# A Comparison of the Technology Advantages of Mechanical Broom Regenerative Air

VS

*This information was researched and presented by Ranger Kidwell-Ross, M.A., Editor of* WorldSweeper.com *and Director of the* World Sweeping Association*.*

*If you have questions or comments you may contact him by calling or texting to 360.739.7323 or via email sent to* ranger@worldsweeper.com*.*

***Note:*** While reading the following, please consider that studies have shown that up to 60% of the pollutant load in 'street dirt' are contained in the particles 250-microns and under that typically comprise only about 20% of total street debris.

If you would like the web citations for any of the following information those can be made available by request.

If you are unclear about how regenerative air or mechanical broom street sweepers operate, click **here** for a diagram of how a mechanical broom sweeper operates and **here** for a similar diagram for a regenerative air sweeper.

## Mechanical Broom Street Sweepers

**are likely not as beneficial as air sweepers for abating stormwater runoff pollution and improving air quality. This is the case for the reasons that follow:**

1. **Ineffective removal of fine particles:** Mechanical sweepers are less effective at removing small particles, especially those under 60 microns in size, which are often the most polluted.

2. **Creation of, as well as limited pickup of, exposed fines:** The abrasive action of a mechanical broom tends to break larger debris into smaller particles. They also loosen the packed-down deposition layer of street dirt. This combination tends to create and leave more fine particulate matter. As this occurs, these small-micron particles largely settle back onto the pavement; the smaller particles left behind are more easily washed off with wind and/or blown off during rain events, contributing to air quality degradation and/or stormwater pollution.
3. **Poor performance in cracks and potholes:** Mechanical broom sweepers are less effective at cleaning debris from pavement imperfections, leaving behind potential pollutants.
4. **Increased dust generation:** Mechanical sweepers are less effective at controlling dust during operation, which can negatively impact air quality. They employ no air-based vacuum system for dust abatement.
5. **Inefficiency in removing wet vegetation:** Mechanical sweepers struggle with wet vegetation removal, which can contribute to stormwater pollution.
6. **Lower pickup efficiency:** Studies have shown that mechanical broom sweepers have lower overall pickup efficiencies compared to modern air sweepers.
7. **Negative impact on air quality/stormwater runoff:** Some studies suggest that mechanical broom sweepers may actually increase stormwater runoff pollution, as well as small-micron particles available for dust entrainment in wind, due to their ineffective cleaning of small particles.
8. **Less environmentally friendly:** Mechanical sweepers typically produce more emissions and are noisier than air sweepers, contributing to air and noise pollution.
9. **Ineffective for improving water quality:** Mechanical sweepers are generally considered a poor choice for sweeping programs designed to eliminate more small micron debris in order to improve air and water quality.

*By contrast, as is shown via the information to follow, air sweepers (such as regenerative air or high-efficiency vacuum-assisted systems) have been shown to provide superior performance in removing fine particles, thereby reducing stormwater runoff pollution and better controlling dust.*

## Regenerative Air and Vacuum Street Sweepers

**are the best choice when small-micron removal is desired, in addition to removal of other general street dirt. Smaller micron material can more easily entrain into the air as dust, as well as washoff during stormwater events. Air sweepers offer:**

1. **Superior fine particle removal:** These sweepers are highly effective at removing fine particulate matter, including particles under 60 microns in size.
2. **Advanced dust control:** Regenerative air sweepers use a closed air circuit that traps more particles within the system, ensuring less dust escapes back into the environment.
3. **Higher overall efficiency:** Studies have shown that regenerative air and vacuum sweepers have significantly higher overall pickup efficiencies compared to mechanical broom sweepers.
4. **Effective cleaning of cracks and crevices:** The high-velocity air blast of regenerative air sweepers can dislodge debris from small cracks and hard-to-reach areas.
5. **Improved stormwater runoff quality:** By effectively removing fine particles, these sweepers help reduce pollutant air entrainment as well as washout during stormwater events.
6. **Better performance on smooth surfaces:** Regenerative air and vacuum sweepers excel on paved surfaces, making them ideal for urban environments.
7. **Reduced environmental impact:** These sweepers typically produce fewer emissions and are quieter than mechanical sweepers, contributing to better air quality and reduced noise pollution.
8. **Wide cleaning path:** Regenerative air sweepers often have wider vacuum heads, allowing them to clean larger areas more efficiently.
9. **Versatility in wet conditions:** Some models of regenerative air sweepers can maintain effectiveness even in rainy or wet conditions.
10. **Potential cost-effectiveness:** By capturing pollutants before they become soluble in rainwater, these sweepers may reduce the need for expensive stormwater treatment practices.