

OSB Discussion Points

Hazards of OSB Burning

- Oriented strand board (OSB) is made from long flakes or chips of wood that are glued together in perpendicular layers. The layers are bonded together with a synthetic resin.
- Other waxes, binders, and/or adhesives are often added to the OSB to improve their durability and water resistance. One of the most commonly used binders in OSB is polymeric MDI (polymeric methylene diphenyl diisocyanate, or PMDI).ⁱ
- The combustion byproducts and smoke content OSB or other engineered wood products, such as particleboard, fiberboard, or plywood, varies based on three main factors:
 - The type and amount of the of the resins and binding agents used in the OSB
 - The composition of the wood chips used (i.e. hardwood or softwood, moisture content)
 - Characteristics of the fire, such as temperature, duration of the burn, and oxygen availability
- The combustion of engineered wood products and pure untreated wood produce similar byproducts; however, the combustion of the synthetic resins and binders used in engineered wood cause the release of additional hazardous vapors.ⁱⁱ Burning PMDI and MDI products causes the release of isocyanate vapors.ⁱⁱⁱ Exposure to these vapors causes irritation of the skin, eyes, and respiratory tract.^{iv}
- A study detected hazardous combustion byproducts of engineered wood that were not detected in the combustion of pure wood, including naphthalene, benzene, 1,2-diol and diethyl phthalate.^v Peng et al. vi compared emissions from pure wood to emissions from engineered wood made with PF resins. When exposed to temperatures up to 500oC, the engineered wood samples emitted various vapors that were not detected in the pure wood samples, such as acetaldehyde and furfural, which are hazardous to human health.^{vi}

Exposures related to OSB Burning

- Fire fighters can be exposed to combustion byproducts through any of the following pathways:
 - During the initial release of the hazardous combustion products and subsequent inhalation exposure
 - Re-release of hazardous substances during the overhaul phase after the initial fire has been put and subsequent inhalation exposure
 - Re-release of hazardous substances during removal of contaminated PPE and turnout gear and subsequent inhalation exposure
 - Dermal exposure from penetration of PPE and personal clothing
- Exposure to concentrations of combustion byproducts at concentrations above the occupational exposure limits set by OSHA can cause acute or chronic health effects

Research on OSB

- Fent et al (2019)^{vii}
 - Trainers with three OSB exercises led to a 30-fold increase in 1- hydroxypyrene, as trainers accumulated exposure with each daily exercise.
 - For trainers combining all urinary PAH metabolites after three daily exercises, exposures were at least 80-100% higher with OSB as compared with pallets and straw.
 - Measuring exhaled breath benzene, exposures for firefighters after a single exercise were approximately two to seven-fold higher for OSB compared with pallets and straw.
 - Although there were differences in exposures based on the type of OSB used, all OSB training scenarios were associated with higher exposures than scenarios burning pallets and straw.
 - The results presented in this paper do not support the assertion that the use of a particular brand of OSB results in exposures of similar magnitude to burning pallets and straw nor did this study evaluate other manufactured wood products.

Legislative Action on OSB Burning

- Fire Fighters have a higher risk of developing cancer than members of the general public, due to the nature of their work. In fact, cancer is the leading cause of line of duty deaths in the fire service. As a result, lessening the toxic load on fire fighters is vital in helping to keep them safe.
- To better protect fire fighters, many states are coming up with new laws to ban the burning of toxic products to help lessen toxic exposure to fire fighters. Many states ban the burning of OSB woods in their codes and federally the EPA has its own regulations to prohibit the burning of OSB, however – while this protects the public, fire fighters can still be exposed to toxins released from OSB burns in their fire training activities.
- One small but impactful step to helping keep fire fighters safe would be to ban the use of OSB wood for fire fighter testing and training purposes. Not only has legislation of this type been successfully passed into law, but it would also reflect the bans in place by many states and federal prohibitions.
- In March of 2021, Virginia became the first state to explicitly ban the burning of OSB wood in fire training scenarios. This fire specific bill mimics the same concerns addressed in state and federal regulations that put bans on the burning of OSB wood.
- VA House Bill 2029 bans the use of OSB wood for testing and training purposes for Virginia fire fighters. This bill will lessen the toxic load that fire fighters are exposed to, helping to implement cancer reduction efforts in the fire service.
- A bill to ban the burning of OSB wood for fire training would be in line with state and federal standards established in the U.S. Environmental Protection Agency regulations to prohibit burning of OSB.

- i U.S. Environmental Protection Agency (EPA). Compilation of Air Pollutant Emission Factors, 5th Edition, Chapter 10.6.1: Waferboard Oriented Strandboard. 2002. <http://www.epa.gov/ttn/chief/ap42/ch10/final/c10s06-1.pdf> (Accessed 21 November 2012).
- ii The Centre for Australian Weather and Climate Research. Inventory of major materials present in and around houses and their combustion emission products. January 2011. <http://www.bushfirecrc.com/managed/resource/inventory.pdf> (Accessed 28 November 2012).
- iii DOW Chemical Company. Pure, Modified, and Polymeric MDI Handling and Storage Guide. October 2009. http://www.dow.com/polyurethane/pdfs/Safe_Handling_Pure_Modified_and_Polymeric_MDI.pdf (Accessed 21 November 2012).
- iv U.S. National Institute for Occupational Safety and Health (NIOSH). Workplace Safety & Health Topics: Isocyanates. <http://www.cdc.gov/niosh/topics/isocyanates/> (Accessed 28 November 2012).
- v Tatano F, Barbadoro L, Mangani G, Pretelli S, Tombari L, Mangani F. Furniture wood wastes: Experimental property characterisation and burning tests. *Waste Management*. 2009;29:2656-2665.
- vi Peng Y, Shi QS, Ingram L. Chemical emissions from adhesive-bonded wood products at elevated temperatures. *Wood Science Technology* 2011;45:627-644.
- vii Fent KW, Toennis C, Sammons D, Robertson S, Bertke S, Calafat AM, Pleil JD, Geer Wallace MA, Kerber S, Smith DL, Horn GP. Firefighters' and instructors' absorption of PAHs and benzene during training exercises. *Int J Hyg Environ Health*. 2019 Aug;222(7):991-1000. doi: 10.1016/j.ijheh.2019.06.006. Epub 2019 Jul 2. PMID: 31272797; PMCID: PMC8848677.