= Ammonia fuming =

Ammonia fuming is a wood finishing process that darkens wood and brings out the grain pattern . It consists of exposing the wood to fumes from a strong aqueous solution of ammonium hydroxide which reacts with the tannins in the wood . The process works best on white oak because of the high tannin content of this wood . Fumed oak is also called smoked oak . Other species may also be fumed but usually will not darken as much as white oak . The introduction of the process is usually associated with the American furniture maker Gustav Stickley at the beginning of the twentieth century , but fuming was certainly known in Europe some time before this .

= = Process = =

The wood to be fumed is placed in a sealed chamber with all the surfaces to be fumed exposed to freely circulating air . A large shallow container of ammonium hydroxide solution is placed on the floor of the chamber and the chamber is sealed . If the chamber is large or the fuming is to be done for a long time then more than one container may be provided or the ammonia may be replenished during the process . The fuming time depends on the amount of darkening required , the size of the chamber , and the strength of the ammonia used . It is usual to oil the wood after fuming to fully bring out the effect .

= = Advantages and disadvantages = =

Fuming has an advantage over staining in that it does not obscure the grain , it just darkens it . Unlike staining , there is no possibility of blotches or runs . Fuming is also colourfast . Fuming has the disadvantage that it is not a very precise process . Different batches of wood will react to fuming differently . For this reason wood that is to be fumed for a particular project is often taken from the same tree . Even so , boards from the same tree , and even different regions of the same board , can have a noticeably different colour . Where a consistent colour is important , staining or dyeing may be better options .

Fuming has some inconvenient safety issues . The solution of ammonium hydroxide used is much stronger (26 % to 30 %) than in household ammonia and is corrosive . The fuming must be done in an enclosed sealed chamber . Ammonia splashes can burn skin and the fumes can cause burns to eyes and lungs . Operators need to wear gas masks , gloves and eye protection .

The darkening of the colour relies on the ammonia reacting with tannins in the wood . The process is most usually applied to white oak as this wood has a high tannin content . Red oak may turn greenish rather than deep brown . Other species may not darken so noticeably as white oak , or at all , depending on the tannin content . The effect of fuming can be enhanced in non @-@ tannic woods by applying a coat of tannic acid to the surface before fuming .

= = History = =

Fuming was an accidental discovery in England after it was noticed that oak boards stored in a stable had darkened . This was caused by the ammonia fumes from the horse urine reacting with the wood . At the end of the nineteenth and beginning of the twentieth centuries fuming became popular with furniture makers in the Arts and Crafts movement . The technique was introduced to the US by Gustav Stickley in 1901 and a manufacturing technique was perfected in the mission style furniture line of the Stickley family business . Stickley also described a method of fuming the wooden architecture of an entire room by setting down bowls of ammonia within the room and completely sealing it . This method was not very practical and quite dangerous for the person placing the ammonia without the personal protective equipment available to modern workers . Stickley was quickly followed by other American Arts and Crafts furniture makers such as Charles Limbert and the Roycroft community .