Activity Hazard Analysis (AHA) — Asphalt Paving

Overall RAC: **M** · SAMPLE formatted to EM 385-1-1 (15 March 2024) and ENG Form 6206 (SEP 2024) conventions. Adapt every step, hazard and control to actual site conditions; requires competent-person preparation, SSHO review and Government acceptance before the definable feature of work begins (EM 385-1-1 2024, para 2-6). Contracts solicited before 15 March 2024 remain governed by the 2014 edition — verify which edition your contract cites.

JOB STEPS	HAZARDS	CONTROLS	RESIDUAL RAC
Mobilization: deliver, unload, and stage paver, rollers, and support equipment	Workers struck by or caught between equipment during unloading and positioning	• Establish an exclusion zone around lowboy off-loading; only the operator and one designated signal person inside it. • Use a signal person whenever the point of operation is not in full view of the operator, when backing more than 100 ft, or when two or more vehicles back in the same area (18-8.c(14)). • Verify back-up alarms operate automatically on backward motion and are audible above surrounding noise; never remove or disable an alarm (18-8.b(1)). • All crew in Class 2 high-visibility safety apparel minimum around mobile equipment operations (5-8.f(2)).	L
	Equipment mechanical failure in service (brakes, steering, safety devices)	• Have a Competent Person inspect all machinery and mechanized equipment before it is placed into use, document the inspection on a checklist, and submit it to the KO/COR (18-5.b(1)); re-inspect at least annually and whenever equipment returns to the project. • Operator checks brakes, parking system, tires, horn, steering, seat belts, back-up alarms/lights, and fire extinguisher before each shift (18-5.a(4)). • Maintain inspection, test, repair, and maintenance records at the site, available to the USACE supervisor/KO or COR on request (18-5.a(5)).	L
	Unqualified equipment operators	• Every operator must be trained, qualified by license/certificate/permit, and designated by the employer in writing before operating (18-3.a). • Operators carry current proof of qualification for the specific equipment and present it to the KO/COR on request (18-3.b). • Operator qualification includes evaluation by an independently certified examiner and a practical operating exam on the equipment (18-3.e).	L
Set up temporary traffic control and work zone protection	Workers struck by live public traffic while placing signs, cones, and barriers	• Implement the Traffic Control Plan, developed before work began by a person knowledgeable in temporary traffic control per the MUTCD and state DOT requirements (8-7, 8-8.e). • Install advance warning signs first and work through the device sequence in the direction of traffic flow, with a shadow vehicle protecting workers on foot. • Wear Class 2 (Type R or P) HVSA for traffic up to 35 mph and Class 3 where traffic exceeds 35 mph or visibility is reduced; at night wear Class 3 jacket plus Class E pants or Class 3 coverall as a minimum (5-8.f(2)-(4)). • Display yellow flashing lights on machinery parked on or moving slower than traffic on haul roads (18-8.g(12)).	M
	Flagger struck by errant vehicle	• Use only flaggers trained per the MUTCD and applicable state DOT requirements (8-3.b). • Flaggers wear hard hat, safety-toed footwear, and high-visibility apparel, and maintain communication with each other and the foreman (8-4.c). • Position flagger stations with an identified escape route, ahead of the taper, never inside the paving train's travel path. • Inspect and correct signage and device deficiencies throughout the shift and document inspections (8-5.a, 8-5.b).	M

JOB STEPS	HAZARDS	CONTROLS	RESIDUAL RAC
Surface preparation: sweeping, milling cleanup, and tack coat application	Dust and particulate exposure during sweeping and cleanup	• Have an IH or equivalent Competent Person evaluate operations with potential exposure to hazardous agents and document the evaluation in a written report (6-8.a). • Use vacuum-equipped or water-suppressed sweeping equipment to keep exposures below OELs (6-8.b; 29 CFR 1926.55). • Position workers on foot upwind of sweeping operations where practical.	L
	Skin and eye contact with asphalt emulsion tack coat	• Keep the product SDS on site and review it in the pre-shift huddle. • Wear chemical-resistant gloves, long sleeves, and safety glasses during distributor operation and hand-wand spraying (Ch 5). • Do not use flammable liquids with a flash point below 100°F to thin material or clean equipment (9-8.k(14)).	L
Hot-mix asphalt delivery: haul truck cycling and truck exchange	Workers on foot backed over by haul trucks	• Designate one trained truck-exchange spotter; no other worker on foot behind a backing truck (18-8.c(14)). • Confirm every dump and cargo truck whose body blocks the rear view has an automatic, audible back-up alarm before it enters the site (18-8.b(1)). • Inspect dump trucks brought onto the site for compliance with 18-8.h before they are placed in service and document the inspection (18-5.a(3)). • Establish a marked truck staging area outside the paving train and pedestrian routes.	M
	Raised dump bed contact with overhead lines or uncontrolled bed lowering	• Survey the haul route and dump zone for overhead power lines before paving begins; prohibit raising beds under lines. • Equip dump trucks with a physical holding device before anyone works under a raised body, and secure hoist levers against accidental tripping (18-8.h(1), 18-8.h(2)). • Arrange tailgate trip handles so the operator stays clear of interference and the truck's crush path (18-8.h(4)).	L
Paving operations: paver, screed, and material transfer	Workers caught between haul truck and paver during hookup	• Truck stops short of the paver; the paver moves forward to make contact — never the reverse. • Prohibit standing between the truck and paver hopper during approach; screed operators and dump man stay at their stations. • Do not get on or off the paver or any equipment while it is in motion (18-8.c(1)).	M
	Asphalt fume inhalation at the screed and hopper	• Base fume controls on the IH/CP hazard evaluation for the operation (6-8.a); exposure above the OEL is prohibited (6-8.b; 29 CFR 1926.55). • Use pavers with engineering fume extraction at the screed/auger where available; position workers upwind of the hopper when spotting trucks. • Institute regular housekeeping and personal decontamination procedures in areas generating fume hazards (6-8.a(4)).	L
	Burns from 275-325°F hot-mix asphalt and hot screed surfaces	• Wear long-sleeved shirts, long trousers, heat-resistant gloves, and safety-toed boots; no synthetic garments that melt against skin (Ch 5). • Keep non-essential personnel clear of the hopper, auger chamber, and screed; treat all screed surfaces as hot. • Brief burn first aid at the preparatory meeting: cool with water, do not pull hardened asphalt off skin, transport for medical care.	M

JOB STEPS	HAZARDS	CONTROLS	RESIDUAL RAC
	Heat stress from combined ambient heat and hot-mix radiant load	• Implement the written Thermal Stress Management Plan covering symptoms, first aid, controls, and exposure monitoring (6-7.g); train all employees on thermal stress (6-3.c). • Use a buddy system so workers monitor themselves and co-workers for symptoms (6-8.m(1)). • Provide readily available potable drinking water and allow workers to acclimatize to conditions (6-8.m(2), 6-8.m(3)). • Monitor weather and schedule high-exertion tasks to minimize thermal exposure where possible (6-8.m(4)).	M
Compaction: breakdown, intermediate, and finish rolling	Roller rollover at pavement edges, shoulders, and slopes	• Inspect road and shoulder conditions in advance to assure clearances and load capacities are safe for equipment passage (18-5.c). • ROPS required on rollers and compactors with an operator's station (18-8.b(15)); operators wear seat belts (18-8.b(11)). • Keep the drum a safe offset from unsupported edges and drop-offs; mark edge hazards identified in the shoulder inspection.	L
	Workers on foot struck by rollers reversing in the rolling pattern	• Keep raking and layout crews out of the active rolling pattern; establish a positive eye-contact rule before anyone crosses it. • Verify back-up alarms function on every direction change and are audible over paving-train noise (18-8.b(1)). • All crew in high-visibility apparel per the traffic speed and visibility conditions on site (5-8.f).	L
Handwork and joint sealing: raking, luting, and kettle operations	Burns and fire during melting kettle operation for joint/crack sealant	• Never locate asphalt or tar kettles on roofs (9-8.k(8)(c)); place kettles on firm, level, non-combustible foundations, downwind of workers, protected from traffic and tipping (9-8.k(2)). • Maintain at least two fire extinguishers rated 2A:20B:C within 25 ft of working kettles, with a fire-retardant tarp under the kettle (9-8.k(3), 9-8.k(4)). • Kettle must have a tight-fitting lid and calibrated thermometer; hold temperature at least 25° below the material flash point (9-8.k(8)). • Never leave a working kettle unattended — operator on the same level, within eyesight, no more than 25 ft away (9-8.k(7)); operators trained per 9-3.b. • Obtain a hot work permit when on a government installation unless the KO/COR indicates otherwise (9-8.k(5)).	M
	Ergonomic strain from repetitive raking, luting, and shoveling of hot mix	• Have a CP evaluate lifting, carrying, and repetitive handwork tasks and document hazards and controls in this AHA (6-8.n). • Rotate rakers and lute operators through lower-exertion tasks across the shift. • Pre-stage material with the paver or skid steer to minimize hand-shoveling distance.	L
Demobilization: equipment cleaning, load-out, and traffic control pickup	Workers struck during traffic control device removal	• Remove devices in reverse order of installation per the Traffic Control Plan and MUTCD, working against exposure, with a shadow vehicle where traffic remains live (8-7, 8-8.e). • Maintain HVSA class appropriate to traffic speed until all personnel are clear of the roadway (5-8.f). • Use yellow flashing lights and warning devices on any vehicle parked on the highway or shoulder during pickup (18-8.c(15)).	M
	Fire and chemical exposure while cleaning asphalt equipment	• Do not use flammable liquids with a flash point below 100°F to clean equipment (9-8.k(14)); use approved citrus- or emulsion-based release agents. • Shut down equipment before and during fueling (18-8.g(7)). • Fully lower screeds, blades, and buckets, place controls in neutral, stop engines, and set brakes before cleaning or repair; block equipment held apart by jacks or hoists before working beneath it (18-8.g(8), 18-8.g(21)).	L

Equipment To Be Used

• Asphalt paver with screed (fume extraction preferred)

• Steel-drum and pneumatic-tire rollers (ROPS and seat belts per 18-8.b(11)/(15))

• Dump/haul trucks with automatic back-up alarms and bed holding devices (18-8.b(1), 18-8.h)

• Tack coat distributor truck and hand wand

• Power broom / vacuum sweeper

• Melting kettle with tight-fitting lid and calibrated thermometer, plus two 2A:20B:C extinguishers within 25 ft (9-8.k)

• Hand tools: rakes, lutes, shovels, infrared thermometer

• Temporary traffic control devices: signs, cones, barricades, arrow board per MUTCD (Ch 8)

• 10-B:C fire extinguisher on each piece of heavy equipment (18-8.g(19))

• Class 2/Class 3 (Type R or P) high-visibility safety apparel per ANSI/ISEA 107 (5-8.f)

• Potable drinking water and shaded break area (6-8.m(2))

Training Requirements

• Equipment operator training, qualification, and written designation by the employer for each machine type (18-3.a); evaluation by an independently certified examiner including a practical exam (18-3.e)

• Current license/permit in the operator's possession for the equipment being operated (18-3.b)

• Defensive driver training for operators of government motor vehicles — 4 hours per 4-year period (18-3.d)

• Flagger training per the MUTCD and applicable state DOT requirements (8-3.b)

• All employees trained on the meaning of workplace signs, tags, and labels (8-3.a)

• Thermal stress training for all employees exposed to thermal stressors (6-3.c)

• Kettle operator training in proper kettle operation (9-3.b)

• Hazard communication on asphalt, tack coat, and sealant SDSs (Ch 6)

• AHA review and signature by every involved employee before starting work (2-6.d(2))

Inspection Requirements

• CP inspection of all machinery and mechanized equipment before initial use, documented on a signed checklist submitted to the KO/COR; re-inspection at least annually and on return to the project (18-5.b(1))

• Daily documented CP inspection of machinery in use — date, inspector, items, PASS/FAIL (18-5.b(2))

• Operator pre-shift checks: brakes, parking system, emergency stop, tires, horn, steering, seat belts, controls, back-up alarms/lights, extinguisher (18-5.a(4))

• Dump truck compliance inspection before placing in service on the site (18-5.a(3), 18-8.h)

• Advance inspection of roads and shoulders for clearances and load capacity (18-5.c)

• Traffic control signage and device inspections with timely correction of deficiencies, documented (8-5.a, 8-5.b)

• Kettle checks each use: thermometer working, lid tight, extinguishers in place, temperature 25° below flash point (9-8.k)

• Thermal stressor monitoring per the Thermal Stress Management Plan (6-7.g(4), 6-8.m)

• Maintenance, test, and repair records maintained on site and available to the KO/COR (18-5.a(5))

Competent / Qualified Person Requirements

• Mobile equipment inspection Competent Person — performs and signs the initial and daily documented equipment inspections (18-5.b); designate in writing by name on the AHA (2-6.d(4))

• Industrial hygienist or equivalent CP in industrial hygiene — performs the hazard evaluation for asphalt fume, dust, and thermal exposure (6-8.a) and the ergonomics evaluation (6-8.n)

• Person knowledgeable in temporary traffic control — develops the Traffic Control Plan per the MUTCD and state DOT before work begins (8-7)

• Trained flaggers per MUTCD/state DOT — qualified persons for signaling and flagging operations (8-3.b, 8-4.c)

• Trained kettle operator when joint/crack sealing kettles are used (9-3.b, 9-8.k(1))

References

• EM 385-1-1 (2024) Ch 18 — Vehicles, Machinery, and Mechanized Equipment (18-3 operator qualification; 18-5 inspections; 18-8.b back-up alarms, seat belts, ROPS; 18-8.c operating rules; 18-8.h dump trucks)

• EM 385-1-1 (2024) Ch 8 — Accident Prevention Signs, Tags, Labels, Signals, and Traffic Control (8-3.b flagger training; 8-7 Traffic Control Plan; 8-8.e/8-8.f traffic control and flagging per MUTCD)

• EM 385-1-1 (2024) Ch 6 — Hazardous or Toxic Agents and Environments (6-8.a hazard evaluation by IH/CP; 6-8.b exposure standards/OELs; 6-7.g Thermal Stress Management Plan; 6-8.m thermal stressor controls)

• EM 385-1-1 (2024) Ch 5 — Personal Protective and Lifesaving Equipment (5-8.f high-visibility safety apparel per ANSI/ISEA 107)

• EM 385-1-1 (2024) Ch 9 — Fire Prevention and Protection (9-8.k heating devices and melting kettles — never located on roofs; 9-3.b kettle operator training)

• 29 CFR 1926.601 — Motor vehicles (Subpart O)

• 29 CFR 1926.602 — Material handling equipment (Subpart O)

• 29 CFR 1926.200-.203 — Signs, signals, and barricades (Subpart G)

• 29 CFR 1926.55 — Gases, vapors, fumes, dusts, and mists (Subpart D)