

Fire Line Production Rate Tables

The tables on the following pages contain the most recent production rates for crews, dozers, and tractor plows for the 13 fuel models described by Anderson (1982). The production rates were produced by a variety of sources. These tables were originally published in Wildland Fire Incident Management Field Guide, PMS 210 (2014 - discontinued in 2021). They are published here by request of NWCG's Fuels Management Committee.

- Sustained Line Production Rates of 20-Person Crews in Feet per Hour*
- Sustained Line Production Rates of 20-Person Crews in Feet per Hour*
- Sustained Line Production Rates of 20-Person Crews in Chains per Hour*
- Sustained Line Production Rates of 20-Person Crews in Chains per Hour*
- Sustained Line Production Rates of 20-Person Crews in Chains per Hour*
- Line Production Rates for Initial Action by Engine Crews in Chains per Crew per Hour
- Fireline Explosives Production Comparisons
- Dozer Fireline Construction Rates (Single Pass) in Chains per Hour
- Tractor Plow Fireline Production Rates in Chains per Hour

FIRE LINE PRODUCTION TABLES

Sustained Line Production Rates of 20-Person Crews in Feet per Hour*

Fire Behavior Fuel Model	Type I Direct	Type I Indirect	Type II & II IA Direct	Type II & II IA Indirect
1 Short Grass	1,122	627	627	285
2 Open Timber Grass	(792–1,386)**	(508–746)	(174–660)	(174–380)
4 Chaparral	436	330	449	272
	(330–528)	(178–482)	(80–640)	(178–376)
5 Brush	1,089	323	471	277
	(924–1,254)	(244–403)	(304–682)	(178–376)
6 Dormant Brush Hardwood Slash	1,089	323	471	277
	(924–1,254)	(244–403)	(304–682)	(178–376)
8 Closed Timber Litter	693	455	447	378
9 Hardwood Litter	(594–792)	(396–515)	(370–448)	(255–452)
10 Timber Litter & Understory				

*Based on San Dimas Technology & Development Center, Tech Tip – 1151-1805P, Fireline Production Rates, 2011. No data was collected in fuel models 3, 7, and 11 – 13.

**Numbers in parentheses are expected ranges of line

production. IA = Initial Attack

Sustained Line Production Rates of 20-Person Crews in Feet per Hour*

Fire Behavior Fuel Model	Crew Type 1	Crew Type 2
7 Southern Rough	264	132
11 Logging Slash, Light	990	594
12 Logging Slash, Medium	462	264
13 Logging Slash, Heavy	330	198

*Based on various sources from pre-1980.

Sustained Line Production Rates of 20-Person Crews in Chains per Hour*

Fire Behavior Fuel Model	Type I Direct	Type I Indirect	Type II & II IA Direct	Type II & II IA Indirect
1 Short Grass	17	9.5	10.0	4.2
2 Open Timber Grass	(12–21)**	(7.7–11.3)	(5.0–15.0)	(2.7–5.7)
3 Tall Grass				
4 Chaparral	6.6 (5–8)	5 (2.7–7.3)	7.0 (6.2–7.9)	4.2 (2.7–5.7)
5 Brush	16.5 (14–19)	4.9 (3.7–6.1)	7.0 (6.2–7.9)	4.2 (2.7–5.7)
6 Dormant Brush Hardwood Slash	16.5 (14–19)	4.9 (3.7–6.1)	7.0 (6.2–7.9)	4.2 (2.7–5.7)
8 Closed Timber Litter	10.5 (9–12)	6.9 (6.0–7.8)	7.0 (6.2–7.9)	4.2 (2.7–5.7)
9 Hardwood Litter 10 Timber Litter & Understory				

*Based on San Dimas Technology & Development Center, Tech Tip – 1151-1805P, Fireline Production Rates, 2011.

**Numbers in parentheses are expected ranges of line

production. IA = Initial Attack

Sustained Line Production Rates of 20-Person Crews in Chains per Hour*

Fire Behavior Fuel Model	Crew Type I	Crew Type II
7 Southern Rough	4	2
11 Logging Slash, Light	15	9
12 Logging Slash, Medium	7	4
13 Logging Slash, Heavy	5	3

*Based on various sources from pre-1980.

Line Production Rates for Initial Action by Hand Crews in Chains per Person per Hour

Fire Behavior Fuel Model	Specific Conditions	Construction Rate (in chains per personper hour)
1 Short Grass	Grass Tundra	4.0 1.0
2 Open Timber/Grass Understory	All	3.0
3 Tall Grass	All	0.7
4 Chaparral	Chaparral High Pocosin	0.4 0.7
5 Brush	All	0.7
6 Dormant Brush/Hardwood Slash	Black Spruce Others	0.7 1.0
7 Southern Rough	All	0.7
8 Closed Timber Litter	Conifers Hardwoods	2.0 10.0
9 Hardwood Litter	Conifers Hardwoods	2.0 8.0
10 Timber (Litter & Understory)	All	1.0
11 Logging Slash, Light	All	1.0
12 Logging Slash, Medium	All	1.0
13 Logging Slash, Heavy	All	0.4

Note: These rates are to be used for estimating initial action productivity only. Do not use these rates to estimate sustained line construction, burnout, and holding productivity. Initial action may consist of scratch line construction and hotspotting.

Line Production Rates for Initial Action by Engine Crews in Chains per Crew per Hour

Fire Behavior Fuel Model	Specific Conditions	Chains Per Crew Hour Number of Persons in Crew				
		1	2	3	4	5+
1 Short Grass	Grass	6	12	24	35	40
	Tundra	2	8	15	24	30
2 Open Timber/Grass Understory	All	3	7	15	21	25
3 Tall Grass	All	2	5	10	14	16
4 Chaparral	Chaparral	2	3	8	15	20
	High Pocosin	2	4	10	15	18
5 Brush (minimum 2 ft tall)	All	3	6	12	16	20
6 Dormant Brush/Hardwood Slash	Black Spruce	3	6	10	16	20
	Others	3	6	12	16	20
7 Southern Rough	All	2	5	12	16	20
8 Closed Timber Litter	Conifers	3	8	15	20	24
	Hardwoods	10	30	40	50	60
9 Hardwood Litter	Conifers	3	7	12	18	22
	Hardwoods	8	25	40	50	60
10 Timber (Litter & Understory)	All	3	8	12	16	20
11 Logging Slash, Light	All	3	8	12	16	20
12 Logging Slash, Medium	All	3	5	10	16	20
13 Logging Slash, Heavy	All	2	4	8	15	20

Note: These rates are to be used for estimating initial action productivity only. Do not use these rates to estimate sustained line construction, burnout, and holding productivity. Initial action may consist of scratch line construction and hotspotting.

Fireline Explosives Production Comparisons

Production Rate Comparison between a 7-Person Fireline Explosives Crew and a 20-Person Hand Crew over a 10-Hour Shift

Fuel Type	Constructed Fireline (in chains)	
	Explosives Crew	Hand Crew
Grass	360	360
Second-Growth Conifers	240	180
Light Slash	210	90
Heavy Slash	120	45

Note: This is based upon Washington State Department of Natural Resources experience.

Dozer Fireline Construction Rates (Single Pass) in Chains per Hour

Fire Behavior Fuel Model	Up or Down Slope	Slope Class	Slope Class	Slope Class	Slope Class
		1 0–25%	2 26–40%	3 41–55%	4 56–74%
Type III Dozer 1, 2	Up	55–90	30–55	8–30	0–8
	Down	90–110	90–110	20–90	0–20
3, 5, 8	Up	45–70	25–45	2–25	0–2
	Down	70–80	65–80	0–65	0
4.00	Up	20–35	10–20	0–10	0
	Down	35–40	25–40	0–25	0
6, 7, 9	Up	35–55	15–35	0–15	0
	Down	55–60	40–60	0–40	0
11, 12	Up	15–25	7–15	0–7	0
	Down	25–30	10–30	0–10	0
10, 13	Up	8–15	3–8	0–3	0
	Down	10–15	5–10	0–5	0
Type II Dozer 1, 2	Up	85–125	60–85	30–60	0–30
	Down	125–145	130–145	75–130	0–75
3, 5, 8	Up	70–105	45–70	15–45	0–15
	Down	105–120	105–120	55–105	0–55
4.00	Up	35–60	20–35	2–20	0–2
	Down	60–75	65–76	20–65	0–20
6, 7, 9	Up	50–85	30–50	7–30	0–7
	Down	85–100	85–100	40–85	0–40
11, 12	Up	25–40	15–25	1–15	0–1
	Down	40–55	45–55	0–45	0
10, 13	Up	10–20	7–10	0–7	0
	Down	20–25	20–25	0–20	0
Type I Dozer 1, 2	Up	100–140	70–100	35–70	0–35
	Down	140–155	140–155	85–140	0–85
3, 5, 8	Up	75–110	50–75	20–50	0–20
	Down	110–130	110–130	55–110	0–55
4.00	Up	45–70	30–45	8–30	0–8
	Down	70–80	75–85	25–75	0–25
6, 7, 9	Up	65–95	40–65	15–40	0–15
	Down	95–110	90–110	50–90	0–50
11, 12	Up	35–55	20–35	3–20	0–3
	Down	55–65	55–65	6–55	0–6
10, 13	Up	20–35	9–20	0–9	0
	Down	35–40	30–40	0–30	0

Dozer Fireline Construction Rates (Single Pass) in Chains Per Hour (Continued)

Note: Production rates are not precise but vary with conditions. The higher rate can be applied for situations involving:

- Newer dozers (1975 and later)
- Dozers in excellent operating condition
- Most-qualified operators
- Temperatures below 90 °F
- Moist soil, few or no rocks
- No lost time
- Indirect fireline
- Average fire behavior
- Daylight operations
- Less resistive vegetative types within each fire behavior fuel model

Dozer	Horse Power	Examples
Type I	HEAVY 200 Minimum Horse Power	D-8, D-7, JD-950
Type II	MEDIUM 100 Minimum Horse Power	D-5N, D-6N, JD-750
Type III	LIGHT 50 Minimum Horse Power	JD-450, JD-550, D-3, D-4

Minimum standards for personnel with dozers will differ depending on fuel type, terrain, and resource configuration. Dozer strike teams may use team leader in place of additional personnel per dozer. Fuel requiring burnout and terrain that requires scouting demands two personnel per dozer.

Tractor Plow Fireline Production Rates in Chains per Hour

Drag or Mounted Plow, Appropriate Blade, Level to Rolling Terrain

Fire Behavior Fuel Model	Tractor Plow Type					
	1	2	3	4	5	6
	(165 HP) D-7, JD-850 & Larger	(140 HP) D-6, JD-750, TD-15, Case 1450	(120 HP) D-5H, D-4H, Case 1150	(90 HP) D-4, JD-650, D-5C	(70–80 HP) JD-450, D-4C	(42–60 HP) JD-350, D-3, JD-400
1	240	240	240	200	180	80
2	180	180	180	140	120	80
3	180	180	180	120	100	70
4	80	80	60	40	20	0
5	160	160	160	100	80	40
6	120	120	100	60	40	20
7	160	160	160	120	100	60
8	180	180	180	120	100	70
9	180	180	180	120	100	70
10	100	100	80	50	40	20
	Mountainous terrain, 60% or less slope, front- and rear-mounted plow, downhill plowing					
8	—	—	—	50	40	20
9	—	—	—	50	40	20
	Mountainous terrain, 60% or less slope, using ripper attachment, up/down slope fireline construction					
1, 2, 3	20/30	10/30	0/30	—	—	—
4, 6, 12, 13	10/20	5/10	0/5	—	—	—
5, 7, 8–10, 11	12/25	8/15	0/10	—	—	—

— = Not applicable