# **Sandstone: Characteristics, Uses And Problems**

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## **Introduction**

Characteristics of Sandstone:

* A sedimentary rock consisting of sheets of sand, mineral particles, and binding matrix deposited one atop in water environments and desert formations.
* Very porous and water will penetrate it easily.
* Brown, red, purple, and pink sandstones are commonly called brownstone.
* Available in a variety of surface textures and earth-toned colors.
* Weathers best when its end-grain faces the weather (naturally bedded).(Face-bedded) stone is subject to greater deterioration.Water damages a face-bedded stone by spalling or flaking off entire sheets of sandstone.Also, freeze/thaw cycles allow water to get into the stone and then freeze and expand causing some of the top layer to split off.

## **Typical Uses**

Typical historical uses for sandstone included:

* Urban row houses, commercial buildings and churches built from the 1840s through the early 20th century (this was usually brownstone); often found in Northeastern and Mid-Atlantic areas of the US.
* Lighter-colored sandstones were used more frequently by the end of the 19th century.
* Typical current uses for sandstone include:
* New sandstone is typically most often used for high quality custom-designed buildings. Such stone represents 13% of the dimension stone market (Mineral Information Institute).Also, new sandstone is used for restoration projects if appropriate.

## **Problems and Deterioration**

Problems may be classified into two broad categories:

* Natural or inherent problems based on the characteristics of the material and the conditions of the exposure, and
* Vandalism and human- induced problems.

Although there is some overlap between the two categories, the inherent material deterioration problems generally occur gradually over long periods of time, at predictable rates and require appropriate routine or preventive maintenance to control. Conversely, many human induced problems, (especially vandalism), are random in occurrence; can produce catastrophic results; are difficult to prevent, and require emergency action to mitigate. Some human induced problems, however, such as improper stone use, installations and details can be mitigated with corrective treatments developed.

## **Natural and Inherent Problems**

* **Moisture-related problems:**May be evident in sandstone as spalling, erosion, cracking, flaking and deteriorated mortar joints
* **Weathering:**Disintegration of the stone's surface usually caused by erosion, chemical action, and moisture freezing in the stone.
* **Exfoliation:**Separation and loss of large areas of stone along the bedding planes usually caused by the stone having been face-bedded
* **Blind Exfoliation:**Separation of stone along bedding planes, but where layers are still loosely attached behind the surface.It is often caused by having laid the stone with the bedding planes running parallel with surface of the wall (face-bedding). Blind exfoliated stone will sound hollow when lightly tapped with a rubber mallet.
* **Blistering:** Swelling and rupturing of a thin uniform skin caused by air-borne chemicals reacting with the stone's surface, forming a hard, brittle skin.The blisters will often pop when touched.
* **Cracking:**Narrow fractures in the stone from 1/16 to 1/2 inch wide.
* **Detachment:**A clean break in the stone often resulting from a sharp impact, or from stresses concentrated in a small area of stone due to structural settlemen

## **Human-Induced Problems:**

* Stone laid with its layers parallel to the wall plane (face-bedded) rather than perpendicular to the wall plane (naturally-bedded):Face-bedded stone is more prone to deterioration by weathering as entire sheets of stone tend to flake off.
* Painting over a deteriorated stone surface may leadto more serious moisture-related problems when necessary treatment is deferred.
* Applying a hard cement patch over deteriorated surface areas:If an inappropriate patching mix is used, it may be necessary to paint the entire stone surface to lessen the visual disparity between the two materials, or remove the patch.