Workplace Incident Analysis

A Portofolio on Data Analysis and Visualization of a Publicly-Available Data

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Overview

About the Data

OSHA HSE DATA_ALL ABSTRACTS 15-17_FINAL.csv (3.43 MB)

Detail | Compact | Column — 12 of 29 columns

# summary_nr	Event Date	Event Keywords	con_end	proj_type	nature_of_inj	part_of_body	event_type	evn_factor
221m … 221m	2015-07-01 … 2017-08-10	4427 unique values	0 79% C 6% Other (748) 15%	0 78% A 12% Other (512) 11%	0 … 22	0 … 31	0 … 14	0
220982664	8/10/2017	FINGER,MECHANICAL POWER PRESS,AMPUTATION,GUARD	0	0	1	10	2	2
220973937	7/17/2017	CAUGHT IN,DRIVE SHAFT,RESIDENTIAL CONSTRUCTION,AMPUTATION,DRILL	H	B	9	10	2	18
220967632	6/30/2017	AMPUTATED,EXPLOSION,FIREWORKS	0	0	5	12	14	18
220969901	6/30/2017	RIB,ROOF,HEAD,FALL PROTECTION,FALL,COLLARBONE,STRUCK AGAINST	C	B	21	13	5	13
220977748	6/23/2017	STRUCK BY,TRUCK,BRAIN,NECK,FRACTURE,UNSTABLE LOAD	0	0	3	20	1	6
220974562	6/22/2017	UNCONSCIOUSNESS,FAINTED,HEAT EXHAUSTION,HEAT	0	0	21	4	14	18
220959936	5/31/2017	STRUCTURAL COLLAPSE,COMBUSTIBLE DUST,FIRE,AMPUTATION,EXPLOSION,CRUSHING	0	0	5	19	14	11
220960629	5/31/2017	PIPE,OIL RIG,STRUCK BY,EMERGENCY RESPONSE	0	0	3	5	1	11
220959944	5/31/2017	FALL,HEAD,ROOF,FLOOR OPENING	G	B	21	4	5	18

https://www.kaggle.com/datasets/rugaiyaship/osha-accident-and-injury-data-1517

- This dataset contains abstracts of the accidents and injuries of construction workers from 2015-2017.
- There is some structured data around the unstructured text abstracts, such as Degree of Injury, Body Part(s) Affected, and Construction End Use.

Between July 2015 and August 2017...

4,844

Workplace incidents have occurred

21%
(1,023)
heads turned victim,

61%
(2,954)
fatality rate, and

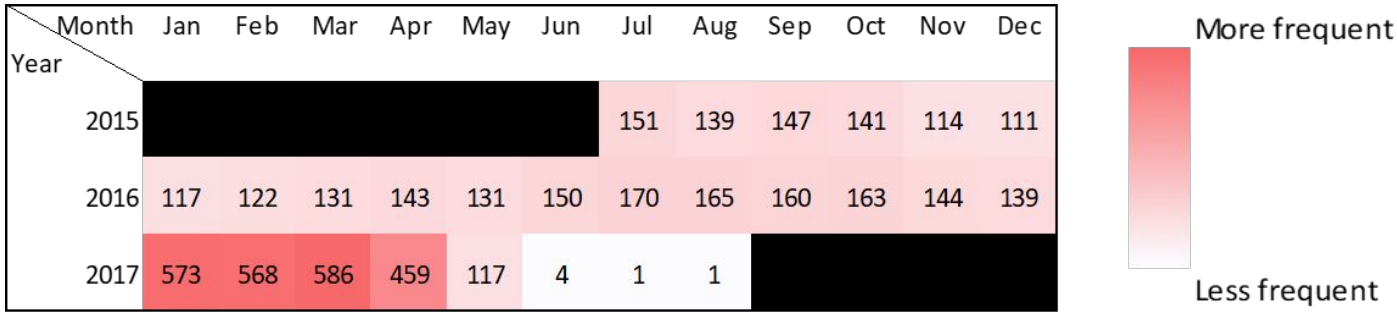
34%
(4,220)
Serious fall/strike incidents.

7.22
Average Incidents per day

Monthly and Daily Trends

Higher incidents in winter due to slippery conditions? Or change of reporting guideline?

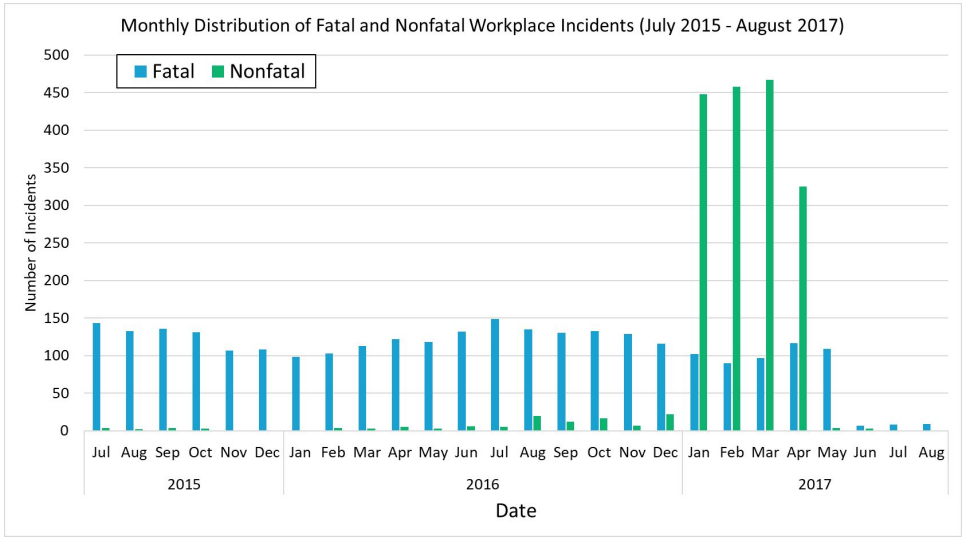
Heatmap of Workplace Incident occurrences by Month



Between 2015 to 2016, frequency of incidents were Hovering in 100s. The number surged on the first trimester of 2017. Only a handful of reports in the last three months of the dataset were recorded. Factors of fluctuation are hypothesized to be:

1. New method/policy of incident reporting starting 2017.
2. Workers are less cautious in winter season
3. There were incidents from April to August yet to be recorded in the database.

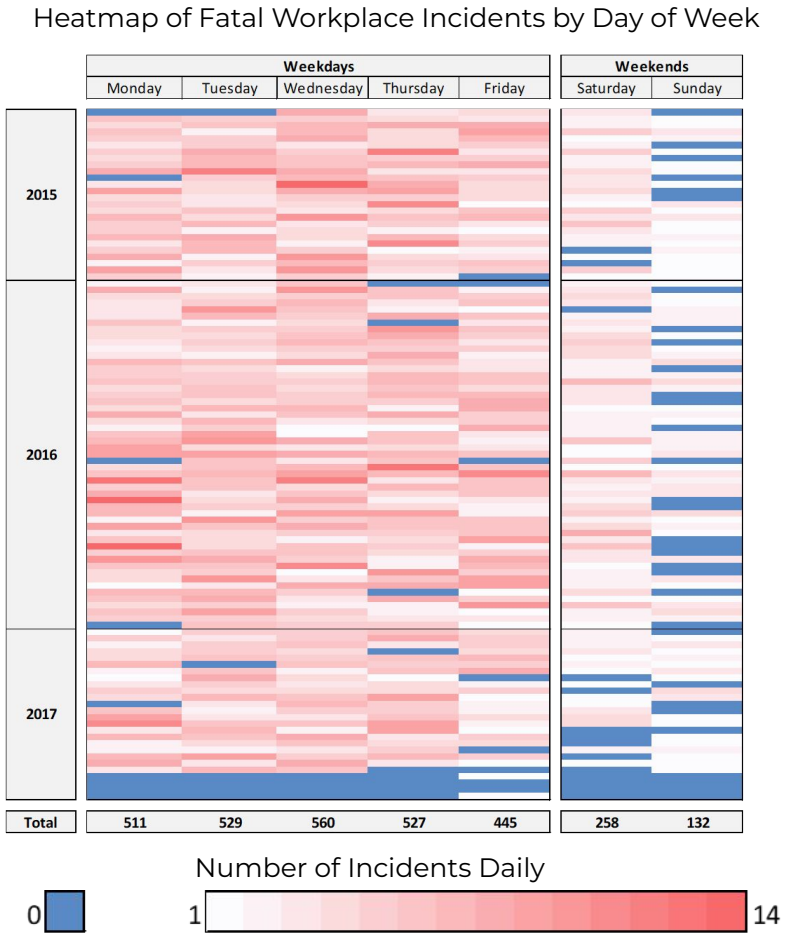
Nonfatal incidents saw a dramatic surge in early 2017, while fatal incidents remained steady



1. **Consistency in Fatal Incidents (2015-2016)**
   - From July 2015 through December 2016, the fatal incidents remain stable, ranging between 100 and 150.
   - Nonfatal incidents during this period are minimal, with as low as zero reports at the end of 2015.
2. **Periodic Trends in Fatal Incidents:**
   - January has the lowest count for both 2016 and 2017, possible indication of laborers not working as much during winter.
   - On the other hand, July contributed to the highest fatality in 2015 and 2016. It's no secret that students are trying to make money on summer jobs.
3. **Spike in Nonfatal Incidents (Early 2017):**
   - There is a sudden, sharp increase in nonfatal incidents from January to April 2017, with the numbers soaring to over 400 per month in February and March, and only settling down starting April.
   - The spike could be explained by changes in reporting method, resulting in even the most minor of injuries being put on the list.

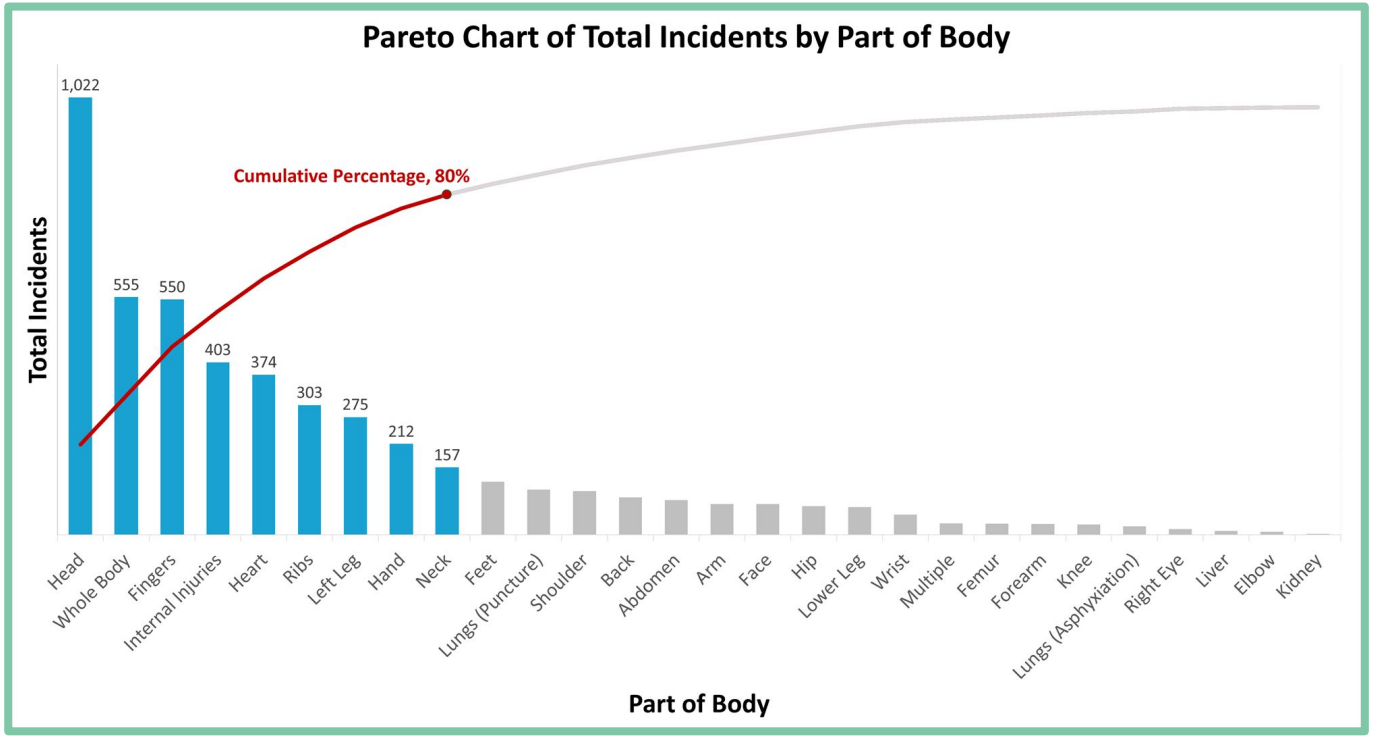
Fatal incidents occurred more often on weekdays than weekends

- **Overall average number of fatal incidents per day is 4.54.**
- **Weekday scores in average 5.27 fatal incidents per day**
  - Higher workplace activity
  - Increased exposure to hazardous conditions.
- **Weekend Average is 2.38**
  - Lower operational levels
  - Fewer people working
  - Thus, fewer incidents.



Analysis on Body Parts Involved in Workplace Incident

Nine unique body parts (30%) were involved with **80%** of Workplace incidents



Top 9 Body Parts involved in workplace incidents:

1. Head
2. Whole body
3. Fingers
4. Internal
5. Heart
6. Ribs
7. Left leg
8. Hand
9. Neck

Head and fingers face the greatest injury risks but...

Heatmap of Injuries by Body Part and Nature of Incident (Higher is worse)

Injury \ Body Part	Internal Injuries	Whole Body	Left Leg	Ribs	Arm	Back	Hand	Head	Heart	Face	Feet	Lungs (Puncture)	Neck	Shoulder	Abdomen	Fingers	Lower Leg	Multiple	Wrist	Forearm	Lungs (Asphyxiation)	Femur	Hip	Knee	Right Eye	Liver	Elbow	Kidney	Count of Body Part	Sum of Body Part
Serious Fall/Strike	204	285	43	141	10	20	12	438	299	11	10	41	46	20	40	4	9	4	7	4	4	7	9	6	0	1	1	0	26	1676
Laceration	10	13	29	8	8	2	56	81	12	7	7	6	28	8	5	59	6	6	6	5	1	6	2	0	5	4	1	0	26	381
Bruising, Contusion	35	29	21	30	6	12	8	60	7	9	8	5	10	12	8	6	5	0	1	2	2	1	7	3	1	2	1	0	26	291
Fracture, Broken Bones	55	40	129	48	25	34	28	177	10	20	63	3	38	19	12	19	35	5	21	5	0	9	43	9	0	1	4	0	25	852
Head Trauma	16	20	7	3	1	2	0	228	5	2	0	5	10	13	0	0	2	1	2	2	2	1	3	1	1	0	0	0	21	327
Electrocution	17	62	2	10	6	1	41	13	11	4	6	0	1	8	5	1	1	2	1	2	2	0	0	1	0	0	0	0	21	197
Dislocation	12	4	1	0	1	1	1	2	6	1	1	2	5	11	0	2	1	2	5	0	1	0	2	2	1	0	0	0	21	64
Puncture	3	1	1	6	1	3	2	4	1	2	1	5	5	0	4	2	2	0	0	0	0	1	1	0	0	0	0	2	19	47
Fire Burn	27	10	20	5	6	3	17	5	5	10	6	2	7	5	0	2	4	5	3	2	0	0	0	0	0	0	0	0	19	144
Asphyxiation, Drowning	17	63	2	49	0	1	1	12	11	0	0	34	6	2	5	0	0	0	0	0	6	1	0	0	0	1	0	0	15	211
Chemical Burn	2	2	8	1	1	1	2	1	2	4	3	1	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	15	31
Amputation, Crushing	1	3	11	0	6	0	43	2	0	0	15	0	0	0	1	455	0	1	0	3	0	0	0	0	0	0	0	0	11	541
Fall/strike	1	1	1	1	1	7	0	0	0	0	4	0	0	4	0	0	0	0	1	0	0	0	0	2	0	0	0	0	10	23
Heat Exhaustion	2	21	0	2	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5	32
Poison	0	1	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4
Eye injury	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	2	6
Fall from Elevation	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Illness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Freezer burn	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Count of Injury	15	15	13	13	12	12	12	12	12	11	11	11	11	10	9	9	9	9	9	8	8	7	7	7	6	5	4	1		
Sum of Injury	403	555	275	305	72	87	212	1023	374	72	124	106	157	102	81	550	65	27	47	25	20	26	67	24	13	9	7	2		4830

0 500

...Head injuries are more likely to be fatal

(Unlike finger, which occured at only 1 in every 550)

Heatmap of Fatality Ratio of Injuries by Body Part and Nature of Incident **(Nonfatal / Fatal)**

Injury \ Body Part	Internal Injuries	Whole Body	Left Leg	Ribs	Arm	Back	Hand	Head	Heart	Face	Feet	Lungs (Puncture)	Neck	Shoulder	Abdomen	Fingers	Lower Leg	Multiple	Wrist	Forearm	Lungs (Asphyxiation)	Femur	Hip	Knee	Right Eye	Liver	Elbow	Kidney	Count of Body Part	Sum of Body Part
Serious Fall/Strike	6 / 198	6 / 279	14 / 29	9 / 132	6 / 4	6 / 14	10 / 2	21 / 417	20 / 279	2 / 9	8 / 2	16 / 25	2 / 44	5 / 15	3 / 37	4 / 0	4 / 5	2 / 2	6 / 1	2 / 2	1 / 3	2 / 5	4 / 5	4 / 2	-	0 / 1	0 / 1	-	26	163 / 1513
Laceration	2 / 8	2 / 11	22 / 7	1 / 7	6 / 2	1 / 1	56 / 0	27 / 54	5 / 7	6 / 1	6 / 1	2 / 4	8 / 20	4 / 4	0 / 5	59 / 0	3 / 3	1 / 5	5 / 1	4 / 1	1 / 0	2 / 4	1 / 1	-	5 / 0	2 / 2	1 / 0	-	26	232 / 149
Bruising, Contusion	11 / 24	4 / 25	16 / 5	12 / 18	5 / 1	7 / 5	7 / 1	9 / 51	3 / 4	7 / 2	6 / 2	2 / 3	2 / 8	8 / 4	1 / 7	6 / 0	3 / 2	-	1 / 0	2 / 0	1 / 1	0 / 1	3 / 4	2 / 1	1 / 0	1 / 1	0 / 1	-	26	120 / 171
Fracture, Broken Bones	19 / 36	9 / 31	119 / 10	18 / 30	23 / 2	31 / 3	28 / 0	18 / 159	5 / 5	17 / 3	61 / 2	2 / 1	6 / 32	13 / 6	7 / 5	19 / 0	30 / 5	4 / 1	19 / 2	5 / 0	-	7 / 2	33 / 10	8 / 1	-	1 / 0	3 / 1	-	25	505 / 347
Head Trauma	3 / 13	2 / 18	4 / 3	0 / 3	1 / 0	0 / 2	-	60 / 168	1 / 4	1 / 1	-	1 / 4	3 / 7	7 / 6	-	-	2 / 0	0 / 1	2 / 0	2 / 0	0 / 2	0 / 1	3 / 0	1 / 0	1 / 0	-	-	-	21	94 / 233
Electrocution	3 / 14	3 / 59	0 / 2	0 / 10	0 / 6	0 / 1	9 / 32	1 / 12	0 / 11	2 / 2	2 / 4	-	0 / 1	2 / 6	0 / 5	0 / 1	0 / 1	2 / 0	1 / 0	1 / 1	0 / 2	-	-	0 / 1	-	-	-	-	21	26 / 171
Dislocation	2 / 10	0 / 4	1 / 0	-	1 / 0	1 / 0	1 / 0	2 / 0	3 / 3	0 / 1	1 / 0	0 / 2	0 / 5	8 / 3	-	2 / 0	1 / 0	1 / 1	4 / 1	-	0 / 1	-	2 / 0	2 / 0	0 / 1	-	-	-	21	32 / 32
Puncture	0 / 3	0 / 1	1 / 0	2 / 4	1 / 0	0 / 3	2 / 0	0 / 4	1 / 0	2 / 0	1 / 0	4 / 1	1 / 4	-	0 / 4	2 / 0	2 / 0	-	-	-	-	0 / 1	0 / 1	-	-	-	-	2 / 0	19	21 / 26
Fire Burn	5 / 22	2 / 8	16 / 4	4 / 1	5 / 1	3 / 0	16 / 1	4 / 1	1 / 4	8 / 2	6 / 0	0 / 2	4 / 3	4 / 1	-	2 / 0	3 / 1	4 / 1	2 / 1	2 / 0	-	-	-	-	-	-	-	-	19	91 / 53
Asphyxiation, Drowning	0 / 17	2 / 61	0 / 2	1 / 48	-	0 / 1	0 / 1	0 / 12	1 / 10	-	-	3 / 31	0 / 6	0 / 2	0 / 5	-	-	-	-	-	2 / 4	0 / 1	-	-	-	0 / 1	-	-	15	9 / 202
Chemical Burn	0 / 2	0 / 2	7 / 1	1 / 0	1 / 0	0 / 1	2 / 0	0 / 1	2 / 0	4 / 0	3 / 0	0 / 1	1 / 0	-	-	-	-	0 / 1	-	-	-	-	-	-	0 / 1	-	-	-	15	21 / 10
Amputation, Crushing	0 / 1	0 / 3	7 / 4	-	4 / 2	-	42 / 1	0 / 2	-	-	15 / 0	-	-	-	0 / 1	455 / 0	-	1 / 0	-	3 / 0	-	-	-	-	-	-	-	-	11	527 / 14
Fall/strike	0 / 1	1 / 0	1 / 0	1 / 0	1 / 0	7 / 0	-	-	-	-	2 / 2	-	-	4 / 0	-	-	-	-	1 / 0	-	-	-	-	2 / 0	-	-	-	-	10	20 / 3
Heat Exhaustion	0 / 2	2 / 19	-	0 / 2	-	-	-	-	2 / 3	-	-	-	-	-	-	-	-	-	-	-	1 / 1	-	-	-	-	-	-	-	5	5 / 27
Poison	-	0 / 1	-	1 / 0	-	-	-	-	-	-	-	1 / 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2 / 2
Eye injury	-	-	-	-	-	-	-	-	-	2 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4 / 0	-	-	-	2	6 / 0
Fall from Elevation	0 / 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0 / 1
Illness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1 / 0
Freezer burn	-	-	-	-	-	-	1 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1 / 0
Count of Injury	15	15	13	13	12	12	12	12	12	11	11	11	11	10	9	9	9	9	9	8	8	7	7	7	6	5	4	1		
Sum of Injury	51 / 352	33 / 522	208 / 67	50 / 255	54 / 18	56 / 31	174 / 38	142 / 881	44 / 330	51 / 21	111 / 13	31 / 75	27 / 130	55 / 47	12 / 69	549 / 1	48 / 17	15 / 12	41 / 6	21 / 4	6 / 14	11 / 15	46 / 21	19 / 5	11 / 2	4 / 5	4 / 3	2 / 0		1876 / 2954

What Routine Tasks Tell Us About Workplace Injuries

Key Takeaways:

1. **Head injuries are predominant**
   - Head injuries are the most common across both regularly assigned (618 incidents) and non-regularly assigned tasks (404 incidents).
   - Based on this and previous fatality chart, this indicates that head protection is critical regardless of the type of task.
2. **Correlation with physically demanding tasks**
   - As shown by higher injury counts for ribs and heart in regularly assigned tasks.

Recommended actions

Prioritize safety interventions focused on **head** and **fingers**

Task Routine / Part of Body	Regularly Assigned	Not Regularly Assigned	Total
Head	618	404	1022
Whole Body	356	199	555
Fingers	369	181	550
Internal Injuries	250	153	403
Heart	220	154	374
Ribs	176	127	303
Left Leg	178	97	275
Hand	131	81	212
Neck	100	57	157
Feet	89	35	124
Lungs (Puncture)	61	45	106
Shoulder	66	36	102
Back	58	29	87
Abdomen	42	39	81
Arm	53	19	72
Face	42	30	72
Hip	37	30	67
Lower Leg	55	10	65
Wrist	29	18	47
Multiple	23	4	27
Femur	13	13	26
Forearm	18	7	25
Knee	17	7	24
Lungs (Asphyxiation)	13	7	20
0	11	4	15
Right Eye	8	5	13
Liver	7	2	9
Elbow	6	1	7
#N/A	0	2	2
Kidney	1	1	2
Total	3047	1797	4844

Thank You

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