speed: 55 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-26 Driver

21-SEP-93 15:29:47

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Paved
4:	Position:.....	Driver
5:	Speed:.....	55 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.4000**	**0.3571**	**0.533**	**4.183**	**10.933**
2.85	0.4200	0.2947	0.800	5.533	14.000
7.12	0.5200	0.1461	2.833	14.183	32.750
4.48	0.1800	0.0804	6.817	29.433	64.000
1.83	0.0600	0.0600	10.117	41.183	87.500

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.2500**	**0.0702**	**8.200**	**34.367**	**74.000**
1.83	0.0600	0.0600	10.117	41.183	87.500
2.24	0.0600	0.0536	11.717	46.750	98.500
2.85	0.0700	0.0491	13.117	51.500	107.750
1.42	0.0400	0.0400	17.000	64.500	133.000

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.4100**	**0.4100**	**0.817**	**5.583**	**14.117**
2.85	0.3800	0.3208	1.350	7.850	19.183
2.24	0.3500	0.2619	1.900	10.300	24.500
4.48	0.1900	0.1900	3.183	15.583	35.683
3.46	0.1400	0.1302	5.550	24.750	54.617

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

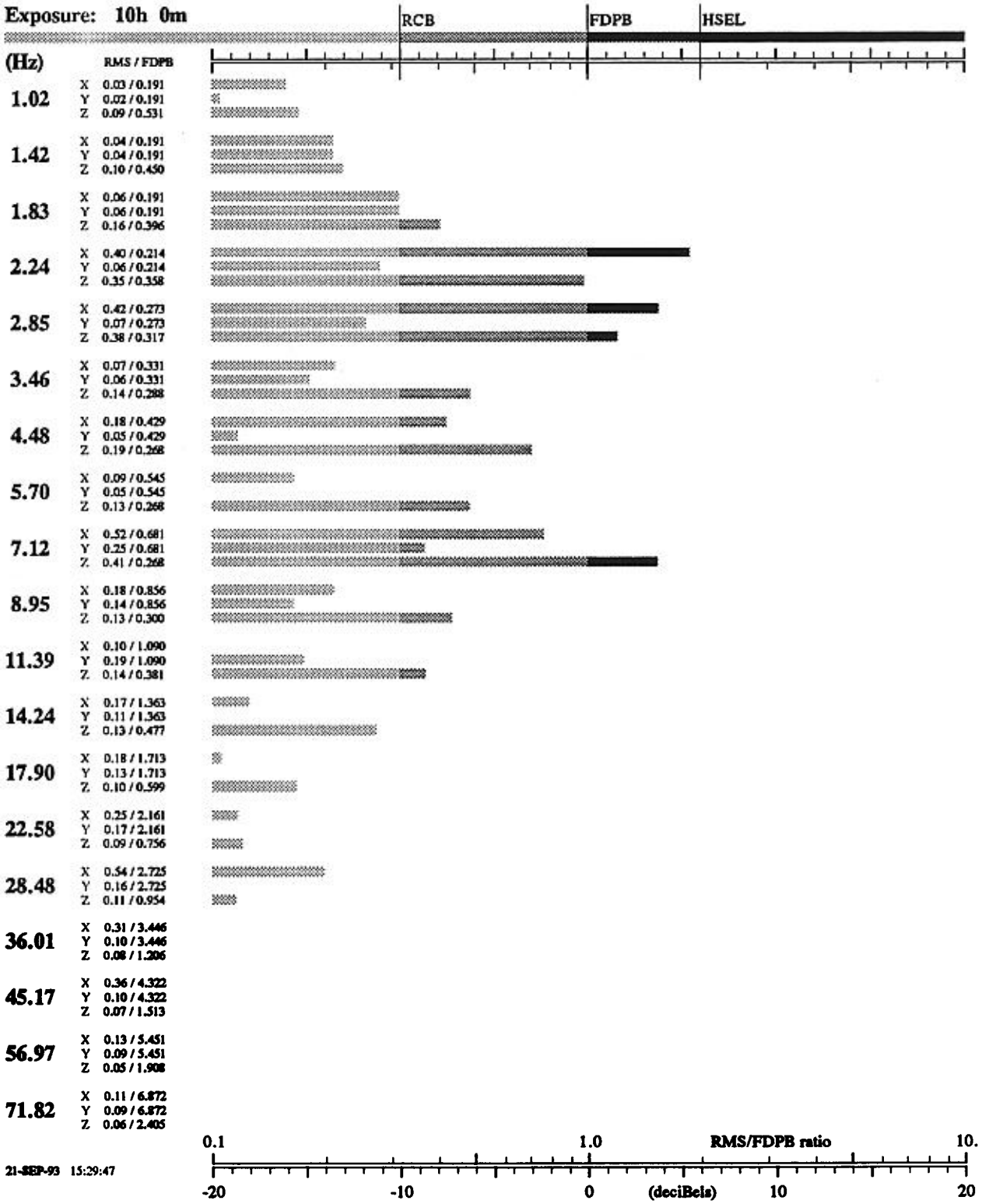
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-26 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:47

Course: Paved
Speed: 55 mph
Note: Loaded trailer

USAARL summary of analysis per ISO-2631* guideline on whole-body vibration (WBV)

RUN-27 Passenger

21-SEP-93 15:29:47

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Paved
4:	Position:.....	Passenger
5:	Speed:.....	35 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2900**	**0.1295**	**3.417**	**16.500**	**37.683**
2.85	0.1200	0.0842	6.383	27.800	60.867
2.24	0.0800	0.0714	8.000	33.750	72.750
56.97	2.0100	0.0706	8.150	34.183	73.617
7.12	0.1800	0.0506	12.650	49.867	104.500

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3700**	**0.1652**	**2.333**	**12.117**	**28.367**
3.46	0.1100	0.0636	9.367	38.550	82.250
8.95	0.2300	0.0514	12.367	49.000	102.750
1.83	0.0500	0.0500	12.833	50.500	105.750
1.42	0.0400	0.0400	17.000	64.500	133.000

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.3300**	**0.2786**	**1.717**	**9.500**	**22.750**
4.48	0.2100	0.2100	2.717	13.717	31.750
2.24	0.2300	0.1721	3.683	17.617	39.933
3.46	0.1500	0.1395	5.033	22.750	50.617
7.12	0.0800	0.0800	10.783	43.500	92.000

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

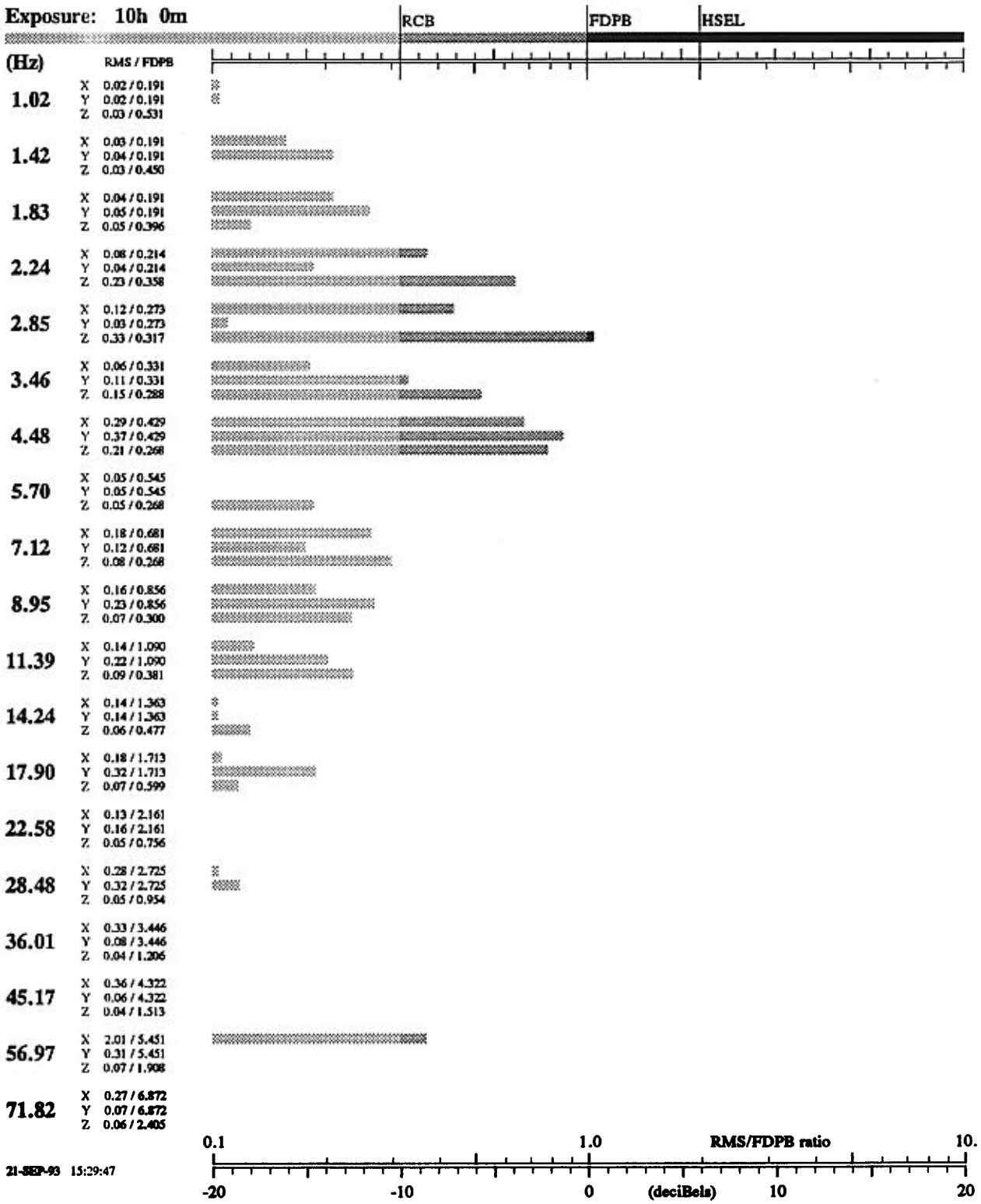
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-27 **Passenger seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:47

Course: Paved
Speed: 35 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-27 Driver

21-SEP-93 15:29:47

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Paved
4:	Position:.....	Driver
5:	Speed:.....	35 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3500**	**0.1563**	**2.550**	**13.017**	**30.300**
2.85	0.0700	0.0491	13.117	51.500	107.750
3.46	0.0600	0.0347	20.250	75.250	153.500
7.12	0.1000	0.0281	26.117	94.000	189.000
2.24	0.0300	0.0268	27.617	98.750	198.000

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2400**	**0.1071**	**4.533**	**20.867**	**46.617**
3.46	0.0700	0.0405	16.750	63.750	131.500
1.83	0.0400	0.0400	17.000	64.500	133.000
8.95	0.1600	0.0358	19.550	72.750	148.750
2.24	0.0400	0.0357	19.550	72.867	149.000

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2400**	**0.2400**	**2.200**	**11.550**	**27.183**
2.85	0.2200	0.1857	3.283	16.017	36.617
2.24	0.1800	0.1347	5.283	23.750	52.617
3.46	0.1100	0.1023	7.767	32.867	71.000
7.12	0.0900	0.0900	9.217	38.050	81.250

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

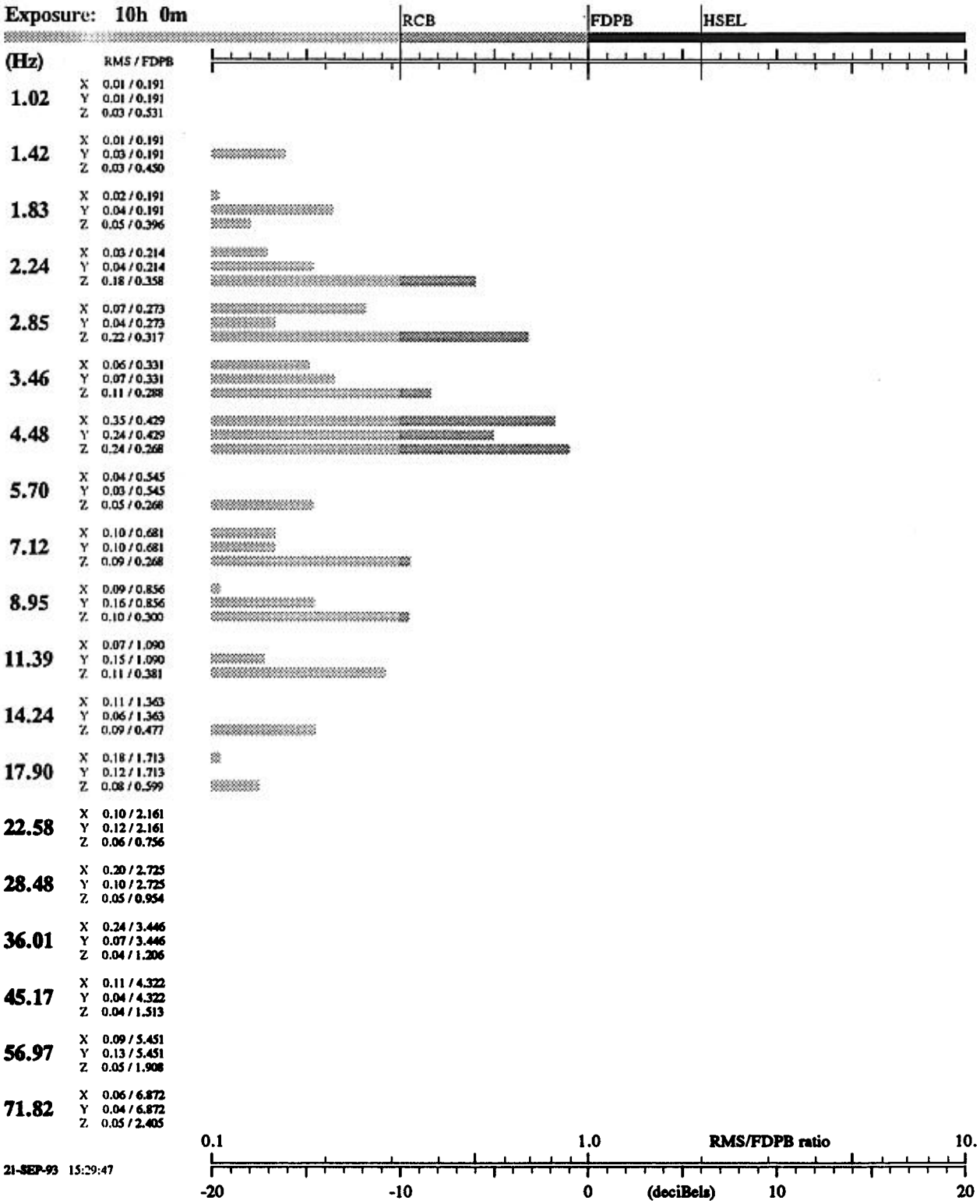
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-27 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:47

Course: Paved
Speed: 35 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-28 Passenger

21-SEP-93 15:29:47

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Paved
4:	Position:.....	Passenger
5:	Speed:.....	45 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.3200**	**0.2246**	**1.400**	**8.067**	**19.617**
2.24	0.2400	0.2143	1.517	8.600	20.800
5.70	0.2400	0.0842	6.383	27.800	60.867
7.12	0.2500	0.0702	8.200	34.367	74.000
1.83	0.0700	0.0700	8.233	34.500	74.250

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.83	**0.0700**	**0.0700**	**8.233**	**34.500**	**74.250**
5.70	0.1900	0.0667	8.800	36.500	78.250
2.24	0.0700	0.0625	9.583	39.300	83.750
2.85	0.0700	0.0491	13.117	51.500	107.750
3.46	0.0800	0.0462	14.183	55.117	114.750

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.4000**	**0.3376**	**1.233**	**7.317**	**18.000**
2.24	0.3000	0.2245	2.450	12.583	29.367
5.70	0.1600	0.1600	4.117	19.267	43.367
3.46	0.1600	0.1488	4.583	21.050	47.117
11.39	0.1500	0.1054	7.467	31.750	68.750

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

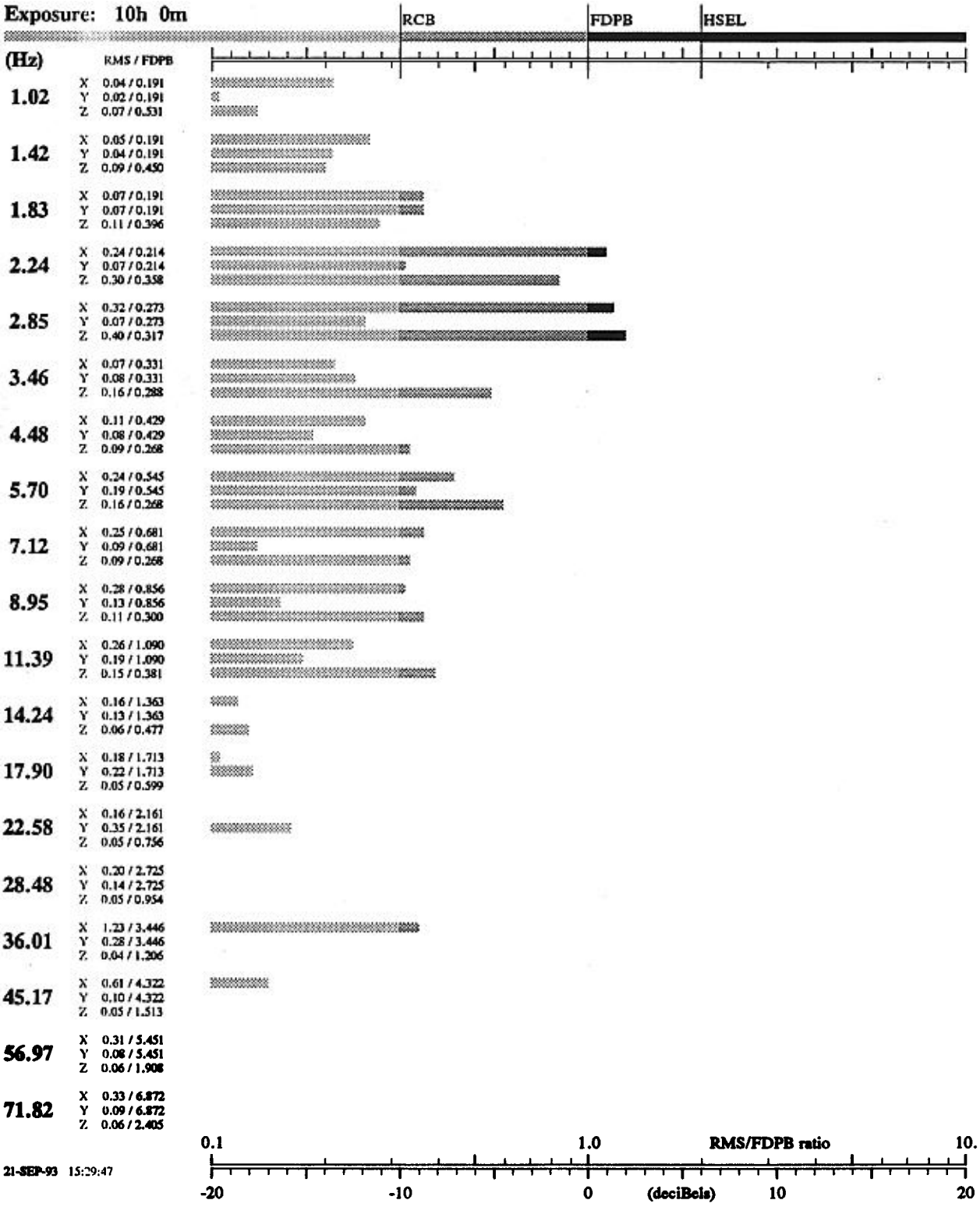
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-28 **Passenger seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:47

Course: Paved
Speed: 45 mph
Note: Loaded trailer

USAARL summary of analysis per ISO-2631* guideline on whole-body vibration (WBV)

RUN-28 Driver

21-SEP-93 15:29:48

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Paved
4:	Position:.....	Driver
5:	Speed:.....	45 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.2400**	**0.1684**	**2.267**	**11.833**	**27.750**
2.24	0.1600	0.1429	2.933	14.583	33.617
1.83	0.0500	0.0500	12.833	50.500	105.750
5.70	0.1400	0.0491	13.117	51.500	107.750
4.48	0.1000	0.0446	14.800	57.250	118.867

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.0700**	**0.0625**	**9.583**	**39.300**	**83.750**
1.83	0.0600	0.0600	10.117	41.183	87.500
5.70	0.1200	0.0421	15.933	61.000	126.250
2.85	0.0600	0.0421	15.933	61.000	126.250
1.42	0.0300	0.0300	24.150	87.750	177.250

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.2900**	**0.2448**	**2.133**	**11.250**	**26.550**
2.24	0.2500	0.1871	3.250	15.867	36.300
5.70	0.1500	0.1500	4.533	20.867	46.617
11.39	0.1700	0.1194	6.267	27.433	60.000
3.46	0.1100	0.1023	7.767	32.867	71.000

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

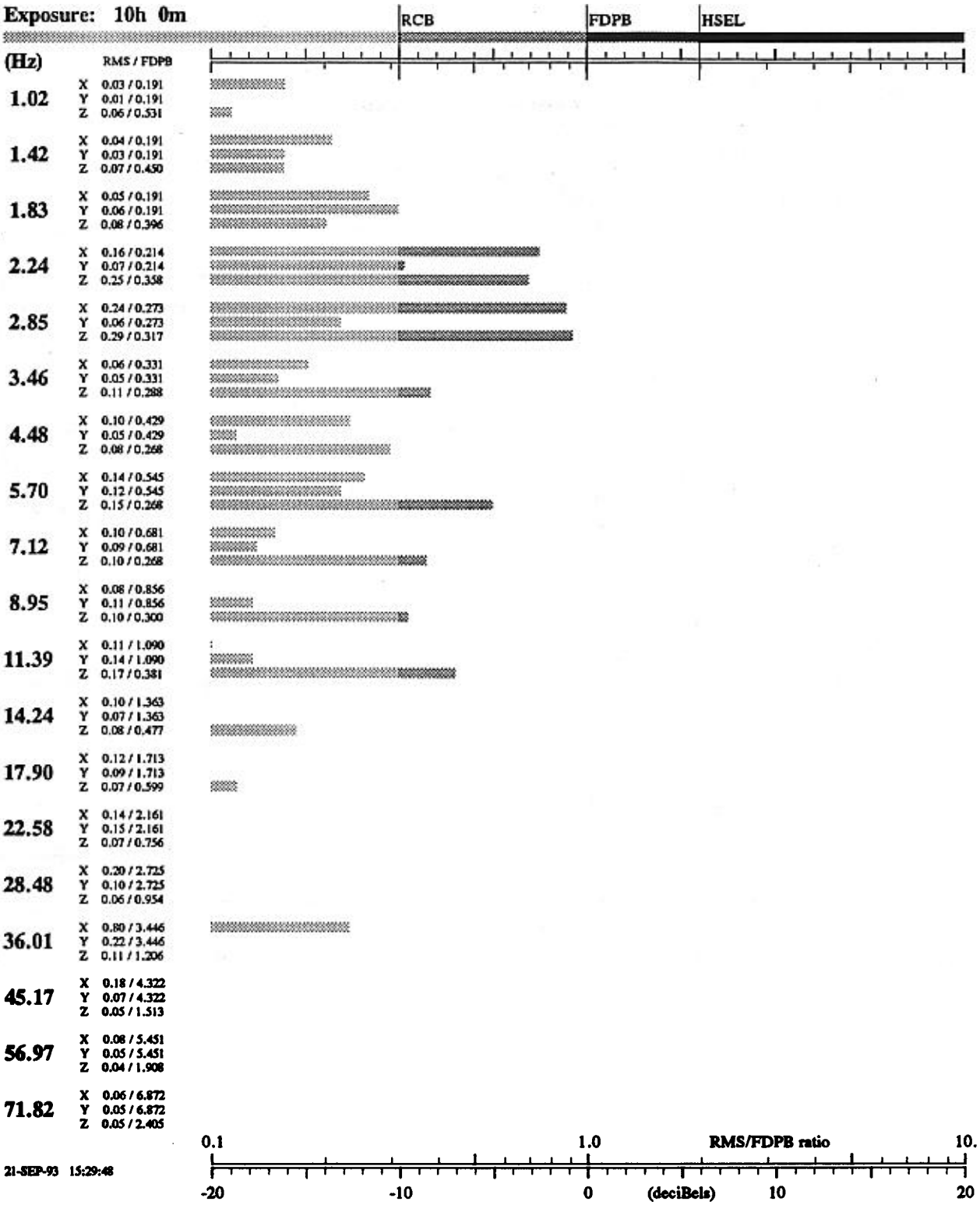
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-28 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



21-SEP-93 15:29:48

Course: Paved
Speed: 45 mph
Note: Loaded trailer

USAARL summary of analysis per ISO-2631* guideline on whole-body vibration (WBV)

RUN-29 Passenger

21-SEP-93 15:29:48

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Passenger
5:	Speed:.....	15 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.6400**	**0.2857**	**0.867**	**5.783**	**14.550**
2.85	0.1900	0.1333	3.267	15.933	36.433
2.24	0.1200	0.1071	4.533	20.867	46.617
5.70	0.2400	0.0842	6.383	27.800	60.867
7.12	0.2700	0.0758	7.383	31.433	68.117

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.83	**0.1500**	**0.1500**	**2.717**	**13.717**	**31.750**
4.48	0.2400	0.1071	4.533	20.867	46.617
2.24	0.1100	0.0982	5.133	23.183	51.367
7.12	0.3100	0.0871	6.083	26.750	58.617
3.46	0.1400	0.0809	6.750	29.183	63.500

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3200**	**0.3200**	**1.367**	**7.883**	**19.217**
2.85	0.2100	0.1773	3.533	17.000	38.617
7.12	0.1600	0.1600	4.117	19.267	43.367
2.24	0.2100	0.1571	4.233	19.683	44.250
5.70	0.1400	0.1400	5.000	22.683	50.367

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-29 **Passenger seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m

21-SEP-93 15:29:48

Course: Secondary a
Speed: 15 mph
Note: Loaded trailer

USAARL summary of analysis per ISO-2631* guideline on whole-body vibration (WBV)

RUN-29 Driver

21-SEP-93 15:29:48

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Driver
5:	Speed:.....	15 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.3100**	**0.1384**	**3.083**	**15.183**	**34.867**
2.24	0.0800	0.0714	8.000	33.750	72.750
2.85	0.1000	0.0702	8.200	34.433	74.117
7.12	0.1700	0.0478	13.617	53.117	111.000
5.70	0.1300	0.0456	14.433	55.867	116.250

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
1.83	**0.1000**	**0.1000**	**5.000**	**22.683**	**50.367**
4.48	0.1400	0.0625	9.583	39.300	83.750
2.24	0.0700	0.0625	9.583	39.300	83.750
7.12	0.2000	0.0562	11.017	44.367	93.750
2.85	0.0600	0.0421	15.933	61.000	126.250

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
4.48	**0.2000**	**0.2000**	**2.933**	**14.583**	**33.617**
2.85	0.1900	0.1604	4.100	19.217	43.250
7.12	0.1600	0.1600	4.117	19.267	43.367
2.24	0.1900	0.1422	4.900	22.250	49.500
3.46	0.1300	0.1209	6.167	27.000	59.250

* International Standards Organization ISO 2631:
Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

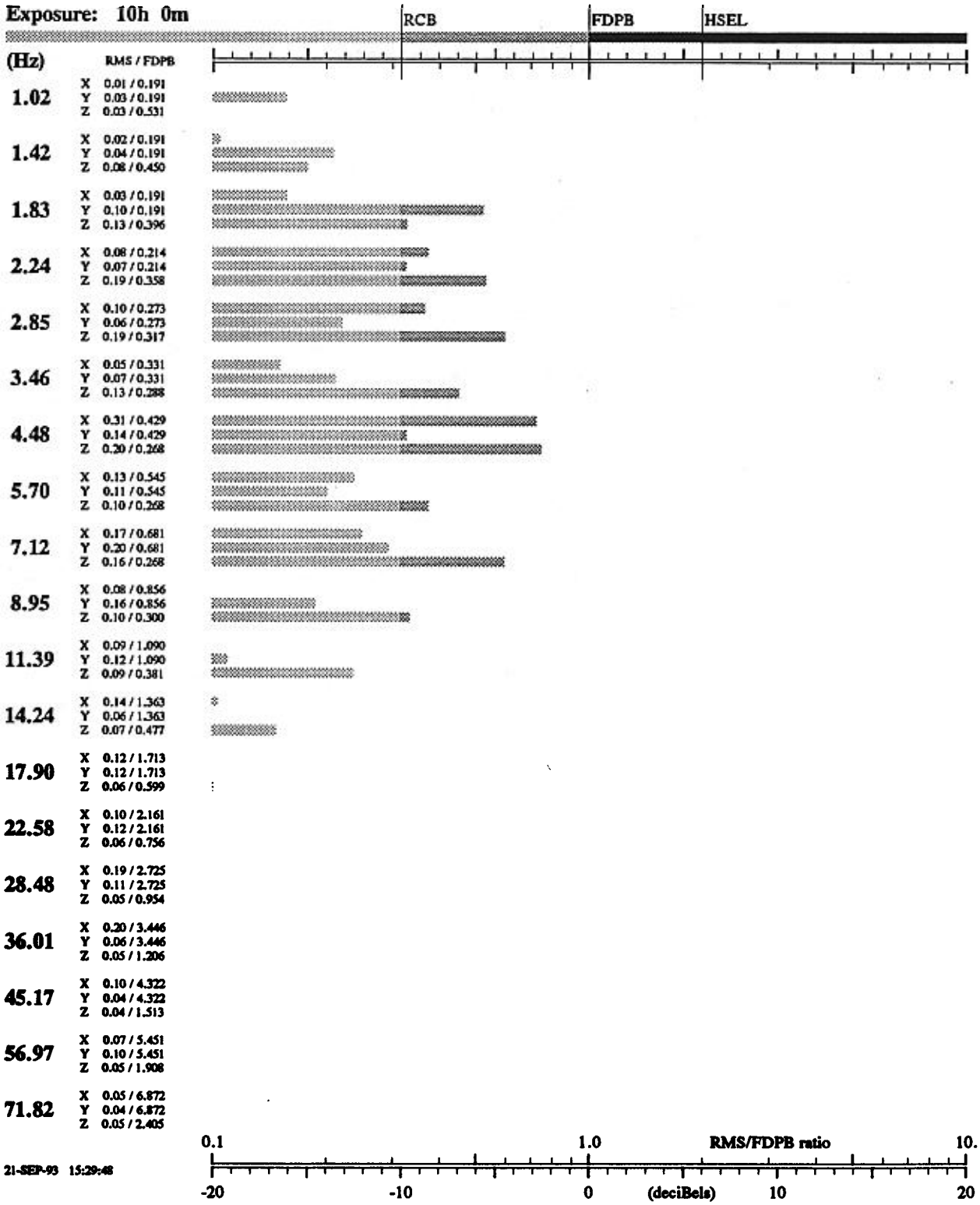
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-29 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



Course: Secondary a
Speed: 15 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-30 Passenger

21-SEP-93 15:29:48

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Passenger
5:	Speed:.....	20 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.3900**	**0.3482**	**0.567**	**4.350**	**11.300**
2.85	0.3100	0.2175	1.483	8.433	20.433
7.12	0.7100	0.1994	1.717	9.467	22.683
5.70	0.3600	0.1263	3.550	17.050	38.750
8.95	0.5000	0.1117	4.250	19.800	44.500

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.1500**	**0.1339**	**3.250**	**15.833**	**36.250**
1.02	0.0900	0.0900	5.817	25.750	56.617
2.85	0.1200	0.0842	6.383	27.800	60.867
8.95	0.3700	0.0827	6.550	28.433	62.117
1.42	0.0800	0.0800	6.850	29.550	64.367

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.4700**	**0.3517**	**1.150**	**6.917**	**17.117**
2.85	0.3400	0.2870	1.633	9.117	21.933
7.12	0.2700	0.2700	1.817	9.900	23.617
8.95	0.3000	0.2682	1.833	10.000	23.800
4.48	0.1700	0.1700	3.767	17.867	40.500

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

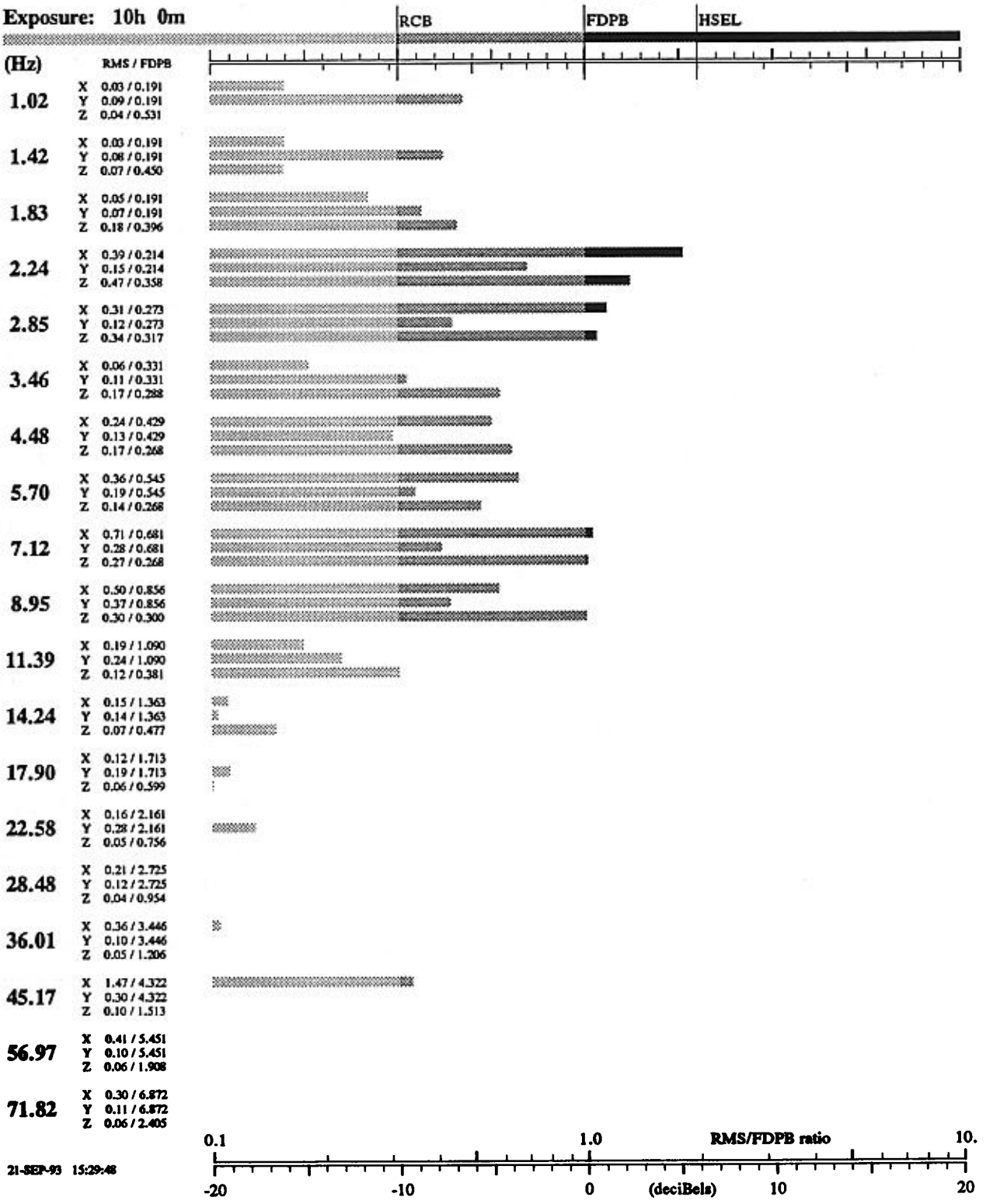
RUN-30

February 14, 1992

Passenger seat

M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:48

Course: Secondary a
Speed: 20 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-30 Driver

21-SEP-93 15:29:48

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Driver
5:	Speed:.....	20 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2) — Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.2600**	**0.2321**	**1.317**	**7.717**	**18.867**
2.85	0.2100	0.1474	2.800	14.017	32.433
7.12	0.3600	0.1011	4.917	22.367	49.750
4.48	0.1700	0.0759	7.367	31.433	68.117
5.70	0.2000	0.0702	8.200	34.433	74.117

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.1200**	**0.1071**	**4.533**	**20.867**	**46.617**
7.12	0.2300	0.0646	9.167	37.867	80.867
2.85	0.0900	0.0632	9.450	38.867	82.867
1.83	0.0600	0.0600	10.117	41.183	87.500
1.02	0.0600	0.0600	10.117	41.183	87.500

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.3900**	**0.2918**	**1.583**	**8.933**	**21.500**
7.12	0.2500	0.2500	2.067	10.967	25.867
2.85	0.2700	0.2279	2.383	12.367	28.867
8.95	0.2200	0.1966	3.017	14.900	34.300
5.70	0.1300	0.1300	5.567	24.800	54.617

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

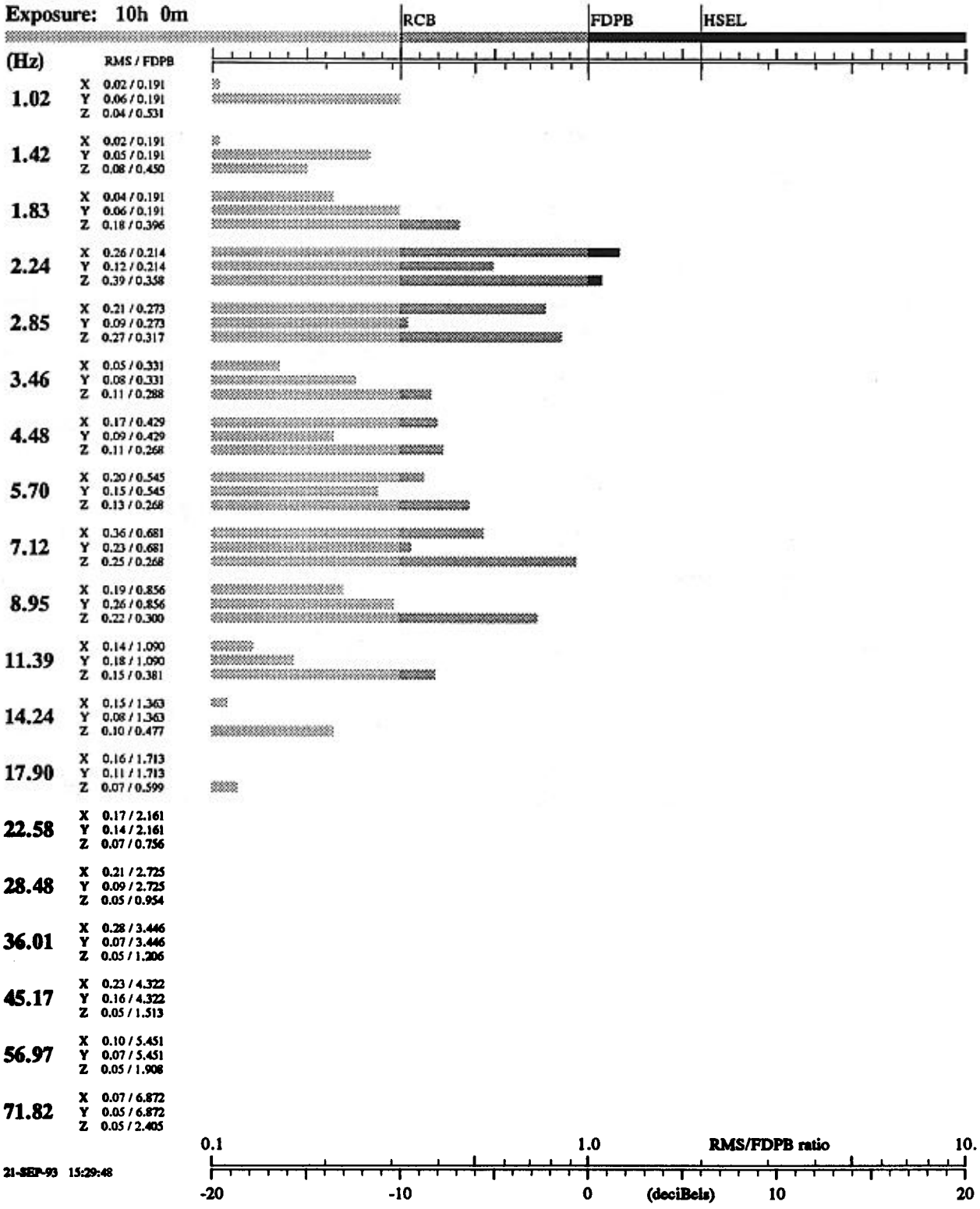
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-30 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



Course: Secondary a
Speed: 20 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-31 Passenger

21-SEP-93 15:29:49

1:	Vehicle:.....	M915a2 truck
2:	Date:.....	February 14, 1992
3:	Course:.....	Secondary a
4:	Position:.....	Passenger
5:	Speed:.....	25 mph
6:	Note:.....	Loaded trailer

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
7.12	**0.6500**	**0.1826**	**1.983**	**10.650**	**25.217**
2.85	0.2100	0.1474	2.800	14.017	32.433
2.24	0.1300	0.1161	4.017	18.933	42.617
8.95	0.4900	0.1095	4.383	20.300	45.500
5.70	0.2400	0.0842	6.383	27.800	60.867

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.1400**	**0.0982**	**5.133**	**23.183**	**51.367**
2.24	0.1100	0.0982	5.133	23.183	51.367
8.95	0.4100	0.0916	5.667	25.183	55.500
1.83	0.0900	0.0900	5.817	25.750	56.617
3.46	0.1500	0.0867	6.133	26.867	59.000

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.3300**	**0.2786**	**1.717**	**9.500**	**22.750**
8.95	0.3000	0.2682	1.833	10.000	23.800
7.12	0.2500	0.2500	2.067	10.967	25.867
3.46	0.2300	0.2139	2.650	13.400	31.117
2.24	0.2600	0.1946	3.067	15.117	34.750

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

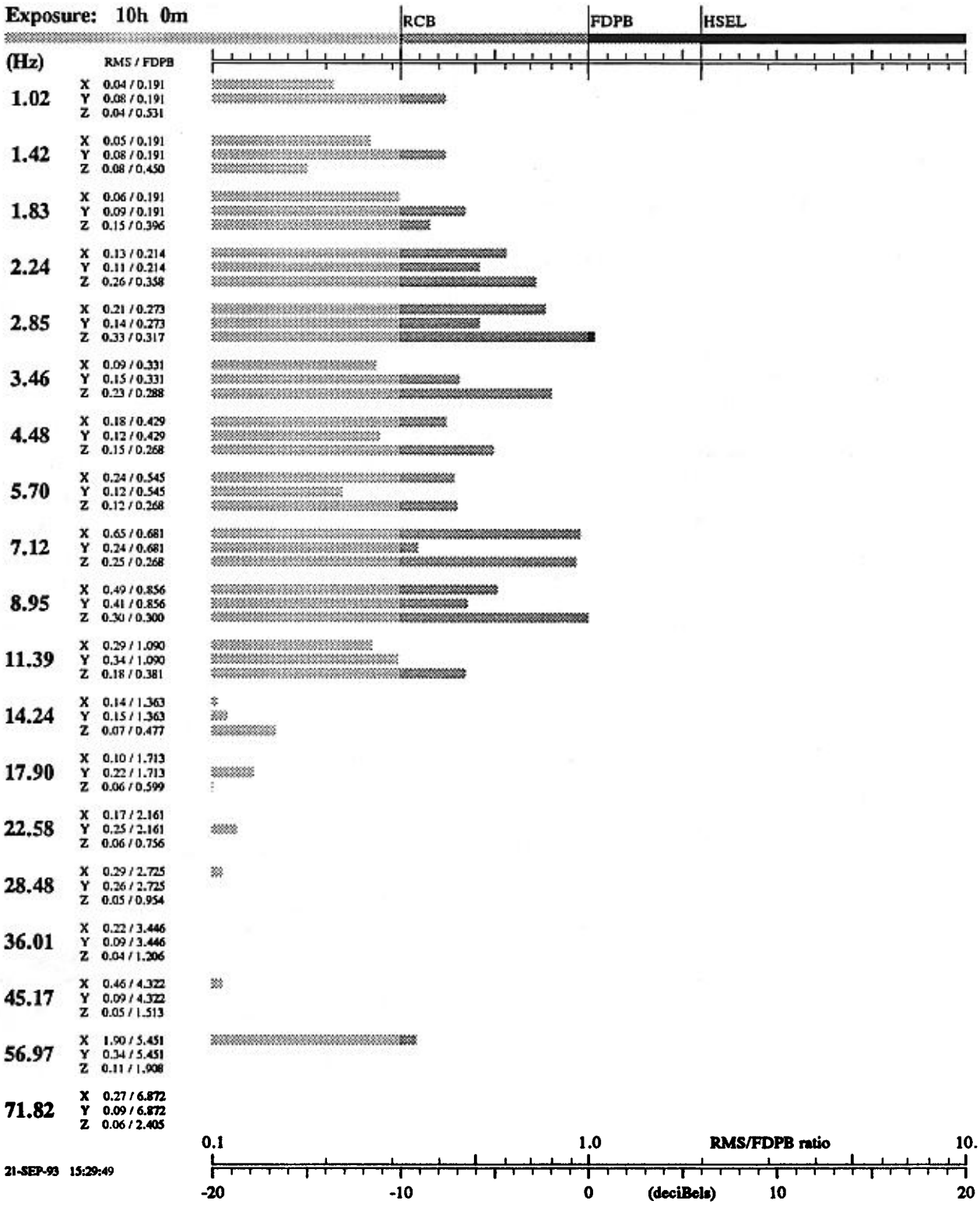
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-31
February 14, 1992

Passenger seat
M915a2 truck

Exposure: 10h 0m



21-SEP-93 15:29:49

Course: Secondary a
Speed: 25 mph
Note: Loaded trailer

USAARL summary of analysis
per ISO-2631* guideline on
whole-body vibration (WBV)

RUN-31 Driver

21-SEP-93 15:29:49

1:	Vehicle:.....	**M915a2 truck**
2:	Date:.....	**February 14, 1992**
3:	Course:.....	**Secondary a**
4:	Position:.....	**Driver**
5:	Speed:.....	**25 mph**
6:	Note:.....	**Loaded trailer**

Third-octave bands with greatest weighted RMS accelerations (m/s^2)

Durations of WBV exposure before reaching ISO limits*

X: Longitudinal

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.85	**0.1500**	**0.1053**	**4.650**	**21.300**	**47.617**
7.12	0.3400	0.0955	5.350	23.933	53.000
2.24	0.0900	0.0804	6.817	29.433	64.000
4.48	0.1300	0.0580	10.567	42.750	90.500
5.70	0.1400	0.0491	13.117	51.500	107.750

Y: Transverse

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
2.24	**0.0900**	**0.0804**	**6.817**	**29.433**	**64.000**
1.83	0.0800	0.0800	6.850	29.550	64.367
8.95	0.3500	0.0782	7.067	30.367	66.000
2.85	0.1000	0.0702	8.200	34.433	74.117
1.42	0.0600	0.0600	10.117	41.183	87.500

Z: Vertical

(Hz)	actual	weighted	Comfort (hours)	Fatigue (hours)	Health (hours)
8.95	**0.2900**	**0.2592**	**1.933**	**10.433**	**24.800**
7.12	0.2300	0.2300	2.350	12.217	28.550
2.85	0.2200	0.1857	3.283	16.017	36.617
2.24	0.2200	0.1646	3.950	18.617	42.000
11.39	0.2200	0.1545	4.333	20.117	45.117

* International Standards Organization ISO 2631:

Comfort ... Reduced comfort boundary
Fatigue ... Fatigue-decreased proficiency boundary
Health ... Health and safety exposure limit

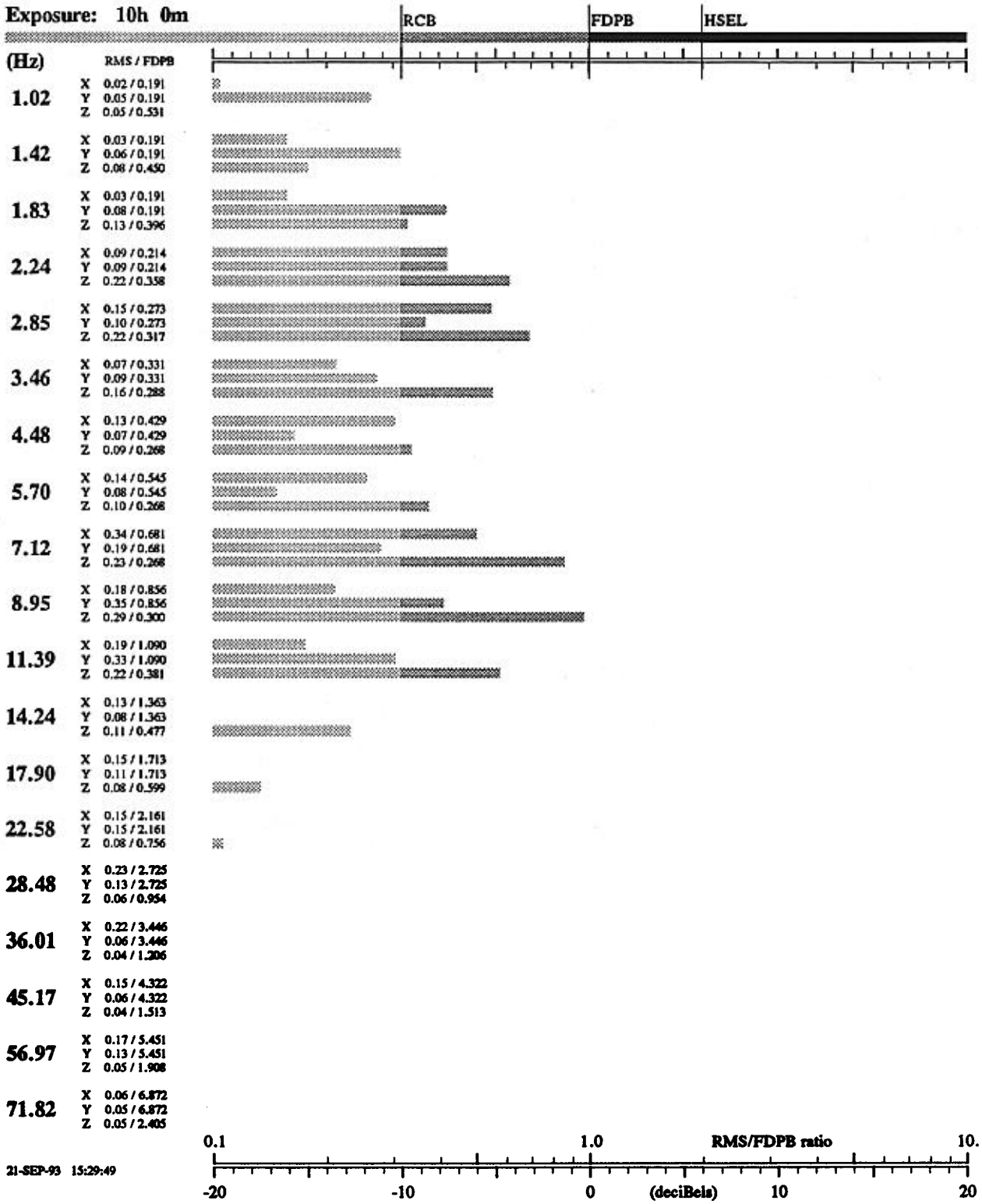
HSEL: Health and safety exposure limit
FDPB: Fatigue-decreased proficiency boundary
RCB: Reduced comfort boundary
RMS: Vibration R.M.S. acceleration (m/s2)

X: Longitudinal
Y: Transverse
Z: Vertical

RUN-31 **Driver seat**

February 14, 1992 **M915a2 truck**

Exposure: 10h 0m



Course: Secondary a
Speed: 25 mph
Note: Loaded trailer