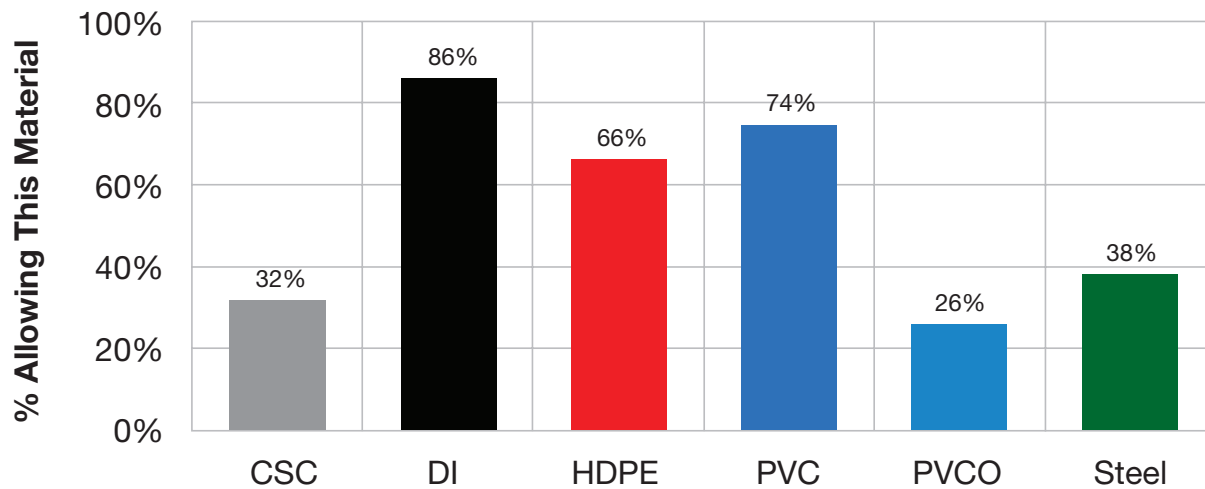


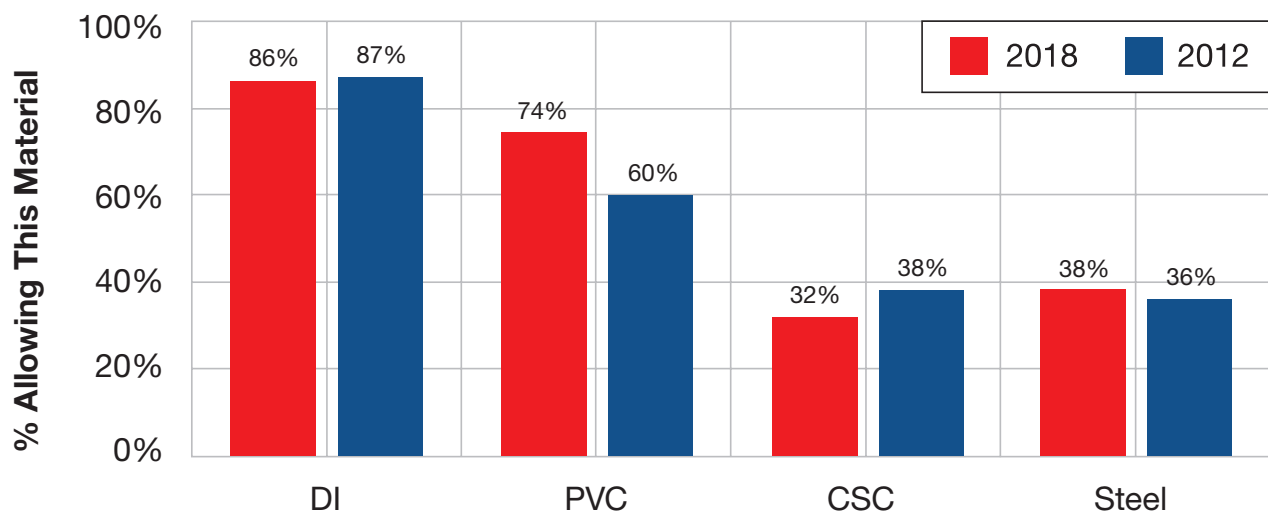
# 11.0 Approved Pipe Materials

**FIGURE 39: RESPONDENTS ALLOWING INSTALLATION OF THESE WATER MAIN MATERIALS**



The detailed survey also asked respondents what water main pipe materials are currently approved for use at their utility. Figure 39 illustrates the percentage of respondents that allow a particular pipe material to be installed. HDPE pipe at 66% allowance for use in water systems represents a high degree of acceptance for trenchless applications such as pipe bursting and directional drilling, whereas for open cut installations PVC and ductile iron pipe are the predominantly accepted materials (see Table 10). Figure 40 compares the pipe materials approved for use by utilities in the 2018 survey with the data obtained in the 2012 survey. Figure 40 shows a 23% increase in the acceptance of PVC water pipe by North American utilities since 2012. Specifically, PVC pipe approval among survey respondents increased from 60% of water utilities allowing its use in 2012 to 74% of utilities allowing its use in 2018. The number of utilities approving of ductile iron, concrete steel cylinder, and steel pipes for use in water systems remains essentially the same.

**FIGURE 40: COMPARISON WITH 2012 SURVEY FOR ALLOWED MATERIALS**



# 12.0 Preferences for Pipe Installation

The detailed survey asked respondents about experiences with three techniques of repairing, replacing, and installing water main pipes. They were relining deteriorated pipes, replacing pipes with a pipe bursting technique, and installation of new pipes using directional drilling. Table 10 summarizes their responses. The rating scale in Table 10 is from 1 to 5 with 1 being “Not Satisfied” to 5 being “Very Satisfied.” Not many respondents have utilized pipe bursting, but an increasing number are looking at using both pipe relining and pipe bursting techniques. A majority of respondents have utilized directional drilling and are very happy with the results, but it is usually only used where open cut replacement is problematic. Open cut replacement remains the most commonly used method of pipe replacement.



**TABLE 10: QUESTIONS ABOUT REPLACEMENT OF FAILING WATER MAINS**

	Pipe Relining	Pipe Bursting	Directional Drilling	Open Cut
% of respondents that have used this technique	35%	10%	62%	100%
Most common materials installed	HDPE, CIPP, cement lining, epoxy	PVC, HDPE, DI	HDPE, PVC, DI	PVC, DI, CSC, Steel
Average Rating 1 to 5	3.8	3.8	4.4	4.7
% of respondents that will use this technique in the future	58%	44%	93%	100%
Comments	High cost, used when open cut not feasible, only for large diameter pipe, many not happy with it	High cost, useful in some situations, need to excavate for service lines	Worked well particularly for river and street crossings, more expensive	Standard installation method