and the silo technique – with sufficient capacities for several days of full duty. The silo technique can be used in particular for closed-down salt depots at support points, since silos both serve as a system for storage and loading. Support points are often used jointly by several motorway and road surveillance centers. Here silos offer the possibility of simultaneous loading for several winter maintenance vehicles. This also applies for concurrent re-loading of vehicles following staggered formation duty. Individual motorway surveillance centers must develop their own loading system design while keeping in mind local conditions and the existing systems. In addition, all support points should be equipped with saline solution tank systems to ensure basic provision of moist salt to winter maintenance vehicles during flexible duties under full capacity conditions. A considerable minimisation of loading times can be achieved by increased simultaneous loading of dry salt and saline solution. As a result, straight loading times of 7 minutes are possible; the decisive factor here is the output of the saline solution task system [CYPRA et al.2006].

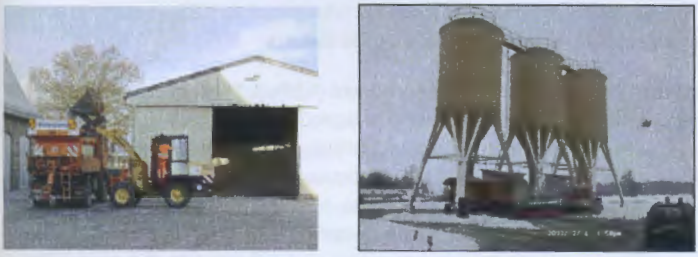

Figure 3-23: Loading by using a wheel loader and a 250 t silo

(see Appendix 3.2 - New Technologies, Report table Q7)

3.3.1.7 De-icing Materials

Chloride salts, particularly sodium chloride continue to be the most widely used chemical de-icing agents, because of their effectiveness, availability and cost. However there are concerns about corrosivity, effects on vegetation and contribution to water quality deterioration, so chemical alternatives or modifications to chloride salts have been trialled in many countries over several years.

All de-icing strategies have a potential environmental impact, whatever process may be used, so it is important to address management issues such as correct spreader calibration. It is also important to identify areas and structures at particular risk from the activity, as it is increasingly recognised that adverse impacts tend to be local [RAMAKRISHNA/VIRARAGHAVAN 2005]. Work is being done on developing models for the complex interactions involved which will help [BLOMQUIST 2001].

Environmental analysis is also becoming more sophisticated and some chemicals previously considered environmentally benign, though expensive, are coming under more scrutiny [OLEK et al. 2006, JOUTTI et al. 2003] but chemicals such as CMA continue to be used [BURKETT/