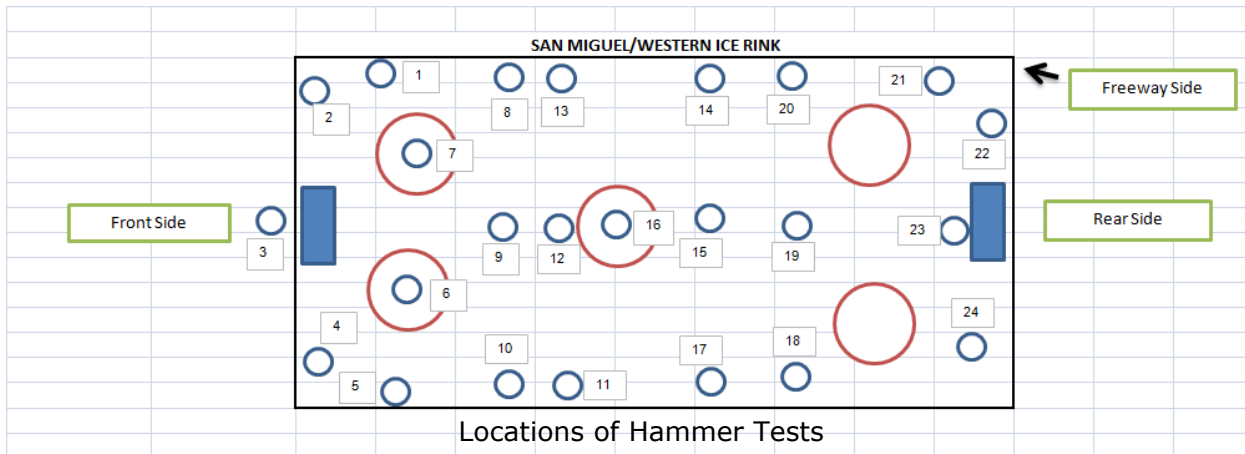


Acknowledgements

Southern California Edison's Design & Engineering Services (DES) group is responsible for this project. It was developed as part of Southern California Edison's Emerging Technology program under internal project number ET09SCE0070. DES' Charles Kim conducted this technology evaluation with overall guidance and management from Paul Delaney.

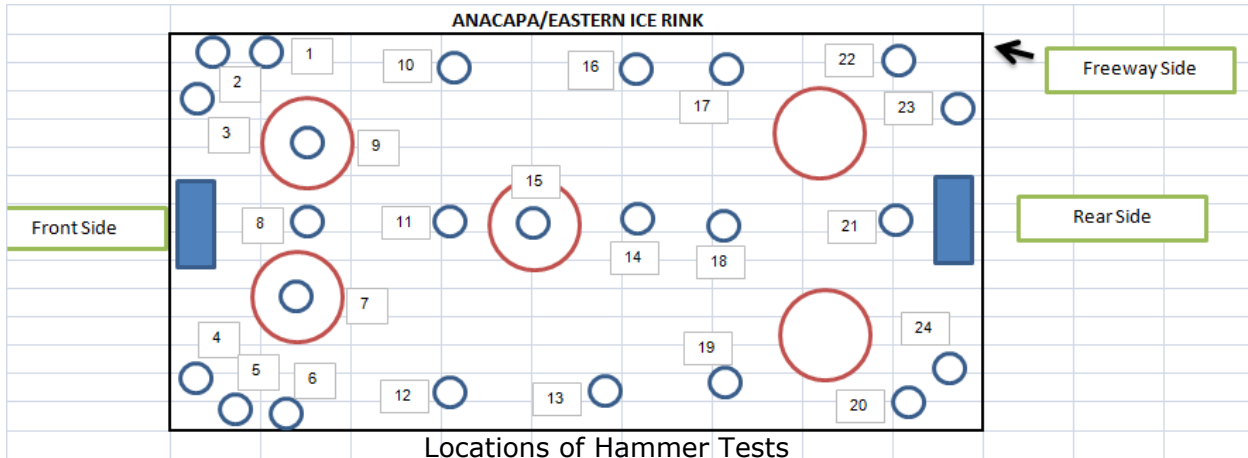
ICE QUALITY TESTING

The premise of the evaluation is that the ice would be of equal or better quality upon installation of the Realice system. The ice quality of pre condition is measured by testing surface strength of contact using a Schmidt Hammer. While this device is not designed to measure the lower surface strength of ice accurately, this device does allow a comparative test between pre and post conditions. Figure 7 and Figure 8 illustrate the ice quality testing results in terms of ice surface strengths.



Pre Readings				Post Readings				% Change			
Number	Reading	Number	Reading	Number	Reading	Number	Reading	Number	Reading	Number	Reading
1	10	13	12	1	16	13	16	1	160%	13	133%
2	10	14	14	2	16	14	16	2	160%	14	114%
3	13.5	15	10	3	15	15	16	3	111%	15	160%
4	12.5	16	16	4	16	16	18	4	128%	16	113%
5	10.5	17	12.5	5	16	17	16	5	152%	17	128%
6	13	18	12	6	18	18	18	6	138%	18	150%
7	10	19	10	7	16	19	16	7	160%	19	160%
8	11.5	20	12	8	16	20	16	8	139%	20	133%
9	12.5	21	10	9	16	21	18	9	128%	21	180%
10	12.5	22	13.5	10	16	22	16	10	128%	22	119%
11	13	23	10	11	16	23	16	11	123%	23	160%
12	10	24	13	12	18	24	16	12	180%	24	123%
Pre Deviation				Post Deviation							
Max	16			Max	18						
Min	10			Min	15						
Avg	11.8333			Avg	16.375						
Deviation	51%			Deviation	18%						

FIGURE 7. ICE QUALITY TESTING RESULTS FOR SAN MIGUEL ICE RINK OF THE TESTING SITE



Locations of Hammer Tests

Pre Readings		Post Readings				% Change					
Number	Reading	Number	Reading	Number	Reading	Number	Reading	Number	Reading	Number	Reading
1	12	13	11.5	1	18	13	18	1	150%	13	157%
2	12.5	14	14	2	15	14	16	2	120%	14	114%
3	11	15	12.5	3	18	15	18	3	164%	15	144%
4	11	16	12	4	15	16	16	4	136%	16	133%
5	10	17	11	5	16	17	18	5	160%	17	164%
6	11.5	18	11.5	6	15	18	16	6	130%	18	139%
7	11	19	11.5	7	18	19	16	7	164%	19	139%
8	11	20	10	8	16	20	16	8	145%	20	160%
9	11	21	10	9	18	21	18	9	164%	21	180%
10	12.5	22	10	10	16	22	16	10	128%	22	160%
11	13	23	10.5	11	18	23	16	11	138%	23	152%
12	12	24	12	12	16	24	16	12	133%	24	133%
Pre Deviation		Post Deviation									
Max	14	Max	18								
Min	10	Min	15								
Avg	11.4583	Avg	16.625								
Deviation	35%	Deviation	18%								

FIGURE 8. ICE QUALITY TESTING RESULTS FOR ANACAPA RINK OF THE TESTING SITE

Specific items of note for this assessment are:

- A reading on the Schmidt Hammer® corresponds to an approximate strength of 1500 psi. It does not provide a relationship curve below a reading of 20 and below. This is the main reason that the test should only be used on a comparative basis.
- The conclusion is that the rebound numbers are as good or better after the installation of the Realice system, which meets the intent of the M & V process.

For West Rink the ice was on average **39% harder** post installation of Realice with a high of 80% and low of 11 %.

For East Rink the ice was on average **46% harder** post installation of Realice with a high of 80% and a low of 14%.

- The overall uniformity of ice strength is much better after the installation of the Realice system. This means that the ice was more consistent in hardness across the entire rink after installation.

FIGURE 9. ICE QUALITY TESTING RESULTS FOR San Miguel-West and Anacapa- East Rinks

