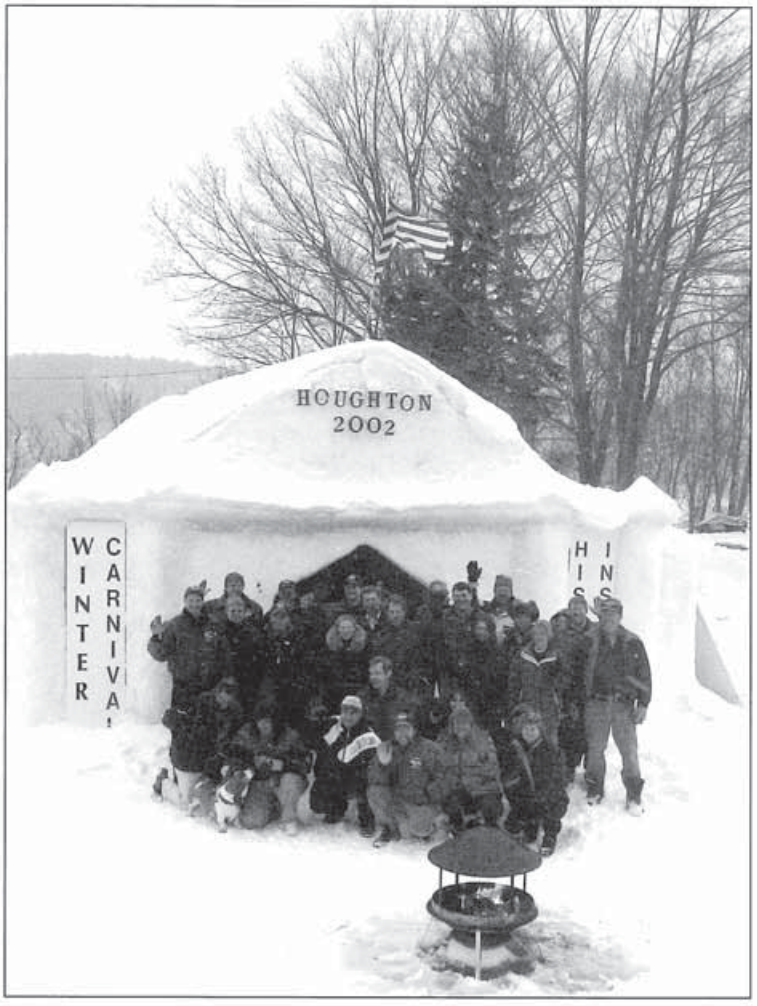
Winter Cities

VOLUME 21 • NUMBER 2 • MAY 2002



HOUGHTON 2002
WINTER CARNIVAL

President's Message

This issue of the magazine includes a selection of papers presented during the Winter Cities 2002 program component of the conference sponsored by the International Association of Mayors of Northern Cities (IAMNC) and hosted this year by the City of Aomori, Japan. The conference theme was "Seeking Sustainability." The twentieth anniversary of the IAMNC was recognised during the event.

Several Directors and members of our Association attended and appreciated the warm welcome extended to us by Mayor Sasaki Seizo, the conference organisers and the community at large. Starting with the discovery of a cheerful origami figure in our registration kits ("Small gift for you from pre-schoolers in Aomori City"), we found that attention had been paid to many details that made the conference very successful. Apart from the presentations themselves, and advance copies of the proceedings in different formats for each delegate, a variety of social and cultural events gave us a glimpse of life in Aomori. Highlights included several technical tours; the National Elementary School Snow Ball Fight Tournament in Gappo Park; attendance at a Noh play; private home visits and a tour of the new Aomori Contemporary Art Centre built in a beautiful deep forest and incorporating an "artist in residence" program. We were able to enjoy the works of the first artists in residence as well as pieces loaned for the occasion by artists from a number of member cities of the IAMNC. Photographs of member cities were also on display in various locations including the Winter Expo with its exhibits and special displays. The arrangements of flowers were spectacular and the food and entertainment at the receptions were outstanding. In addition to the program sessions, there were many opportunities to network and discuss issues. As Mayor John Rowswell remarked in his presentation to the Mayors Conference, many alliances come out of exchanges that occur on these occasions.

Two more such opportunities are on the horizon. Plans are being developed by Mayor Rowswell and the City of Sault Ste. Marie, Ontario, to host the next Winter Cities Forum in the first week of February 2003. In the following year, the IAMNC Conference will be hosted by Mayor George Wuerch and the City of Anchorage, Alaska, February 18 - 22, 2004. Look for more details about these two conferences in subsequent issues.

Our thanks go to the Aomori Conference Office and the authors for permission to reprint the papers that appear in these pages.

Anne Martin, President

Cover photo by Patrick Coleman

Winter Cities
Volume 21 • Number 2
May 2002

Winter Cities magazine is published by
Winter Cities Association
c/o The City of Prince George;
1100 Patricia Boulevard,
Prince George, British Columbia,
Canada V2L 3V9

The Winter Cities Association is dedicated to realizing the potential of all northern communities. Through publishing, networking, organizing conferences, facilitating research and other means, the Association seeks to make available northern solutions to northern problems and to promote awareness of opportunities associated with the winter season.

Subscription Rates
Cdn. $40.00 - 1 year
Cdn. $75.00 - 2 years
Cdn. $100.00 - 3 years

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ICICLES

What's Up in the Winter Cities

Association member wins competition

Congratulations to Laura Ryser, a graduate student in the Environmental Studies Programme at the University of Northern British Columbia, who won a competition for best graduate student presentation at the Western Canadian Geographers Conference held in Vancouver in March. The title of her presentation was: "Defining Responsibilities for Climate Responsive Design: Conflicting Political and Structural Frameworks".

The Garden in Winter

Prince George's Winter City Committee sponsored a workshop in March to explore ways in which enjoyment of the garden can be extended beyond the growing season to include winter. Design elements of the garden were considered as well as choices of plants with interesting shapes and colourful barks, twigs and berries as well as varieties of evergreens that can be incorporated into private gardens and public spaces. The programme included a session to help plan a demonstration winter garden in a City park.

Annual Meeting Highlights

An annual meeting was held on March 2, 2002. The President reported on the International Association of Mayors of Northern Cities Conference held in Aomori, Japan and noted that the February issue of the magazine was available for distribution there. An election of Directors was held and the Board welcomed a new Director, René Akre, from Ann Arbor, Michigan.

Northern Michigan Snow Building Project Successful

by Patrick Coleman

The February 2002 issue of Winter Cities journal included an article about plans to make snow buildings in Houghton and Hancock, Michigan, USA. Two snow buildings were constructed, one in each city. Local officials are enthusiastic about the project and plans are being made to further develop the concept for 2003.

In Hancock, the "Lumitalo" (Finnish for snow house) was the centerpiece of the city's Heikinpaiva midwinter festival, which celebrates the Finnish heritage of the area. An art gallery inside included snow and ice sculptures. Painted murals depicted scenes from the Kalevala, the Finnish epic poem.

In Houghton, the city used their snow building to display ice carvings, historic photos and memorabilia of the 75 year history of Michigan Tech University's Winter Carnival. The project created a new way for Houghton to expand the winter carnival from the campus into the community. The building also provided a unique venue for a Chamber of Commerce "business after hours" reception. (see cover photo).

Both structures were constructed during an unusually warm and snow-less January, and fared well under the less than desirable winter conditions experienced this winter. Later in February and in March, cold and snow returned to the area and extended the life of the structures. The structures were closed to the public April 1, but remain standing to see how they react to the climate.

As the first snow buildings in the USA, the project gained international exposure through an Associated Press article carried by newspapers across the USA, Canada and Finland. Local citizens were delighted by this new use for the area's abundant snow. The buildings created a new winter tourism experience for many visitors. Finally, the project was a demonstration of how the city governments, the business community, tourism interests, and university students can collaborate to create something special of great benefit to the region.

Mark your calendar to be in Sault Ste. Marie, Ontario between January 31 - February 3, 2003 for the Winter Cities Conference. In addition to the Conference, you will be invited to participate in the spectacular celebration of the 40th Anniversary of the Bon Soo Winter Carnival. Bon Soo has been named one of the top winter festivals in Ontario. What a great way to mark the 20th Anniversary of the Winter Cities Association. More information coming soon!

Linking Through Ice and Snow

Economic prosperity & sustainability through partnerships among winter cities

by JOHN ROWSWELL, Mayor, Sault Ste. Marie, Ontario

The world is changing every day and sustainable development has to be a priority for the 21st century. Business opportunity comes with change. We, the Winter Cities of the world, can change the world for the better by working together.

I believe we can achieve this change through strategic partnerships, that is, by "Linking through Ice and Snow". Winter Cities share many unique characteristics and strengths. These can be combined to achieve sustainable economic initiatives through strategic partnerships or linkages with other winter cities around the world.

The conferences of the International Association of Mayors of Northern Cities and the Liveable Winter Cities Association provide a valuable venue for the seeding of such alliances. These conferences have been hosted around the world and many alliances have come out of exchanges that occurred on these occasions.

Sault Ste. Marie is one of the winter cities that sees much potential in partnering with its northern neighbours. The City is the "hub" of the Great Lakes and there are 60 million consumers within one day's drive. The City is rich in heritage and culture, enjoys a great, healthy "northern" lifestyle, and has a diversified economy. It is the gateway to world class outdoor opportunities, including Ontario's 45,000 km of snowmobile trails, and is a year-round recreation destination.

In 1991, Sault Ste. Marie hosted a Winter Cities Conference also themed on Sustainable Development. A number of important observations and projections were made by conference speakers. Dr. Vello Soots, then Manager of Ontario's Transportation Energy Office, commented on the importance of energy consumption in determining the efficiency of any industrial or economic activity. More energy is often consumed by commuting employees than by the distribution of goods produced. Because average trip lengths and times are less and trip speeds greater in smaller communities, there could be significant energy savings associated with the location of industry in smaller centres. His research at the time revealed that congestion in the Toronto area was adding anywhere from 10-20% to the cost of distribution compared to smaller centres in Ontario.

Dr. Soots was right. The transportation infrastructure of many of our cities today is already operating at, or well above, capacity. For example, a trip that took from 40 minutes to 1 hour in Toronto in 1986 now takes 50% longer. Add in a high cost of living and housing, and the "race-like" pace of life in major urban centres, and it is not surprising that stress has become one of business and industry's most costly health issues.

Alex Beraskow, then President of Vision 2000 Inc., also speaking at the 1991 conference, noted that "changes in the global economy are challenging the long term viability of northern communities based predominately on natural resources. This trend is reshaping Canada's infrastructure requirements...towards a rising importance for communications and information services. It is also changing the career aspirations of many of Canada's young men and women who see their future as information or service professionals as well as production workers."

Communications are a vital link to survival of all levels if we can succeed in creating a communications environment that minimizes the downside of being in the north and maximises the positive aspects - that enables economic, social and cultural life to be carried on independent of local constraints - so that we have the freedom to work and live in a winter city if we want to. Technology and electronic linkages have significantly reduced the importance of physical proximity and now allows companies to network electronically rather than in person. As such, investments in the

telecommunications infrastructure of northern communities/winter cities clearly hold the key to transforming our location disadvantage to our advantage.

Dr. Joseph Levy from York University, Toronto, was also enthusiastic about the future value of a northern lifestyle and environment when he proposed that "people will choose to live in balance with the eco-system with a lifestyle centred on quality of life."

The observations of these speakers reveal several fundamental conclusions concerning winter cities. The sustainability of current settlement patterns is questionable given the degradation of the environment and quality of life, and the costs of congestion and urban sprawl. Communities like Sault Ste. Marie are more efficient and sustainable (less fuel consumed and less impact on the environment). A modern communications infrastructure, together with our unique northern landscapes and lifestyles, can position winter cities as attractive and cost-effective alternatives for businesses and their employees seeking to escape the congestion, stress and expense of locating in major urban growth areas. Winter cities like Sault Ste. Marie are very well positioned to accommodate further development in information and technology-based business. The unique lifestyle of winter cities translates into a high quality of life and, in turn, a more energetic and productive workforce.

Ten years have passed since the 1991 conference and the urban sprawl and congestion continues in many major urban centres. Perhaps just in time, the provincial Government in Ontario has recognized how great the environment is in the north of the Province and how this pristine place and its natural resources are treasures that need to be used for the benefit of our communities today but also protected

for future generations.

One region in northern Ontario is known as the Great Lakes Heritage Coast. It consists of 2,900 km of pristine coastline that contains 13 municipalities, 18 First Nations and 290,000 residents. The challenge ahead is to balance development and the protection of pristine wilderness. The communities have come together to develop ways of doing this. For example, in June 2001, Sault Ste Marie hosted a meeting of the International Association of Great Lakes and St. Lawrence Mayors from both Canada and the USA. The meeting passed a resolution recognizing the value of the resources of the Great Lakes to its communities and calling for the development of tourism opportunities through transportation linkages such as trails, waterways and highways. The participants encouraged and endorsed Circle Tours of the Great Lakes, including Lake Superior with all its natural beauty and international significance.

This example reveals linkages within winter city communities of the Great Lakes Region but other linkages connect Sault Ste. Marie with the rest of the world. Similar opportunities exist for winter cities around the globe to build mutually beneficial partnerships. For example, Bratsk in Russia and Sault Ste. Marie are studying the opportunity for transpolar air cargo routes between Sault Ste. Marie to the Pacific Rim and India via the Russian cities of Yakutsk, Bratsk and Krasnoyarsk. This northern transpolar route would be more direct than traditional east-west flight paths and savings are estimated to be in the order of 10 - 30%.

Winter cities are defined by their northern heritage and lifestyles. They provide a quality of life that is increasingly desirable in a busy and congested world. Constraints imposed by geographical location have faded. Advances in telecommunications have put them virtually at each other's doorsteps. They have the enviable advantage of participating in the economies of metropolitan areas while enjoying a healthier and affordable northern environment. By working and linking together, winter cities have an opportunity to achieve and sustain a high quality of life for their citizens.

This article is an adaptation of Mayor Rowswell's presentation to the Mayors Conference, International Winter Cities Forum, Aomori, Japan, February 7, 2002. Visit Sault Ste. Marie's website at www.cityssm.on.ca

The Next Generation Snowplow

by JOHN SCHARFFBILLIG

Plowing snow in today's environment is very stressful and at times extremely dangerous. The conditions surrounding the snowplow operator are in direct conflict with the prevailing paradigm of technology, which is to "do more with less." The operator does not have the luxury of waiting for the snowstorm to abate, and motorists (both the public and private agencies) do not alter their schedules because of a simple snowstorm. To perform our jobs in the snow removal business it is very important that we have many tools in our toolbox. Much of the time the visibility conditions are very poor. Under these conditions the driver operates three plowing blades, controls nine hydraulic levers, and spreads up to five different surface materials while avoiding motorists and dodging obstacles. More often than not, the operator has to perform these tasks during "whiteout" conditions because they often cannot see the roadway, other motorists, or the road furniture (guardrails, signs, curbs, etc.).

Compounding the challenge, after a long shift (often 14-16 hours), the operators are asked to accurately record how many loads of material have been used, the location that they were placed, and the rate at which they were distributed. Driving safely while remembering precise details such as materials used, rates used, and where applied is a difficult and stressful task. Emerging technology can provide tools to relieve some of this stress and assist the snowfighters.

EVOLVING TECHNOLOGY

Snowfighters work together as a team to successfully complete their job. People and equipment must work in concert to maximize performance. Today's technology provides some very innovative tools to aid the snowfighter. Several of these tools are presently being tested in Minnesota. These tools provide the operator with the ability to "see" the roadway under all visibility conditions and automatically record the data from the truck in real time. This will reduce the stress of the operator, accurately record the plow activity, and create a safer roadway for everyone.

The Minnesota Department of Transportation (Mn/DOT) is performing "next generation" winter highway maintenance activities to improve the safety and maximize efficiency for both snowplow operators and the motoring public. Utilizing state-of-the-art Intelligent Transportation System (ITS) technologies, Mn/DOT has centered its research activities on increasing operator safety and enhancing maintenance operation efficiency. The goal is improved roadway safety under adverse weather conditions. These goals are being pursued using advanced vehicle guidance, collision avoidance, ergonomic design features, and automatic vehicle location (AVL) technologies.

SITUATION

Adverse weather can strike anywhere, anytime, impairing a vehicle

operator's ability to see. Low visibility conditions can make an operator's ability to conduct mission critical tasks all but impossible. Typically in Minnesota roads are closed because of poor visibility and not solely because of severe weather. Under these poor visibility conditions the operator's capabilities are greatly reduced, increasing the chances of roadway mishaps. These conditions occur at least once a day (night is considered low visibility), but more often during snowstorms. This limited visibility presents a danger to both the operator and the traveling motorist.

Driver assistive technology has matured to the point where it can be used to enhance drivers' situational awareness during periods of limited visibility, thereby decreasing the risk of an accident (incident) to both the operator and the motoring public.

The myriad of requirements, unpredictability of events, and the nature of the critical tasks associated with snowplow operations demand the marshalling of resources, the integration of emerging technologies, and the focus on human centered solutions. A productive method with which to accomplish this task is through a partnership of government (public sector), academic (research institution), and industry (private sector) entities. In Minnesota, this type of partnership (Mn/DOT, University of Minnesota, and several private corporations) has been formed and is meeting this challenge. The SAFEPLOW and Intelligent Vehicle Initiative (IVI) programs reflect the second and third generations of this partnership.

SOLUTIONS

Mn/DOT has a long history of projects researching operator safety and ITS technology for snowplows. Along with the SAFETRUCK and SAFEPLOW programs, these projects include Safety With Automated Intelligent Locator (SAIL) and Advanced Rural Transportation Information and Coordination (ARTIC) projects for AVL and remote data collection. Presently Mn/DOT is conducting assisted guidance for snowplows on Highway 101 between Rogers and Elk River using differentially corrected GPS for longitudinal and lateral guidance, and a University of Minnesota designed collision avoidance system, which uses Eaton Vorad 300 radar as its primary collision avoidance sensing modality. Trunk highway 19 between Gaylord and Fairfax uses Smart Tape by 3M and a collision warning system by Altra Technologies.

Mn/DOT is the prime contractor on the US DOT Generation Zero IVI Field operational test. For these tests four snowplows, one ambulance, and one state patrol vehicle will be equipped with this driver-assistive system. The IVI project is using Highway 7 from Hutchinson to Minneapolis. Presently (October 2001), there are four snowplows, one state trooper, and one ambulance configured with the IVI hardware.

The nature of a workable solution must focus on human-centered technology that creates driver-assistive systems increasing the safety and productivity of highway maintenance vehicles. This technology is not meant to replace the driver but rather to assist the driver during high stress situations.

Driver-assistive technology as described herein takes two forms. The first form is aimed at providing a driver with information necessary to perform mission critical tasks during periods of low visibility. Essentially, the normal view through the windshield is augmented under low visibility conditions. This view is based primarily on sensory data, which allows the driver to maintain proper lane position and avoid obstacles in a natural and intuitive way. The second form focuses on directly lessening the mental workload on an operator by collecting, processing, and either automatically storing data on the vehicle or transmitting relevant operational data to a dispatch facility. This process eliminates the need for a driver to manually record vehicle operational parameters either during or after a shift.

SYSTEM COMPONENTS

Human-Machine Interface. The human machine interface (HMI) is accomplished using two complementary approaches; the Graphical User Interface (GUI) and the Haptic User Interface (HUI). The GUI provides the location of road boundaries, fixed geospatial elements, and unmapped obstacles to the driver in the proper perspective via a conformal, augmented display. This allows the driver to guide the vehicle under conditions of limited visibility.

The GUI is implemented via a conformal augmented display presented to the driver via a Heads-Up Display (HUD). Using the lateral, longitudinal, and radar sensing techniques described below, a virtual representation of the view out the windshield can be projected onto the HUD. The location of road boundaries, fixed geospatial elements, and unmapped obstacles are provided to the driver in the proper perspective, allowing a driver operator to guide the vehicle safely under conditions of low visibility. This technology was field-tested on the SAFEPLOW during the winter of 2000-2001. The next generation of this technology has proven to be smaller and more streamlined. It is being tested during the fall and winter of 2001.

The conformal augmented display is a radical departure from the norm regarding the display of data to a driver of a road vehicle. This approach is being pursued for the

following reasons:

- This display replicates the typical view out of the windshield.
- This display is intuitive, and therefore eliminates confusion about what the GUI is attempting to convey to the driver. This minimizes training requirements.
- This display eliminates typical human factors issues regarding placement and format of driver display and eliminates the eye muscle fatigue associated with typical dash- mounted displays.
- Because the HUD operates in the normal line of sight, the need to divert eyes from the roadway is eliminated.

The HUI consists of tactile feedback presented to the driver through the steering wheel. At the present time, a "virtual rumble strip" is used to indicate an imminent lane departure. If an undesired lane departure is sensed, the steering wheel oscillates, replicating the steering wheel motion as if an actual rumble strip were being run over. If the improper steering correction is made, the severity of the oscillation increases, indicating to the driver to execute a steering correction in the other direction. To implement this tactile feedback, standard steering gear is modified so a servomotor operates in parallel with human actuation. Motor torque is limited so the human can overdrive the system if he/she so chooses.

Vehicle Positioning and Geospaial Databases. In order to properly project the location of the road boundaries onto the HUD, the vehicle guidance subsystem needs to know the location of the vehicle; its heading, and the surrounding geospatial landscape. Vehicle location is handled by off-the-shelf commercially available differentially corrected Global Positioning system (GPS), or Differential Global Positioning System (DGPS). Vehicle heading is determined by a combination of DGPS, dead reckoning, and Inertial Measurements. The surrounding geospatial landscape is provided by a geospatial database.

Two elements are key to vehicle guidance via DGPS: high accuracy geospatial databases and real time query engines, and a network of sources of differential corrections. Work is underway in both of these areas.

The requirements for high accuracy geospatial databases used for vehicle guidance are substantially different than those for more traditional applications such as highway design and road asset management. In addition to high accuracy, the vehicle computer needs to acquire significant amounts of data in real time with minimal latency. This high-speed access is important because a 100-millisecond delay at 60 MPH translates into a longitudinal positional error of almost 9 feet. Delays of this magnitude cannot be tolerated. To accommodate these requirements, databases and query functions have been structured so that fast access of all pertinent data is achievable.

Finally, wide area coverage of DGPS correction signals is required at the present time to support this vehicle guidance effort. Issues regarding broadcast frequency allocation, correction accuracy degradation due to distance from correction sites, and errors associated with moving from one correction zone to another are all issues being examined at the present time.

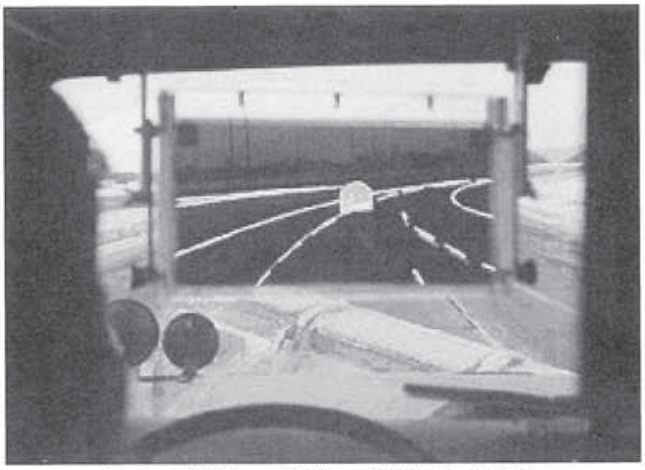
Collision Avoidance. Recent advances in vehicular radar have made possible comprehensive driver assistive systems. The most significant advance has been the ability of forward-looking radar to provide accurate and high-resolution range, range rate, and azimuth information to multiple objects over a wide beam width. This information allows the location of potential obstacles to be projected to the operator in the HUD in the proper perspective. This allows the information to be projected as it is normally seen through the windshield, providing an optimal, intuitive interface to the driver. The driver "sees" the obstacles in the same manner as viewed through the windshield, receiving distance and closing rate information based on the relative size of the obstacle as projected in the screen.

Another significant development is the availability of relatively inexpensive side and rear looking radar. Properly implemented, these side and rear sensors can be used to mitigate the effects of the blind spots associated with optical mirrors. One severe problem snowplow operators have is when vehicles approach the snowplow from behind at high relative speed. These approaching drivers are suddenly subjected to white out conditions, become disoriented, and often collide with a snowplow from the rear or the side. The ability to detect these incoming vehicles can provide a warning to the incoming vehicle (i.e., if a collision is imminent, the radar system can trigger a rear-looking high intensity strobe which can be seen through the snow cloud as a warning to the driver) or provide a driver time to execute a countermeasure (i.e., raise a wing blade to avoid a collision with a vehicle attempting to pass, etc.), which may result in an avoided or reduced-severity collision.

LESSONS LEARNED

The most valuable lesson that we can learn from using these technologies is to include all of the stakeholders into the design, planning, and testing of the systems. Input from the vehicle operators is essential for the design to truly be helpful to the driver when the snow hits the fan. The complexity and cross discipline nature of integrating these technologies makes the driver's input crucial to the success of these types of projects. Modeling and simulators

can provide cost-effective ways of incorporating the driver ideas and reactions to the integration of these technologies with the actual job of plowing snow. There can be no substitute for recording the driver responses and gathering their suggestions for the implementation of this system. This keeps it simple.



Heads-up display on Highway 101 in the Safeplow

There are many other lessons learned from the pilot programs. The evaluation of these projects includes the measurement of the technology issues, the cultural issues, and the value of the outcomes. From the research completed at this stage, the cultural issues have been the most difficult to solve. Issues such as firewall throughput, how to use the data once collected, and then validating the data, that is, ensuring the accuracy, and developing the interface to existing maintenance management software applications.

With respect to the operator interface, overcoming the "big brother" syndrome is quite a challenge. Gaining trust in the technology that the information provided is accurate, true and correct is also a hurdle that will come only from working with these systems every day. For instance, it is imperative that the collision avoidance systems not give "false positives."

Organizational issues also arise with the deployment of new technology. For instance, how is AVL data incorporated into existing software applications (such as weather monitoring systems and map data systems)? When changing from manual logs to automated logs, how does the computer literacy of operators affect productivity? What types of training make the project successful by achieving operator "buy-in" at the management level?

Management asks our drivers to do more and more every year. The equipment is becoming more sophisticated: front plows, wing plows, scrapers ("under body plow"), salt, sand, ant-icing and liquid deicers must be applied. Drivers operate warning lights, blast for intersections, judge material usage from the pavement temperature, determine spread rates, operate manual, automatic, and electric valves, levers, joy sticks, read 3-4 different screens, idiot lights, stay warm, and answer the radio every time the dispatcher calls. On top of that, a fully equipped plow costs $100K with the latest state-of-the-art equipment. To justify this cost, the operator is told to do more with this plow in order to make it cost-effective.

The toughest part of deploying a driver assistive system is getting the operator to accept it. The driver understands that technology is here, and realizes that the young people are not flocking to be snowplow drivers. The operator knows that he has to deal with all of this, and still, he feels the challenge every time it snows.

SAFETY

Technology today has provided a variety of in-vehicle sensors that can collect information on plow activity, weather, events, progress, salt usage, and tag each record with date, time, location, temperature, and others. From this information, what would the driver like to know and what do supervisors want to know that would improve the safety of the driver?

Another source of valuable information is from the data bus (on-board computer) that all new snowplows have installed. These parameters are now resident on the engine bus. The data port can translate the information into a standard RS-232 serial port that allows a straightforward download of over 200 vehicle parameters. Examples are air pressure, transmission fluid level, and coolant temperature, engine RPM, battery charge, and brake status. Is there a subset of very particular parameters that if monitored by a trained mechanic, trained dispatcher/ supervisor, or expert system warning would (that could instead of would?) be issued if a threshold is breached? Can we avoid a dangerous situation, vehicle breakdown, or electrical failure?

CONCLUSION

In conclusion, all of this technology provides a comprehensive tool with which to improve the safety and productivity of the snow-clearing processes. We ask a lot of our operators when it comes to snow removal and responding to different types of emergencies. If roads are kept open longer or can be opened sooner, it will save lives and keep the economy moving. Doing this type of research will pay out in big returns to not only the operators, but also to the traveling public.

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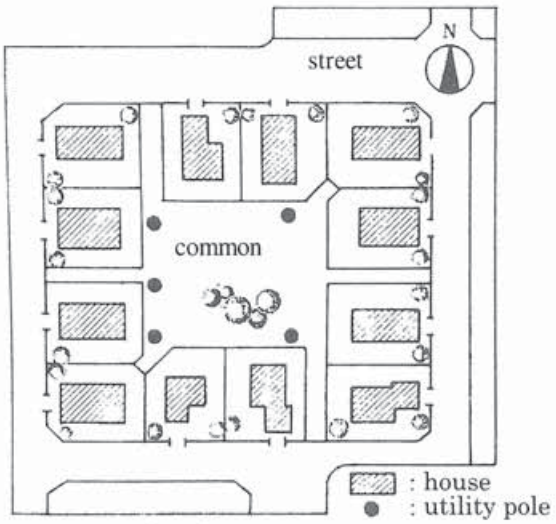
Increasing children's enjoyment of winter & enhancing winter perception

effective use of small open spaces in winter cities neighbourhoods throughout the year

by MASAMICHI ENAI, NORMAN PRESSMAN & ANNIE LÜTTGEN

The physical length of winter cannot be changed, but the extension of winter in our mind can be reduced by changing our lifestyle in the future. When a small open space in a Winter City Neighbourhood is covered with much snow, it is usually not used during the winter season. However, if it is possible to deposit snow in block parks, spontaneous neighbourhood festivals and local celebrations could be organized, with the participation of the inhabitants, all to the enjoyment of the children who generally like sledding on snow slopes, carving snow statues and lighting snow lanterns. Through the children's enjoyment of the winter season, new ways of looking at winter will emerge by acknowledging and integrating winter activities on a daily basis, therefore improving northern lifestyles in the future.

In this paper, from examples in Sapporo, Kucchian and Takikawa, is discussed how to clear and deposit the removed snow from along the streets, in front of garages and entrances; how to organize a snow festival in a block park with local participation and finally what to enjoy in the cold season. It is also proposed how to more effectively use the block park in Winter Cities Neighbourhoods throughout the year.



Site plan of new town Saint-Mortiz

Length of the Winter Season

There are two images concerning the length of the winter season: one on the calendar and the other one in our minds. We cannot alter the physical length of winter on the calendar as we might wish. However, based on Norwegian studies, architects Ralph Erskine and Boris Culjat from Sweden have suggested that the outdoor season could be extended by up to six weeks by easily applying microclimatic planning and design principles. If we had activities in the urban outdoors for one or more weeks during the cold season, we could reduce, in perception, the length of winter in our minds, by simply using microclimatic countermeasures or by enjoying outdoor play activities such as winter festivals. Such practices would decrease by one or several weeks the length of winter in our minds. If children, in winter cities, could enjoy the cold and the snow through outdoor activities, they could overcome many negative factors in winter. If they perceive the winter positively, yet amusing and pleasurable, their parents, their families and the entire community in Winter Cities Neighbourhoods will benefit by feeling winter is neither too long nor too debilitating. Hence, the slow process of changing the perception of winter would be engaged towards improved lifestyles in the future. But in order to achieve this first evolutionary step through the enjoyment of snow and cold by children, urban spaces must be arranged for their use in winter, by dedicating to this function small open areas covered with snow, in Winter Cities Neighbourhoods.

Snow Removing, Clearing and Depositing

In the Bo i Nord-Arctic Housing Exposition of Norway in 1990, snow clearing and depositing guidelines and objectives were as follows:

a) The snow clearing executed by the municipality must be kept to a minimum. The maximum distance between snow deposits should not exceed 150 meters.
b) Snow deposits must be placed in full sun so that melting in the spring is accelerated.
c) There must be room for small private snow deposits.
d) The access to the individual dwellings should be short in order to reduce snow clearing in front of garages, dustbins, mail-

boxes and entrances. Nevertheless, the distances between snow deposits in Sapporo City generally exceed 150 meters. When spring comes, huge deposited snow piles can be seen in the form of large hills along the main traffic arteries in the suburbs.

Such mountains of snow deposits include the removed snow cleared along the streets, in front of garages and entrances for each house, in all neighbourhoods, once or twice in the winter season. Those huge deposits of compacted snow do not normally melt until July, even if human and mechanical power would be supplied. In the case of Sapporo, it is forbidden to use open spaces for snow collecting even if there exist block parks within a capture area of 250 meters. Sometimes neighbourhood parks as well as district parks, have little free space, a specific topography and many trees, street furniture and equipment for leisure and play and thus cannot receive snow deposits. But others, namely block parks, although designed with play equipment, still provide enough space to collect snow from local neighbourhoods.

The cost of snow clearing for roads and streets augments every year according to annual demographic growth and based on intensification of traffic and road building. In Sapporo, the population increased 10% in the last 10 years. But the cost for snow clearing of roads and streets expanded by 80% during the same period. In order to avoid such discrepancies and to create a sustainable lifestyle in the future, the concepts of snow removal and clearing have to be changed and rearranged.

In the case of the block, it is not necessary for the cleared snow to be conveyed to far deposits spaces. If the cleared snow could be conveyed into a block park by trucks, we do not waste energy to convey for long distance.

However, such block parks are usually public spaces and managed by a local self-governing body. The block parks are not common spaces for inhabitants in the block so that they do not freely use them to deposit snow in winter.

Kucchian Town is located in the highest snowfall region in Hokkaido. This city is one of the most famous ski resorts in Japan and has tried new community designs to deal with the snow. One block in New Town Saint-Moritz has a small open space in its centre, as a common area for depositing snow in front of garages, dustbins, mailboxes and entrances. The removal of snow, every morning, by the residents creates a community spirit in winter among the inhabitants. Anyone may be expected to help with snow clearing for the elders and the handicapped. Thus, snowfall, as a negative factor disturbing the daily outdoor activities in winter cities, can work as a cooperative factor for mutual support.

Participation of the Inhabitants

The general block park in New Town Ainosato bears a small mound which is expected to be used as a slope for sledding in winter when covered with snow. But children cannot take advantage of such a slope neither for sledding nor skiing because it becomes dangerously loose if it accumulates too much snow.

The block park offers enough space to receive snow deposits from within the neighbourhoods. This open area can, indeed, be used for cleared snow. Nevertheless, Sapporo City which possesses and manages the block park does not, unfortunately, allow the inhabitants to use it for this purpose. The concern for refuse dumping in the park or the delayed access to it by the late melting of the snow, might perhaps justify this regulation. However, the authors would like to introduce a form of winter participation experienced by the inhabitants in Nakajima-Cho of Takikawa City.

As there is much snow in Hokkaido, it is possible to build a snow sledding slope by using mechanical power, and to carve numerous snow statues for lanterns lighted by children in the coldest season. And if all residents in a block, children, parents and elders join together to celebrate winter, it is possible to generate a snow festival, spontaneously, in any neighbourhood. Then, by the magic of participation and cooperation, the community will give its children lots to discover, appreciate and enjoy in winter.

The Nakajima-Cho example

At first a workshop was organized for planning the local neighbourhood festival. Young volunteers and their parents helped to prepare the festival's schedule of activities. The children of the block attended this workshop in October 1997. In small groups, they discussed and chose what characters they could carve in snow and decided, by themselves, how to light them during the night. It was important for all to attend and make decisions by themselves. The celebration for winter started from this workshop meeting in autumn. Huge amounts of snow removed from the streets, in front of garages and entrances of houses, became a valuable resource for winter celebration. The children could learn about the playful properties of snow through the activities that were developed and in which the entire community participated. Snow can then be used in a constructive fashion and winter can, indeed, be perceived in a positive, rather than negative manner!

Enjoyments in the Winter Season

According to the plan, in order to create a snow slope sufficient for sledding in the block park of

Nakajima-Cho, help by manpower was not required, although support by mechanical power was necessary. The event started on February 7, 1998. After building a suitable slope, the children could play, sled, slide and ski to their greatest pleasure. Then, additional children and residents started to make snow lanterns and carve snow statues in the block park. After sunset, candles in snow lanterns were lighted. The view and the ambience in the block park had undergone a complete change at night, and the residents of the neighbourhood were delighted by its beauty. The block park was now bathed in warm illumination even though the outdoor temperature was extremely low.

As the children have small bodies, it is easy for them to quickly become cold. To warm them up, it is a wise idea, for their parents to prepare hot soup or warm food that they could savour, comfortably sitting in the snow. Obviously, as they expressed it, the children of the Nakajima-Cho enjoyed the winter season, by participating in the organization of their neighbourhood festivals and snow celebrations. After this event, the children would go out to play in the block park all winter long, regardless of the weather conditions. They have learned to tame, appreciate and celebrate winter: their perception of winter has evolved and their future lifestyles are changed from now.

Of course, inhabitants in the block have to make the effort of melting the remaining snow in the park as soon as spring arrives. By spreading charcoal powder on the snow in March, the strong solar radiations of early spring will absorb the powder and melt the snow by the first days of April. With such a concept, small open spaces in Winter Cities Neighbourhoods could be used all year-round.

Conclusions

1) The distances between snow deposits generally exceed 150 meters in Sapporo City. In order to reduce the huge snow deposits, we propose that the block park be used as an open space for collecting the removed snow by the residents, from along the streets, in front of garages and entrances for each house in the block. Such a proposal diminishes the cost for clearing the snow in Winter Cities.
2) Slopes for children to sled, slide and ski should be created in block parks with the removed and deposited snow, so that children could acknowledge, tame and appreciate the winter season. The deposited snow will, therefore, be used as a vital resource for the community.
3) If the perception of shorter winters is desired for the north, snow festivals and celebrations should be organized with the participation of the neighbourhood's residents, so that children could enjoy and celebrate the winter season. For this, urban spaces need to be planned and arranged for the children, by using small open areas covered with snow in Winter City Neighbourhoods.
4) If snow slopes are erected, snow statues carved and snow lanterns moulded from the deposited snow in block parks for children enjoyment, the effort should be made to help melt the snow rapidly in the spring by spreading charcoal powder. Such a concept will, in the future, make a severe winter appear and feel shorter in our minds.

Acknowledgments
The events which were tried in Nakajima-Cho of Takikawa City, were supported by Takikawa City, Civil Committee for Snow in Takikawa and Hokkaido Branch of Architectural Institute of Japan. We thank the Mayor of Takikawa City: Mr. Yoshio Hayashi, the Senior Officer of Takikawa City: Mr. Kazuhiro Ito and Professor Emeritus of Hokkaido University: Dr.Noboru Aratani. Mr.Ito arranged the planning of the events in Takikawa City. Professor Aratani was a Chairman in the Research Subcommittee of Hokkaido Branch and gave us appropriate suggestions about common ownership.

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Good Housing Areas
and good housing policy

by LENE EDVARDSEN

The Norwegian Government's main aim in the housing policy is that everyone should have the disposal of an adequate dwelling in a good housing environment. The Norwegian State Housing Bank has, since it was established in 1946, been the State's main instrument in order to achieve this goal, mainly through its criteria defined for loans and subsidies which defines good planning of dwellings and reasonable use of resources. It has also been essential for The Norwegian Housing Bank to provide good information, guidance and contact with the market.

The Norwegian State Housing Bank has, since it was established, worked actively to promote good housing and reasonable dwellings for the average Norwegian citizen. In 1985 "Good Housing Areas" was put on the agenda. This indicated a new policy within The Norwegian State Housing Bank which meant that focus was turned from demands on single dwellings into focus on whole housing areas and distributing information on good house planning in new and existing housing areas.

The Norwegian State Housing Bank underlines the connection between good living conditions, economical and social development where primary demands are covered within the framework nature sets, and a good housing environment. The physical environment is important for well-being and social security as well as more environmentally conscious building planning can give better housing environments.

Quality and environment is dependent on the fact that each dwelling is part of an overall planning structure. Good planning requires influence on all levels; from planning, projecting and the accomplishment of projects. The local authority has the superior planning responsibility.

The single dwelling is part of a larger physical and social coherence. The possibilities of achieving good housing- and environmental qualities is at large determined by conditions which the single builder cannot influence. The changes from building new housing areas to building in, and improving existing areas, set greater demands on local planning than earlier.

Many local authorities struggle with the lack of capacity and competence to deal with these matters. It is therefore a challenge for the local authorities to make a strategy which, in the long run, will strengthen the planning stage. On the other hand, the established framework and the superior plans will make the procedure for each dwelling easier, and in the next phase save the use of resources and expenses in this particular part of the building process.

The structure in the Norwegian housing sector is mainly as follows;

THE STATE:

- sets central goals and draws the main lines in the housing policy
- establishes laws and other framework factors to planning and building
- uses economical instruments in the building policy, stimulates research, encourages knowledge and information about building conditions and housing environment

THE MUNICIPALITIES

- provide areas for housing in addition to necessary infrastructure
- control that the building activity is in accordance with prevailing plans and regulations
- provide guidance for disadvantaged groups to establish themselves in the housing market

THE PRIVATE SECTOR INCLUDING THE HOUSING COOPERATIVE MOVEMENT

- holds responsibility and risk as builder
- responsible for projecting and construction of housing
- decides means of finance and contributes capital
- administers, maintains and repairs the majority of the aggregate number of dwellings

In the work for environmentally friendly housing the municipality's contribution is vital. The Municipality Plan and its part is maybe the most important administration instrument. In addition, the municipalities approve of regulation plans and other planning documents which are of great importance to the building of housing.

PRINCIPLES FOR GOOD HOUSING MANAGEMENT

A good development plan involves taking existing landscape and green areas into consideration. All groups within the population including different age groups ought to have access to adequate outdoor areas and

a traffic secure environment. Housing areas should not be loaded with noise and pollution. Common areas for different activities and meetings are also a natural part of this. Physically disabled persons should have freedom of movement both within the house and outside. All housing should have a private outdoor area, either as a terrace, balcony or garden. Private and common outdoor areas should be protected against each other for instance by making half-private passages.

Protecting nature and reducing the encroachment is important in order to protect the biological diversity and an environmental friendly housing development. The reduction in green areas is resource-demanding and often causes great repair work. The lack of green "lungs"close to housing areas also causes increased transport demands as people have to leave the housing area to obtain such qualities.

Sun, temperature, wind and precipitation are important factors concerning management and maintenance of buildings and for the amount of energy used for heating. The climatical conditions are also important for the inhabitants' well-being and the quality of the buildings in the housing area. The use of fossil fuel for maintenance and heating creates air pollution. Adequate climate planning is therefore crucial for an environmental friendly housing development as well as obtaining good building traditions.

WHAT IS GOOD BUILDING POLICY?

In order to develop good building policy, totality and harmony in the housing development pattern is equally important compared to the shaping of the single building. Interdependence between building, surroundings and landscape are essential factors in the building tradition. It is important to look at a building as part of a greater coherence, that is belonging to the character of the actual location and in a more restricted sense; the house's relation to the neighbouring house and the local topography.

In connection with new housing, it has to be taken into consideration whether a harmonious unity or contrast and suspense is wanted. Both elements can give successful results if the choice is deliberate. Still, it is more difficult to achieve a wanted result by breaking radically with the existing tradition. The challenge is to create new and exciting houses rooted in the old building heritage. A systematic planning, co-operation between architects, building planners, builders and users often give good building environments with a harmonic and varied framing.

Good housing policy is important in order to create a common identity. This is achieved by underlining the characteristic features of the area and the distinctive character in the local environment. Inspiration and models back in time bring in an important historical perspective. We become aware of the past, the actual basis for the location. Therefore it is important to preserve fine old buildings. New building areas should be in harmony with old ones in order to create a dynamic unity.

In order to look closely upon how good building policy is achieved, it is necessary to look at the house in relation to landscape, climate and building site. It is also important to look at the actual house in relation to surrounding buildings in addition to size and patterns of buildings. Choice of materials, colours and shapes of windows are other aspects of good building policy.

In repairs and extension of existing buildings, it is important that volume, use of materials, roof angles, window shapes and use of colours are taken into consideration. If we want to maintain characteristic features in a certain building area , we will have to take good care of the old buildings which set standards for the regional building policy.

UNDER NORTHERN LIGHTS

The Architecture of Reconstruction – Colourful and Distinctive.

The Architecture of reconstruction represents a unique part of the Norwegian history. It is the physical result of the Government's and the single inhabitant's joint struggle to get the northern part of the country on foot again after the 2nd World War. The architectural reconstruction is also a presentation of new ideas in planning and architecture after they had been tested against tradition and the people's wishes and requirements.

After 50 years of influence, the architecture of reconstruction has become a carrier of identity. For the future generations this valuable cultural heritage can create an anchor to the past. During the last years, we have become more aware of the values which were made shortly after the war.

The Norwegian State Housing Bank has made a multi-vision programme about the planning of housing and repairing of architectural reconstructed houses in towns and densely populated areas in order to focus on the regional building policy in the northern county of Troms and in Finnmark.

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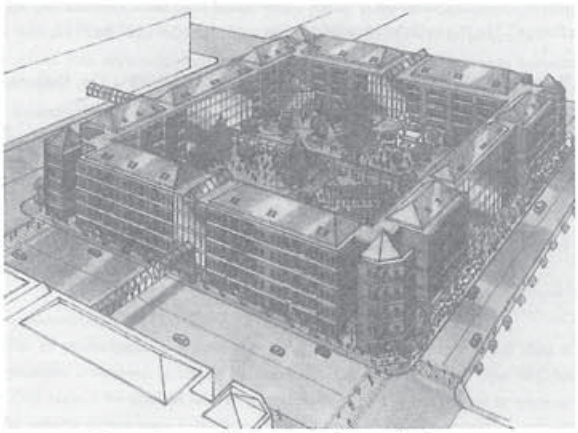
Comfortable Living

in a compact city - Northern regions, where everybody can enjoy an independent life

by TAKAHIRO NOGUCHI

Why the "compact" city?

Compact cities are ideal for the northern regions. The problem with cities which are large in area is that they lack open space and have a low population density. While this may not be a downside for the southern regions with their mild climate, it appears to be a disadvantage in the northeast or northern regions due to such factors as dealing with the snowfall, using heating resources, living in harmony with nature, as well as lifestyle of the elderly.



Future image of apartment houses in Sapporo

To illustrate, let's take a look at how a snowfall is dealt with. Every year, as much as ten and several billion yen is spent on clearing the snow in a big city like Sapporo. The cost becomes exorbitant if we take into account the entire Hokkaido region. Add to this all the cities with snowfall in Japan, and the amount becomes tremendous. Can we keep the costs down? Apparently, the larger the number of towns with a low population density, the higher the cost. In addition, the winter season brings enormous traffic problems. People commuting to school or office during a snowfall have to deal with a heavy traffic congestion. The commute that normally takes 30 or at most 60 minutes will take 2 or 3 hours if it snows. How can we possibly not panic and take it in stride?

The design of the city will have a major effect on the above factors. By and large, in the northern regions with a heavy snowfall, it is best to build compact cities. However, this does not mean that we have to cram a large number of high-rise buildings into a small space. Rather, we have to develop the style and plan the density of the city based on its location. In general terms, how about designing a city with a relatively crowded center and an adjoining residential area where people can enjoy nature? Take a medium-size town, for example. By building apartment houses in the center of the city, we can provide various amenities for daily living as well as an easy access to transportation for the residents. In this way, commuting to office or school or shopping will not be a problem even in a heavy snowfall. In addition, by apartment houses, we save space and facilitate snow removal. And just imagine living comfortably in an adjoining residential area close to nature!

Thus we need to develop a city with this lifestyle in mind. Further, I am going to give you my vision of what northern cities should be like; how buildings should be designed and how the surrounding area should be developed.

Apartment houses are ideal for northern cities

The northern regions are well-suited for constructing apartment houses. In Japan, there has been a dramatic increase in their construction after World War II, beginning with public housing and later privately owned corporation apartments. At present, 40% or more households are estimated to be living in apartment houses. While initially people used to live there temporarily, currently an increasing number of residents choose to stay there permanently. Apartment houses boast a variety of features which detached houses don't have, such as efficient use of land and energy, plenty of open space, durability, and earthquake resistance. All these factors are also crucial for living in a harsh climate with a heavy snowfall. Let's examine these factors more closely.

First, by constructing apartment houses, we cut down on labor when it comes to clearing the snow. If you take detached houses, snow has to be cleared in front of the house and garage. On average, there is a total area of about 20-30 square meters to be cleared. In addition, there might be a sidewalk or roof that need to be cleared also. Over the last few years,

snow removal equipment has become very popular in Hokkaido, but clearing the snow also requires considerable manpower. With apartment houses, it becomes much less of a burden, since all that needs to be cleared in the area outside the entrance is usually done with others routinely. With the garages located mostly inside the building or with heating system, there is no need to clear the snow when you need to drive on a snow day. This has prompted an increasingly large number of elderly people to move from detached houses in the suburb to apartment houses.

Second, with this kind of construction, open space becomes available, which can be used for dumping snow. Generally, it is recommended that snow not be removed. Should there be a need to remove it, it can be dumped nearby in the open space adjacent to the building. At the same time, the open space will let sunlight in, allowing us to use the solar energy for heating. In these ways, open space can be used quite effectively. Trees may also be planted around the building to provide a healthy environment.

Third, it will allow us to lower heating costs. Obviously, heat is much better conserved in apartment houses than in detached houses; this makes heating apartment houses considerably more cost-effective. In buildings with central heating, the cost of piping will also be reduced.

Fourth, plenty of indoor space will become available, creating a favorable environment. In the northern regions, people tend to spend more time indoors due to limited outside activities available in this harsh climate. Children's activities, as well as residents' sports activities, take place inside, so having an indoor space open to the residents will promote an active lifestyle. The buildings can also provide laundry facilities, or an area for work, if necessary, which may be located in the basement or in the common area on the first floor; this would not be feasible in detached houses.

Fifth, there is a connection with garden. It gives no disadvantage for the houses in northern cities in case there needs a separation from the garden. In warmer areas, many of the houses have an ample open space on the first floor adjoining the garden, which is similar to verandas, whereas in cold places like Hokkaido, houses do not commonly have a large opening because of the need to insulate the heat. However, residents of apartment houses need to find some ways to enjoy the nature close to them.

Residents living in the center of the city

In recent years, a large number of people who previously lived in private houses in the suburban area have moved to apartments in the city, which are conveniently located for shopping and transportation. Many of these residents are getting old or retiring. Not so long ago, owning a private house with a garden was a dream for many people, but lately, they have been reconsidering this dream. The main reason for moving from detached houses to apartment houses is "cutting down on clearing the snow." According to a survey conducted by the author and others, more than 60% of the elderly people who moved to apartment houses, cited this as their basic reason for moving. Problems caused by snow are so daunting as to make people move; it also demonstrates that the current detached houses are built without any regard for the snow. This is not a problem if the members of a household are young enough to clear the snow, but the problem looms large for elderly people living on their own. Apart from dealing with the snowfall, "the trouble of maintaining the house and garden" was also quoted as a reason for moving. Apparently, the current detached houses are not suitable for senior citizens.

Conversely, a lot of people who moved to apartment houses cited "easy access to stores and hospitals" as the main reason for moving. Thus we can see again that living in detached houses is hard for the elderly, since they have to get to the hospital or stores on foot.

An increasing number of elderly people are relocating to the center of the city. At the same time, city life also attracts young people. Thus, the older and the younger generation alike enjoy their lives in the center of the city. In the same survey, residents of privately-owned apartments located in the center, gave the following three reasons for moving here - "proximity to the workplace," "convenient transportation," and "a variety of amenities". Residents of apartment houses own fewer cars, and very few people use cars to get to work. A lot of residents said by reducing their commute to the office, they are now able to spend more time shopping, taking walks, or dining. Not surprisingly, over the last years, a growing number of people choose to live in the apartment houses according to their taste of the place or their lifestyle.

The western district of Hakodate - living with friends

The western district located at the foot of Mt. Hakodate is famous for its exotic town and sightseeing. As you step off the crowded main street into an alley, you will see wooden tenement houses adjoining each other. These are the homes of elderly people in their 70s and 80s, most of whom live alone, help each other, and enjoy an active lifestyle. Residents of tenement houses located across from each other are a close-knit group. They visit each other to talk and even share the food they cook. If there are young people in the group, they provide the elderly with support and advice.

The elderly take care of themselves. They go about their daily life, do the shopping, go to the hospital. Fortunately, in this western area, most of the facilities necessary for daily life are within walking distance. As many houses are not equipped with bathrooms, people have to walk to the public bath. The town has a lot of slopes, so as they walk, people can enjoy a beautiful view of the harbor. Should they want to take a rest, they can sit down on a chair or sofa, which are often placed in front of the houses by caring residents.

Some of the residents were invited by their children to live with them in their new house in the eastern district, but within six months many of them returned to their houses in the western area. The reason was simple - they could not live in the new area on their own, since they could not get to any of the facilities on foot. Nor did they have friends. It is not surprising that they returned. Here they have dignity, freedom, and independence. There is a system that supports them, which has special significance for our lives.

Nordic cities - living in apartment houses and in harmony with nature

Helsinki, the capital of Finland, makes an efficient use of apartment houses and at the same time promotes harmony with nature. The center of the city is built up with 6 or 8-storied apartment houses; none of the buildings is higher than that. The city is very compact. There is also an abundance of trees, even in the center. About 10 km from the city center is an apartment complex with trees all around it, so it almost feels like living in the forest. The city called Tapiola is also enjoying such a style of living. Now let's take a look at one of the newest residential complexes called Vuosaari.

This apartment complex is located near the waterfront, about 15-20 minutes from Helsinki by subway. As you get off the subway, you can see scattered buildings, tall trees and, if you walk a little further, a dense forest. The buildings and nature are skillfully blended. By constructing apartment houses, an open space is preserved, where trees are often planted. If you walk further into the forest, you can have a breath-taking view of the bay. The Finns are fortunate to have such a pleasant environment a mere few minutes away from their houses.

Style of apartment houses in the future

We need to develop a concept for designing new cities with apartment houses in northern areas. They should be designed in such a way as to allow the elderly and disabled to live independently, get around on their own; here people will live in harmony with the environment, and maintain their dignity. This is the kind of town we envision for the northern regions.

Close attention should be given to the following areas:

1) Living conditions in the center of the city. There are obvious advantages to living in the city. It takes careful planning to develop both a residential area with apartment houses in the center of the city and the surrounding area, so the residents can live a satisfying life and have an easy access to a variety of public facilities.

2) Ensuring accessibility. Inside the buildings, especially on the first floor, a space should be provided for walking. This area should be designated, from where the elderly or wheelchair-bound residents can easily go outside, even in winter.

3) Providing more services in the buildings. In Sweden and Finland, the so-called service houses are very popular; they provide apartments for elderly residents on the upper floors and facilities, such as a restaurant, library, or recreation room on the first floor. The residents would also welcome such facilities as a post office, store, etc.

4) Enhancing the buildings with additional features. Given that the residents spend long hours inside the buildings in the winter, it is essential to provide heating in the hallways, introduce a southern-style corridor (Gangi), and develop a new housing style.

5) Making the houses more suitable for long-term living. Since more and more residents are choosing to stay in these houses permanently, provisions should be made for enlarging the houses, improving the storage system, and enhancing the surrounding area.

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A visit to the XIth International Winter Road Congress

by FRANK BLUES

PIARC Sapporo JAPAN
January 2002

I was looking forward to my trip to first trip to the Orient. The Conference topics were appealing as a number of the over 200 technical papers, directly applied to current issues in Prince George. I arrived at my Sapporo hotel late at night in this city of 1.8 million people, to find an English speaking hotel receptionist waiting to direct me to my room. My lack of Japanese was a bit of a handicap but manageable.

The next morning I headed out in search of the Sapporo Dome Conference Centre. Unlike North American cities, many downtown Sapporo sidewalks were heated, which made for easy walking in this Winter City. The subway was easy to find with plentiful guide signs. A 15 - 20 minute subway ride took me in the direction of Sapporo Dome. A short walk later I arrived at this new sports arena that is one of the venues for the 2002 Soccer World Cup.

Registration was very efficiently handled. Conference documents included a book of the proceedings extracts, a technical tour outline, a data summary booklet of International Winter Road Statistics, and a CD ROM containing the conference proceedings generally organized under the following topics:

Sapporo Dome with snow shedding roof

- Winter Road Policies and Strategies
- Snow and Ice Management and its Costs
- Winter Road Issues and Traffic Safety in Urban Areas
- Environment and Energy
- Telecommunications Technology
- Development of Snow Removal and Ice Control Technology

After registration, I toured the Sapporo Dome. This facility has a grass playing field that normally sits outside the dome. The grass surface is contained within a shallow concrete tank that holds the soil supporting the grass field. On game day, the concrete structure is floated on a cushion of air and pushed into the dome where it is then rotated into the correct orientation for optimal playing and viewing, and then lowered to the concrete floor of the Dome. The field is moved outside after the game is over. This innovative arrangement permits use of the Dome for large events where a concrete floor surface is desired, while a premium grass surface remains available for major sports venues.

On my daily trips to the conference centre, I was impressed with the pedestrian facilities leading to the Dome. Asphalt sidewalks had a yellow brick inlay to guide the visually impaired. Grooves in the brick permit canes used by the visually impaired to orient themselves in the direction of the sidewalk. Crossings have a "Braille" brick with raised dimples, cast into the brick surface which alerts the visually impaired to danger. The yellow brick trail seemed simple enough. I have found a supplier of the "Braille" brick in British Columbia and hope to be installing this in new sidewalks in Prince George later this year. Additional pedestrian facilities included elevated and heated walkways and stairs that are snow free, in this City that experiences over 5 metres of snow per season. An elevator assists wheelchair users accessing the elevated walkways to the Dome.

During the conference, I learned that approximately 25% of the Japanese population will reach the age of 65 by the year 2020. Many of the pedestrian improvements are the result of planning for this change in demographic. Confer-

ence demonstrations included a pedestrian Intelligent Transportation System (ITS) that uses GPS, palm pilots and transmitters under the "Braille" bricks to guide and inform pedestrians as they travel through the City.

I was particularly interested in the use of geothermal and waste energy to heat roads and sidewalks. Presentations outlined various options including:

- Waste heat from the Underground Transit System is utilized to heat water in a snow melt tank downtown.
- Waste heat from a refuse incinerator is utilized to heat water in a snow melt tank near the incinerator.
- Waste heat in treated sewage effluent at 12° is utilized to melt snow near a sewage treatment plant.
- Heat is extracted at 30 metres depth from the ground through concrete pile foundations. Heat from the "warm" ground is compressed using heat pumps and is directed through piping under a sidewalk adjacent to the building to melt snow.

The increasing cost of energy, the desire to reduce greenhouse gas emissions, and Japan's objective of "barrier free" mobility, appear to have driven this widespread level of innovation in the utilization of waste heat.

One of the conference highlights was the first class exhibition and equipment show. With hundreds of international exhibitors and numerous large equipment demonstrations, that was a feast for the senses. Specialty equipment from a one-man snow melter for residential use, to specialized highway truck plows and snow blowers. This exhibition will be hard to surpass.

There were a number of opportunities to visit with conference delegates from around the world, where exchanges of ideas and opinions can broaden the mind and boost the spirit. I felt this trip was an excellent investment for my employer where years of experience and research can be obtained at a fraction of the cost of developing these processes at home. Contacts developed can also assist in providing advice in uncharted territory before hard-earned dollars are expended.

PIARC information can be obtained at their web site at http://www.piarc.org/

City staff at the City of Sapporo very kindly arranged for a post conference tour of some of their facilities that time did not permit during the conference. Seeing these facilities first hand and meeting the people that run them, is important in fully appreciating the infrastructure supporting snow and ice management. The City of Sapporo is a leader in the application of these underutilized energy sources. I could not help but admire the degree of planning and commitment by the City of Sapporo, to excel in the snow business, from brochures outlining City plans, services and policy, to the staff who take great pride and care in the delivery of service to their citizens.

My hat is off to the Organizers of the XIth, PIARC Conference, and to its host City, Sapporo - a job well done!

Elevated and heated walkways with yellow bricks and elevator/heated stairway at mid-right

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Sapporo

by DEENA HARAGAN

Located on the island of Hokkaido in the north of Japan, Sapporo is a unique city of 1.83 million blessed with nature and distinct seasons. Sapporo is the fifth largest city in the country and plays an important role as the cultural, economic, and political center of northern Japan. Overseas it is often known as a host city of the Winter Olympics and the birthplace of historic Sapporo Beer.

View of Sapporo

Situated at 43° north latitude and 140° east longitude, Sapporo has snowy winters and mild, pleasant summers. In the year 2001, the annual mean temperature was 9.0°C, the highest temperature 36.0°C, and the lowest temperature -14.7°C. Average snowfall is approximately five meters.

Sapporo is a relatively new city, with a history of approximately 130 years. It was the center of the reclamation of Hokkaido during the Meiji era in Japan and the colonization commission was located here. During the reclamation period, experts in the fields of agriculture, industry, and education were invited from overseas, and Sapporo developed using the knowledge and technology they brought. This influence has given Sapporo a very "western" feel in comparison to older Japanese cities.

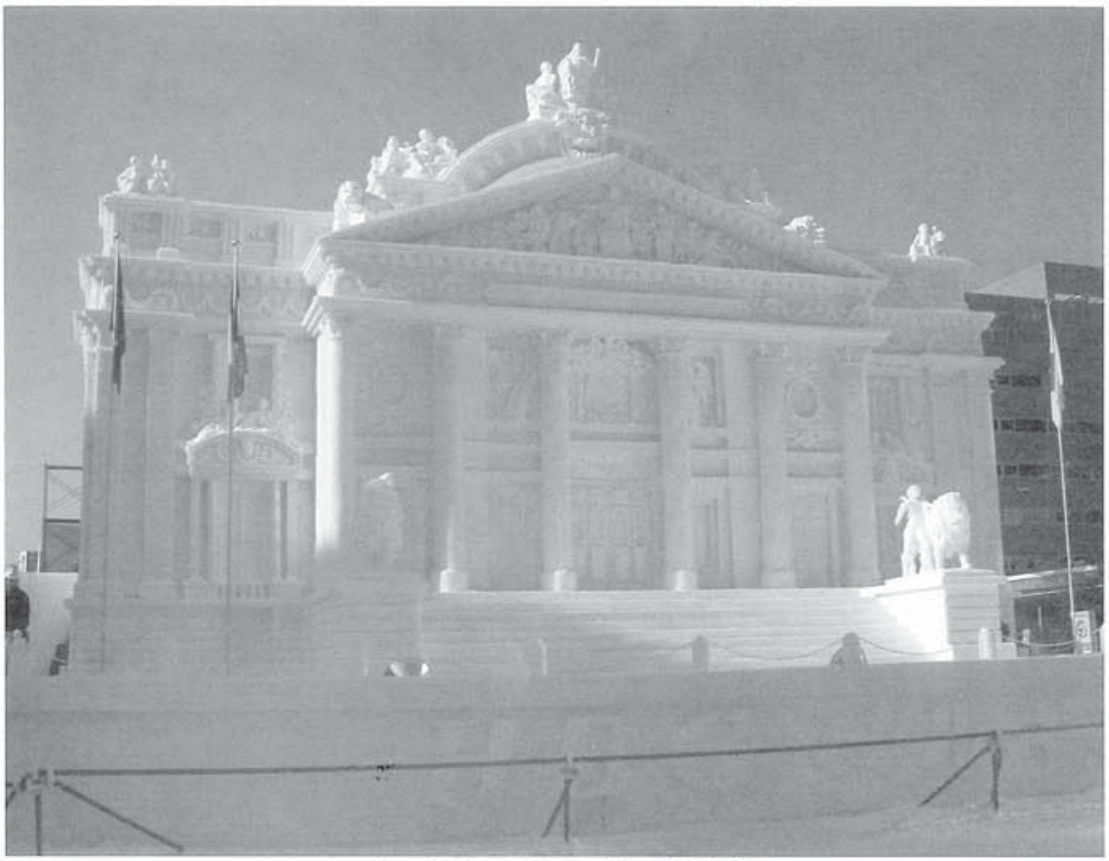
One thing that has remained the same throughout the city's history is its abundant nature and striking natural beauty. More than 60% of the city is mountainous with lush greenery. Mt. Moiwa and Mt. Teine lie relatively close to the city center and are popular destinations for hikers in summer and skiers in winter.

The city's numerous parks also provide endless recreational opportunities for citizens. Odori Park stretches from east to west through downtown Sapporo and offers a place for residents and visitors to relax. Sapporo Art Park in the city's suburbs features outdoor sculptures that can be enjoyed even in winter. Moerenuma Park, designed by the legendary sculptor Isamu Noguchi, is also located in the city.

In addition to abundant nature, Sapporo's citizens enjoy a large variety of cultural institutions and events. Music lovers flock to the Pacific Music Festival every summer, initiated by Leonard Bernstein and featuring young musicians from all over the world. The Hokkaido Museum of Modern Art has a well-known collection of modern glassworks as well as prominent permanent and temporary exhibits. Music performances take place throughout the year at the highly praised Sapporo Concert Hall "Kitara" in Nakajima Park. Sapporo Museum of Sculpture and Hokkaido Museum of Literature are two of the other cultural facilities available in the city.

Sapporo has many vivid festivals marking the seasons. Yosakoi Soran Festival began ten years ago and has evolved into the city's largest summer festival. Sapporo Snow Festival is world famous and over two million visitors come every year in February to see the snow and ice sculptures that adorn the city. Other major events include the Hokkaido Shrine Festival, Sapporo White Illumination, and Sapporo Lilac Festival.

Winter is harsh in Sapporo, and snow removal is challenging for citizens and the government alike. However, the citizens of Sapporo



Snow Sculpture - Sapporo Winter Festival

have used wisdom and ingenuity to make winter an enjoyable and livable season. The Sapporo Snow Festival is one way winter is enjoyed, and the ski grounds and ski jump stadiums located in the city enable citizens to have fun in the snow. Sapporo has also been working to develop and promote technology and industry related to heavy snowfall and cold region issues.

Sapporo's efforts to develop a more livable winter city led to the establishment of the International Association of Mayors of Northern Cities (IAMNC) by former Sapporo Mayor Itagaki Takeshi. This organization was formed as a network of the world's winter cities and the first conference was held in Sapporo in 1982. Conferences are held once every two years, where member cities, academics, and experts discuss and exchange ideas on issues of concern to winter cities. Presently there are 19 member cities and Mayor Katsura Nobuo of Sapporo serves as chairperson.

Sapporo's contribution to the international community, however, does not stop with the IAMNC. Sapporo has hosted many international events such as the 1972 Winter Olympic Games, Winter Universiade, and Asian Games. The all-weather Sapporo Dome opened in June of 2001 and is the venue for three games of the FIFA Soccer World Cup in June 2002. Additionally, the Sapporo Convention Center, with an expected completion date of 2003, will further increase the number of world-class conventions held in the city each year. Sapporo's sister-city relationships with Portland (Oregon, USA), Munich (Germany), Shenyang (China), and Novosibirsk (Russia) also give citizens many opportunities to learn about foreign countries and participate in exchange programs and events.

Japanese consistently cite Sapporo as one of the most desired places to visit in Japan, and Sapporo aims to preserve its reputation and charm while developing in fields of sports, events, fashion, arts, culture, tourism, and information technology in order to play an even more active world role in the future.

Deena Haragan is Co-ordinator for International Relations, International Relations Department, City of Sapporo. She is a participant on the JET program and has been working for the city since July 2000. She works on IAMNC-related projects, visits schools to talk about the United States, teaches English to emergency response workers and organizes and participates in international exchange events and projects related to sister cities.