

# **A Cost-efficient Method for the Disposal of Waterborne Woody Debris**

## **On-site elimination of collected wood waste from hydro dam reservoirs, rivers, lakes, waterways and other shorelines**

### **Introduction**

Wood debris accumulates in waterways for a number of reasons, and wood in a waterway is not always necessarily a bad thing. In most cases the wood debris is undesirable, if not a menace or hazard, especially in navigable waters and hydro dam reservoirs.

If debris removal from the body of water is necessary, collecting it and depositing it on the shoreline is only the first phase of the task. Removing the debris piles often is equally cumbersome and expensive, frequently cost prohibitive. The reason is simply that in very many cases the shoreline is not easily accessible for vehicles (and chippers) to haul the debris away. Also, the shoreline may be many miles long, making collecting and loading the debris a real chore. Leaving it on the bank of the waterway is also usually not an option, as earlier or later the debris will be washed back into the water.

The best solution is the use of an air curtain FireBox to burn the wood debris safely and efficiently on site. The Firebox (see [www.AirBurners.com](http://www.AirBurners.com)) is a self-contained burn container that can be loaded with the wood debris without further handling of it, even while still wet. The machine meets EPA regulations and has been used around the world by forest industries, construction, land-clearing and agricultural businesses and extensively by the Government for many applications, including disaster recovery after hurricanes, tornadoes, etc. and for waste reduction by our Military overseas.

### **Description of Waterborne Debris Problems and Issues**

#### *a. Wood debris in undisturbed natural waterways*

Natural wood debris from decaying and falling trees has been introduced into our rivers, streams and lakes for as long as forests exist. This debris actually plays a role in supporting the ecosystem within and around the body of water. The debris influences the velocity with which the water travels downstream, it provides a habitat for microorganisms and other living beings in the water, such as fish. It also may strengthen the shoreline and act as erosion control. Finally, wood stores carbon, so by definition, the waterborne debris is a carbon store.

*b. Wood debris in disturbed natural waterways*

Forest fires and beetle kills more than any natural disasters, such as ice storms and heavy rainfalls influence the behavior of rivers and streams, because they tend to deposit an inordinate amount of wood debris into the adjacent water bodies from partially burned and fallen trees and branches. The fires, moreover, tend to create a shoreline erosion problem, as the vegetation has usually been burned away. The excessive wood debris may cause blockage, flooding and potential downstream bursts and dangerous floods from blockage abruptly forced away by an inordinate amount of backed up water.

Post fire and beetle-kill clean-up and remediation programs should not only target the disposal of trees whether standing or partially burned or killed by beetles and the downed trees and the replanting of the affected area, but also the removal and disposal of excessive woody debris that has fallen into adjacent rivers and streams, and possibly lakes.

*c. Wood debris in navigable canals and other waterways*

Although some debris in canals and other navigable waterways may originate from routine natural occurrences, most of such debris stems from disasters, such as hurricanes, heavy rainfall and floods. This debris becomes a hazard to vessels and watercraft of all sizes, and it is imperative that it be swiftly and safely fetched out of the waterways and removed from the shorelines. This task is often overseen or tackled by the US Coast Guard. For example, as a result of Hurricane Katrina, waterways in the Gulf States were rendered hazardous if not impassible by wood debris from trees, fences and other swept away structures. This waterborne debris must be collected from the water and brought to shore for disposal.

*d. Wood debris in reservoirs of hydro dams*

In the past, hydro dams were usually built in ravines and canyons without first removing trees and many man-made structures upstream. Fortunately that simplistic approach no longer prevails with new reservoir construction, but thousands of large and small reservoirs pose a serious dilemma for the hydro dam operators, as trees rise to the surface along with other woody debris and float downstream to the dam's grid where the debris piles up. This is an obvious problem and requires the collection and subsequent removal of the wood debris from the reservoir. The dilemma is



aggravated further by the fact that road access to landings on the shoreline of the reservoir is usually very limited. Roads usually lead to the top level of the dam and its power plant below downstream. A debris collection landing on the shoreline can often be reached only by way of a watercraft.

As the collection and disposal of the woody debris is vital for the proper operation of the hydropower plant, open burning the debris was often used resulting in serious polluting of the area's valleys, as shown in the photo to the right. Open burning is outlawed today in many jurisdictions around the world, especially in the USA, Canada and Europe, and alternate debris disposal methods that are efficient and affordable are required. The optimal solution is the use of an air curtain burner FireBox.



## **The Use of Air Curtain Burners for the Disposal of Collected Waterborne Woody Debris from Waterways**

### *a. What are air curtain burners?*

Air Curtain burners are self-contained machines that are an “efficient, environmentally friendly, and technically viable means of disposing of slash, wood, and other burnable waste materials” (US Forest Service Tech Tips). Air curtain burners were designed principally as a pollution control device. The primary objective of an air curtain machine is to reduce the particulate matter (PM) or smoke that results from burning clean wood waste. It is sometimes hard to visualize without seeing a machine in operation, but the machines do not burn anything, rather they control the results of something burning. For detailed information, see [www.AirBurners.com](http://www.AirBurners.com) or go here for a streaming video clip: <http://www.airburners.com/video/s217video.html>.

Air Burners, LLC manufactures above-ground self-contained machines, also called FireBoxes and trench burners where the burn chamber is a pit or trench dug into the ground. Waterborne debris disposal operations make only use of FireBoxes, as it would not be practicable to dig a trench on most shorelines, especially hydro dam reservoirs with their steep ravines and limited collection landings.

FireBoxes come in various sizes. The photo to the right shows two large S-327 FireBox models on a debris collection landing at a BC Hydro reservoir in Western Canada. The smaller FireBoxes are more suitable for operations on floating barges and they can also be air-crained if necessary and if space is very limited.



*b. Advantages of air curtain burners over alternative woody debris disposal methods*

The bullet points below will highlight that there is absolutely nothing more advantageous or practicable for waterborne woody debris disposal than the Air Burners, LLC FireBox from any body of water that requires clean-up:

- ❖ Only an air curtain FireBox can actually dispose of the woody debris completely on site leaving but a residual ash that has beneficial qualities and which can be land applied to the area. Costly and cumbersome chipping, trucking and landfill deposits are totally eliminated.
- ❖ The debris requires no process handling, such as cutting or chipping apart from very long and thick tree trunks: if it fits into the burn chamber it goes in as is, wet or dry.
- ❖ FireBoxes operate very efficiently and in an environmentally friendly manner meeting appropriate air quality regulations of the EPA and state agencies.
- ❖ FireBoxes are affordable and have a long useful life in excess of 8-10 years.
- ❖ FireBoxes are self contained and they are shipped completely assembled from the factory; moreover, they are skid-mounted and can be dragged on site for relocation.
- ❖ FireBoxes can be run by the loader operator (i.e. excavator operator) and require no additional personnel. One operator can support two to three FireBoxes placed next to one another.
- ❖ FireBoxes can burn woody debris in almost any kind of weather, rain or shine, summer or winter.

- ❖ The woody debris can be introduced into the FireBox while still wet; no lengthy drying out period is necessary in contrast to chipping, which requires that the wood debris be fairly dry.
- ❖ FireBoxes require very little maintenance and their operating cost is basically reflected by the cost of the Diesel fuel required to run the small (EPA Tier3) Diesel engine that powers the air fan which creates the air curtain over the top of the burn chamber and forces air into the firebox to help accelerate the burn.
- ❖ FireBoxes eliminate the need for open burning of woody debris in hard to reach reservoir locations and they can be operated on barges. Air Burners, LLC offers a special version for barge operation that includes a double steel floor that is vented to protect the vessel's deck.
- ❖ For waterborne debris disposal along the right-of-way of waterways, such as rivers and canals, where the FireBox may have to travel over a distance of many miles from one collection pile to the next, Air Burners offers an off-road wheel assembly to assist with moving the FireBox when merely dragging it on its skids would be impractical for a streamlined operation. This version may also be fitted with a double steel floor.
- ❖ The photo on the next page sums up quite strikingly the pollution control effects of the FireBox compared to open pile burning. Note, that the two FireBoxes are in full operation with no visible smoke and remember also that the burn process is extremely fast as compared to open burning:





## Conclusion

Waterborne woody debris in waterways, canals, rivers, lakes, streams and hydro dam reservoirs often requires mandatory removal and subsequent disposal, because the debris may render the body of water hazardous for watercraft or the debris may interfere with the safe operation of hydro dam reservoirs. Sometimes, waterborne debris in natural streams and rivers must also be addressed, because of possible environmental impacts.

The ultimate disposal of woody debris fetched out of waterways, poses a particular challenge, because of generally poor access to the shorelines where the debris would be piled up upon removal from the water. Historically, open burning has been used to dispose of the waste on site. That is no longer an acceptable method in many areas. Sometimes, chipping along river right-of-ways has been employed, but this method is cumbersome and expensive and often impossible. Leaving the debris piles on the shoreline is also not an option, as they may eventually be swept back into the water. Also, if the piles are left on the shoreline near residences, they may become a fire hazard or an issue for rodent control

There is only one plausible solution that is all encompassing: the use of portable FireBoxes manufactured by Air Burners, LLC in Palm City, FL. Air Burners is a GSA Contract Holder and has served private industries and government entities for many years.

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