



---

# RETEC

## TOOLING FOR THE 90's

---

### CONFERENCE PAPERS

**September 14, 15, 16, 1987**  
**Toronto, Ontario, Canada**

*Sponsored by*



Society of Plastics Engineers  
Ontario Section  
The Mold Making and Mold Design Division  
SPE

---

# TABLE OF CONTENTS

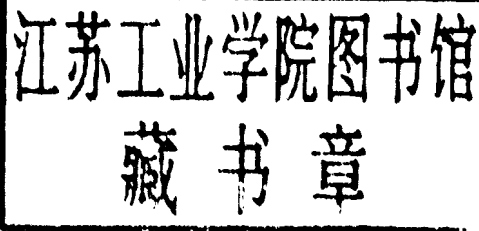
---

## INTERNATIONAL

- 187-110      International Moldmaking  
                 *Robert W. Shaw - Shaw Intercontinental Corporation*
- 187-120      How U.S. Mold Makers Can Face Overseas Competition  
                 *James Meinert - Snider Mold Company Inc.*
- 187-130      The Offshore Tooling Decision  
                 *William J. Tobin - Hewlett Packard*
- 187-140      The Mold Making Industry In Portugal  
                 *Portuguese Trade Commission - U.S.*

## TECHNOLOGY

- T87-150      Computer Simulation of Shrinkage and Warping  
                 *George T. Forbes - Moldflow Pty. Ltd.*
- T87-160      Computer Modeling of Injection Molding  
                 Key Points for the Industrial User  
                 *Ernest C. Bernhardt - Plastics and Computer Inc.*



## MOLDING SYSTEMS

- MS87-170      Design of Hot Runner Systems  
                 *Trefor Jones - Husky Injection Molding Systems Ltd.*
- MS87-180      Family Mold with Dissimilar Parts Produced by Valve Gating Methods  
                 *Kurt Gauler - Incoe Export Inc.*
- MS87-190      Kona Hot Runner Systems  
                 *Paul Swenson - Kona Corporation*
- MS87-200      Advances in EDM  
                 *Don Moulton - Sodick*

---

# Retec Program

Tooling For The 90's

---

Tuesday, September 15, 1987  
Moderator: Michael Urquhart

- 9:00 - 9:30      International Molding Making  
                     Robert W. Shaw - Shaw Intercontinental
- 9:30 - 10:00     How U.S. Mold Makers Can Face Overseas Competition  
                     James Meinert - American Mold Builders Assoc.
- 10:00 - 10:30    Molds Built in the Pacific Rim  
                     William Tobbin - Hewlett Packard Co.
- 10:30 - 10:50    Break
- 10:50 - 11:20    The Mold Making Industry in Portugal  
                     Portuguese Trade Commission - U.S.
- 11:20 - 12:00    U.S.-Canadian Mold Makers Situation  
                     Ron Hayter - SPI Canada  
                     Frank Marra - Marra International Associated
- 12:00 - 2:00     Lunch  
                     Speaker TBA

Moderator: Glenn Beall

- 2:00 - 2:30      Computer Simulation of Heat Transfer and Warpage in Molded Parts  
                     George T. Forrest Jr. - Mold Flow Pty Ltd.
- 2:30 - 3:00      Computer Modeling of Injection Molding Key Points for the Industrial User  
                     Ernest C. Bernhardt - Plastics & Computers Inc.
- 3:00 - 3:30      Improvements in CAD/CAM  
                     Robert Baker - McDonnell Douglas
- 3:30 - 4:00      Integrated Computer-Aided Design, Engineering and Manufacturing of Plastic  
                     Parts and Molds  
                     Ray Townsend - G.E. ICADEM
- 4:00              SPE Mold Makers Business Meeting
-

---

Wednesday, September 16, 1987  
Moderator: Ken Christian

9:00 - 10:10	Hot Runner Panel Discussion Trefor Jones - Husky Injection Molding Systems Ltd. William F. Schmitz - Fastheat Ken Reid - Incoe Corporation Paul Swenson - Kona Corporation
10:10 - 10:30	Break
10:30 - 11:00	Future Trends in Machinery Keith Law - Cincinnati Milacron
11:00 - 11:30	Advances in EDM Sodick Incorporated
11:30 - 12:00	New Developments in Resins for Automotive Molding Richard Brooks - Dupont Automotive Development Centre
12:00 - 2:00	Lunch Speaker John R. Kretzschmar - SPE International

---

# 1987 CAD Retec Committee

---

Ken Christian	General Chairman
Michael Urquhart	Program Chairman
Paul Peterson	Registration and House
Mike Newman	Treasurer
Karen Wolfe	Promotion
Dennis Taylor	
Don Yellow	
Ralph Nunnaro	

---

## International Mold Making

### abstract

This presentation will discuss the trends in mold procurement over the last 8 years. The facts concerning the numbers of molds that are imported and exported from the USA will be shown and discussed.

### author

Robert W. Shaw  
- Shaw Intercontinental

### conference

Retec - Tooling for the 90's  
September 14, 15, 16, 1987  
Toronto, Ontario, Canada

### sponsors

Society of Plastics Engineers, Ontario Section  
Mold Making and Mold Design Division, SPE

INTERNATIONAL MOLD MAKING

BY  
ROBERT W. SHAW

SHAW INTERCONTINENTAL CORPORATION  
216 C-1 STELTON ROAD  
PISCATAWAY, NJ 08854

TITLE: International Mold Making

AUTHOR: Robert W. Shaw  
President-Shaw Intercontinental Corporation

#### Biographical Sketch

-----

Mr. Shaw is a graduate of the University of Lowell holding a B.S. in Plastics Engineering. He, also, has a MBA from Fairleigh Dickinson University with a major in Marketing. His work experience includes positions with Fisher Price Toys, Lego Systems Inc., Knickerbocker Toy and Johnson & Johnson Baby Products Company. The positions he has had with these companies range from entry level engineer, operations manager, and Director of Product Development and Engineering. In these positions, he has been responsible for taking product from concept through manufacturing. He has spent many years involved with International mold making in order to source tooling for products to be manufactured in the US and overseas.

#### TEXT: Introduction

-----

This presentation will discuss the trends in mold procurement over the last 8 years. The facts concerning the numbers of molds that are imported and exported from the USA will be shown and discussed.

Many of you are here today because of your concern about the import of molds into the USA. The factors which play a large part in these procurement decisions are:

Capital	Import Duties
Equipment	Exchange Rates
Labor	Price
Energy	Quality
Raw Material	Delivery
Mold Components	Relationship

These issues are weighed by each of you in order to make decisions which impact on the production of new products. Our business is an international business in which we have to serve an international client base as well as domestic. We have spent an extensive amount of time reviewing and working with domestic and international mold making facilities to satisfy the demands by our clients.

We can say that tools are bought on the international market for many reasons. However, the main reasons are capital, quality and delivery.

The demand for injection molds in the US continues to be high and non-US mold makers are more than eager to supply the market. Canada, Portugal, and Japan are the top three on the list of countries whose mold makers have done a substantial amount of business in the USA in recent years. Twenty or more countries also have been involved to a lesser extent.

There have been a couple of studies done over the last couple of years to determine how much business is lost to overseas competition.

One study was conducted by the Society of Plastics Engineers and the American Mold Builders Association to survey their members about losses to foreign competition. During the summer of 1984, the SPE surveyed 1600 captive and custom mold making professionals. There was a 9% response. The American Mold Builders Association surveyed 180 custom mold makers and received a 34% response rate. The combined responses equalled 11%.

The survey questionnaires were broken down by company size (annual net billings).

Company Size	Average Loss to Foreign Competition
-----	-----
\$10 million and over	\$895,000.
\$5-\$10 million	910,000.
\$2-\$5 million	552,000.
\$1-\$2 million	355,000.
Under \$1 million	213,600.

The data tended to indicate the companies which were less well equipped were losing the most business especially on a percentage basis.

It is, also, interesting to note the 25% of those who did respond to the survey indicated they only built molds for their own use, that the survey did not apply to them, or that they were not aware of having lost work to foreign competition.



The other 75% had lost work to foreign competition. The survey asked for the types of markets the business had been lost to on a dollar volume basis. The largest losses were in electronics, automotive, housewares (including appliances and toys). and medical devices and packaging respectively.

There we have one perspective. Now we should look at the data compiled by the US Department of Commerce. The largest source of molds imported into the United States measured in dollars is Canada. Portugal and Japan are a distant second and third respectively. The US Department of Commerce keeps their records in dollars vs # of molds. They also keep separate records for injection, compression and blow molds. They list the top 20 countries and lump the rest into an all other category.

There has been very little information about the competitive situation of American mold makers vs Portuguese and Japanese mold makers. However, the competitive situation between US and Canadian mold makers has been studied in some detail. A subcommittee of the US House of Representatives requested in August 1983 that the US International Trade Commission conduct a study of the competitive conditions relating to the importation of industrial molds into the United States from Canada. The report on the completed study was given to the subcommittee and published in April 1984 (USITC Publication 1522).

I would like to review some of the findings in the report. Prior to that I would like to point out that the report demonstrated that Canada and the United States are each others most important trading partners for the import and export of molds.

The findings indicated that the US export of molds declined in 1982 and 1983 after having increased during 1979-1981. Canada was the US largest foreign export market for molds and parts. They received 40% of these exports.

At the same time, Canadian exports of dies and molds for plastics industry increased during 1979-1983. The largest market is the US automotive industry.

The United States is the largest market for Canadian produced dies and molds for plastics. Canadian exports of these products increased from \$69 million in 1979 to \$108 million in 1983. It is estimated that more than half of all Canadian shipments of dies and molds for plastic are exported to the United States.

These next facts are some of the most interesting. During 1979-1983, the United States was the world's largest exporter of industrial molds, followed by West Germany. France being a distant third. During the same period, US imports increased annually from \$134 million in 1979 to \$174 million in 1983 (30% increase). In 1983, Canada was the largest source of such imports (54%) followed by Portugal (11%) and Japan (8%). However, the ratio of molds imported into the United States to all molds bought for US industrial use stayed at approximately 10 percent.

The most significant cost advantage enjoyed by Canadian manufacturers is in wages which typically account for 65 to 70 percent of the total production costs. The Canadian wages were about 21% lower than their US counterparts in the north-central US. This fact was further highlighted when US purchases of molds where asked about their considerations for buying molds in the US and Canada. They indicated price, delivery and established supplier relationship. The most important factor in making a Canadian purchase, according to the ITC questionnaire respondents, was the lower price offered by the Canadian mold maker.

There is a 4.5% duty rate charged by the US on Canadian imports while an 11.4% duty is charge on US imports entering Canada.

In 1984, the United States imported \$84.4 million of molds from Canada, \$22.4 million from Portugal and \$10.1 million from Japan. The US exported \$24.7 million to Canada, 0 to Portugal and \$700,000 to Japan. The imports from Portugal and Japan are only about 1/3 of the imports from Canada. Again, Canada is the most important trading partner.

From our experience, we find that tools are bought on the international market for many reasons. Not only are tools bought from lower cost and quality sources but, also, from high cost and quality sources. Again, I can go back to the fact that during 1979-1983, the US was the largest exporter of molds. But during this time, there was a 30% increase in export dollars for molds, but overall levels of import dollars hovered at 10%.

Many international tool sources exist mainly because of their export market. Their economies are geared to exports because they have little internal capacity to use their end products. Here in the US, we have a large capacity to consume molds and have largely responded to that need. However, the demand for tooling outstripped our ability to provide a service in a timely and cost effective fashion to support new product introductions especially in electronics, housewares, etc. Therefore, we began to search for alternatives to get to market faster and cheaper. Also, we needed to upgrade the facilities in the countries where the product was being manufactured.

We found that, being late 3-4 weeks, <sup>g</sup>become the norm rather than the exception. This further produced delays in product introductions.

What we have failed to realize is that there are a lot of people in this world who are willing to work extremely hard to help themselves. We have experienced the following situation. A tooling program being built in a domestic tool shop, and it is behind schedule, but the tool makers continue to leave at the end of the shift. No effort is made to keep to the schedule. In fact 3-4 weeks late should be acceptable. When business is placed with someone who wants your business, you expect to get service. We have experienced that our international sources have extended themselves and deliver the goods on time and to quality specifications 95% of the time. In those cases where they do not, they at least put in the extra effort. There is no good reason why a domestic shop could not do the same because we have the capability, but we just do not have the desire.

The major economic reasons for internationally sourced tools are not under the control of the tool makers' "Labor rates, interest rates, etc." Highly educated skilled labor and technology advancements are where we have an advantage. We have found that tools which are very basic and have a limited amount of labor content are priced competitively around the world. However, the more demanding the technology and sophistication of the tool, the advantage shifts to those with technology and skill as can be seen by the exports of the US and West Germany (the two largest exporters of tools). That being the case, everything should be done to enhance our delivery of highly demanding tools to international standards.

An encouraging finding of the ITC study was that US mold makers are taking advantage of CAD/CAM equipment capabilities in such a way as to give them a competitive advantage.

We have found that certain types of tools are best sourced in certain countries. In these cases price was not the consideration, but production performance was.

We feel international mold making competition is here to stay. Therefore, we must accept fair competition and fight unfair competition.

A healthy acceptance of international realities and a willingness to go for facts to get a handle on the situation will be in order for years to come.

**Table I. Injection molds used for rubber or plastics: U.S. imports for consumption, by principal sources, 1979-84 (in thousands of dollars)**

Source	1979	1980	1981	1982	1983	1984
Canada	51,828	53,319	55,182	51,811	68,653	84,449
Portugal	8,748	9,684	8,312	11,595	14,320	22,402
Japan	4,135	4,063	8,836	5,555	7,044	10,052
Italy	3,628	2,765	2,490	3,300	4,160	3,799
Australia	2,478	2,234	2,914	4,928	3,795	5,197
Hong Kong	1,764	1,791	2,055	2,637	2,311	3,205
Switzerland	2,396	640	3,031	3,435	2,112	1,046
United Kingdom	1,050	1,318	1,050	1,806	1,694	968
West Germany	2,575	2,458	1,522	1,721	1,644	2,515
China (Taiwan)	261	574	596	894	1,259	2,783
All other	4,595	5,316	4,778	4,574	3,572	6,207
Total	83,457	84,162	90,767	92,254	110,564	142,623

Source: Compiled from official statistics of the U.S. Department of Commerce. TSUSA No. 6801210

**Table II. Compression molds used for rubber or plastics: U.S. imports for consumption, by principal sources, 1979-84 (in thousands of dollars)**

Source	1979	1980	1981	1982	1983	1984
Canada	1,872	1,405	3,034	2,328	3,126	4,632
United Kingdom	7	10	72	29	185	
Italy	72	104	56	28	104	191
Austria	6				92	171
Korean Republic	1		33	38	65	174
China (Taiwan)	3		42	1	45	
Denmark	1				43	
Portugal	25	44	65	12	29	
France	20	4	5		25	
Australia		29			13	
All other	96	309	47	178	31	1,199
Total	2,102	1,905	3,353	2,613	3,759	6,367

Source: Compiled from official statistics of the U.S. Department of Commerce. TSUSA No. 6801210

5

**Table III. Blowmolds used for rubber or plastics: U.S. imports for consumption, by principal sources, 1979-84 (in thousands of dollars)**

Source	1979	1980	1981	1982	1983	1984
Canada	1,186	3,387	3,877	3,738	5,758	5,506
Japan	324	129	139	118	277	326
Portugal				15	150	
West Germany	60	50	8	14	126	284
Switzerland	10	14	8	59	98	141
Mexico					25	
Australia			1		17	
Austria					13	
Italy		18	124		10	
France		36	6	2	9	
All other	83	47	33	53	11	166
Total	1,663	3,681	4,197	4,000	6,492	6,423

Source: Compiled from official statistics of the U.S. Department of Commerce. TSUSA No. 6801220

**Table IV. U.S. exports of plastics molds, total/type, 1980-84 (in thousands of dollars)**

Molds	Type	1980	1981	1982	1983	1984	Value 84/83
6801310	Injection molds used for rubber or plastic materials (47 markets)	49,374	54,827	56,024	58,683	56,264	.959
6801330	Molds for rubber or plastics (75 markets)	30,775	34,148	30,724	28,487	27,798	.976
	Total	80,149	88,975	86,748	87,170	84,062	

Source: Bureau of the Census IM-246. Compiled by Eugene F. Shaw Jr.

**Table V. Injection molds used for rubber or plastics: U.S. exports of domestic merchandise, by principal markets, 1979-84 (in thousands of dollars)**

Market	1979	1980	1981	1982	1983	1984
Canada	15,967	20,942	29,660	25,395	29,772	24,679
Mexico	5,468	6,978	7,914	12,006	13,822	14,020
West Germany	2,236	2,500	2,921	3,285	2,638	2,959
Hong Kong	1,050	954	1,959	2,392	1,717	1,272
United Kingdom	2,002	8,574	1,277	1,425	1,478	1,774
China t	262	322	857	879	1,187	927
Belgium	951	822	1,089	447	1,020	384
Venezuela	448	536	479	607	932	1,122
France	547	960	2,121	1,050	876	1,259
Japan	1,203	765	841	270	568	694
All other	4,666	6,020	5,710	8,268	4,675	7,174
Total	34,800	49,374	54,827	56,024	58,683	56,264

Source: Compiled from official statistics of the U.S. Department of Commerce. TSUSA No. 6801310

**Table VI. Other molds used for rubber or plastics: U.S. exports of domestic merchandise, by principal markets, 1979-84 (in thousands of dollars)**

Market	1979	1980	1981	1982	1983	1984
Canada	10,557	12,718	12,981	10,482	13,225	12,795
Mexico	4,688	4,121	5,469	5,729	4,605	3,816
United Kingdom	1,784	1,129	1,160	778	1,417	1,568
Venezuela	1,537	1,505	2,690	2,667	928	901
Ireland	164	197	664	1,650	842	1,473
Hong Kong	291	428	635	1,520	627	463
Singapore	73	133	232	136	555	233
Australia	253	491	308	525	545	200
Colombia	265	66	389	466	522	313
Japan	438	320	411	476	481	806
All other	7,180	9,668	9,210	6,293	4,740	5,230
Total	27,230	30,775	34,148	30,724	28,487	27,798

Source: Compiled from official statistics of the U.S. Department of Commerce. TSUSA No. 6801330

BIBLIOGRAPHY: Offshore MoldMaking:  
Unfair Competition?  
By Merle Snyder  
Plastics Machinery & Equipment Magazine  
HBJ Plastics Publications  
Denver, Colorado 80218



## How U.S. Mold Makers Can Face Overseas Competition

### abstract

This paper will discuss how North American mold makers can become and remain competitive without the protection of tariffs and duties.

### author

James Meinert  
- Snider Mold Company, Inc.

### conference

Retec - Tooling for the 90's  
September 14, 15, 16, 1987  
Toronto, Ontario, Canada

### sponsors

Society of Plastics Engineers, Ontario Section  
Mold Making and Mold Design Division, SPE