Common errors found in DOAS applications/designs

1. Recirculated air is used during occupied times. Neutralizes most benefits of DOAS.
2. Supply Air (SA) is continually tempered. Result, huge cooling first and energy cost penalty as well as significantly reducing its potential free cooling contributions.
3. Enthalpy wheel (EW) controlled like a sensible wheel, i.e. control based upon DBT rather than enthalpy. Result, a significant percent of the recoverable energy is lost because the EW is off.
4. Enthalpy wheel improperly controlled during the majority of the time the Outdoor Air (OA) enthalpy is lower than the return air. Consequence, most free cooling is lost.
5. Building pressurization, which results in unbalanced flow in the Enthalpy Wheel, was not considered. As a result heat recovery is compromised and cooling/heating capacity may be insufficient near design conditions.
6. Investment decisions made on first cost only, rather than owning costs.
7. Significant modeling errors at off design conditions resulting in significantly understated energy savings. Result, DOAS value engineered out of the project.
8. Toilet exhaust vented directly outside, generally making energy recovery impractical. If toilet exhaust can be directed to an enthalpy wheel, significant cooling plant first cost and operating costs can be realized in most climates.
9. Significantly more OA than necessary supplied to remove the space latent load with modest SA DPTs (about 55F). Result, significant air handling unit and ductwork first and fan energy costs.
10. Failure to recognize that the occupancy category, i.e. combined OA cfm/person, has a profound impact on the required SA DPT for space latent control. For example the *office category* at about 18 combined cfm/p the required SA DPT is about 45 F. For a *conference room category* at about 6 combined cfm/p the required SA DPT is about 25 F.
11. Terminal cooling coils/surfaces configured in series with the cool-dry DOAS supply air, rather than parallel. For example, with fan coil units the result is derated capacity resulting in increased first cost for the terminal equipment, and excessive terminal fan power use.
12. For highly variable occupancy density spaces a constant volume of OA is supplied at a neutral temperature to avoid over cooling. To minimize excessive first and energy costs, supplying the air to such spaces at a DBT similar to the required DPT and equipped with Demand Controlled Ventilation (DCV) overcomes this error and cost penalties.